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Oral health behaviors and beliefs: A basis for oral health care in Africa

Daugherty, Karen Ruth Ortlip, Ph.D.

The Ohio State University, 1987

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ORAL HEALTH BEHAVIORS AND BELIEFS:
A BASIS FOR ORAL HEALTH CARE IN AFRICA

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By

Karen Ruth Ortlip Daugherty, B.A., B.S., M.S., M.A.

* * * * *

The Ohio State University
1987

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Approved By
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With love and gratitude I dedicate this dissertation to four very special people: W. Henry and Elizabeth Ortlip and Shoff and Sue Daugherty.

My parents, long before my birth, committed their lives to God. This decision had a tremendous impact on their lives and mine. It led them to work as missionaries in China prior to my birth, then in Haiti where I grew up. Consequently, as a child I saw my parents dealing with the universal problems of poverty, physical suffering, and spiritual ignorance. There were no easy solutions then and there are none now, but I saw lives changed when people grasped the truth that there is a Creator-God Who cares and Who loves mankind deeply. I thank my parents for showing me that purposeful living is based on serving others. In addition, their lives demonstrated contentment not in the pursuit of material things but in holding to those deep truths that sustain us through the valleys and mountains of life. Their faith over the years has vividly illustrated to me that, "Every word of God is pure; He is a shield to those who put their trust in Him." (Proverbs 30:5)

My parents-in-law, long before I knew them, committed their lives to God and followed a similar path of service in the United States. The choices they made, likewise, had a profound impact on their son's life. Their willingness to help others physically and spiritually and their interest in the needs of those outside their circle of friends set a pattern. I thank my parents-in-law for their consistent example of choosing to do that which was right over that which was convenient. For their influence on my husband's life and for their continued support of our lifework I am deeply grateful.
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I thank Dr. Alfred C. Clarke, my advisor, and Dr. Simon Dinitz and Dr. Grayce M. Sills, members of my reading committee, for their examples of scholarship and teaching at its best and for their efforts and encouragement on my behalf. Dr. Clarke deserves special credit for urging me to explore a research topic in Africa. His consistent trust in my ability and the freedom he gave me to pursue the inquiry, far from his control, made the research possible. Dr. Dinitz, whose deviance course introduced me to the sociology department, showed me that sociology can be extremely interesting, relevant, and practical. Dr. Sills, as my professor in the graduate nursing program, sparked in me a desire to learn and directed me into sociology. A heartfelt thank you goes to all three.

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I especially wish to thank the people of Nanga Commune for their willingness to participate in this research project. For reasons of confidentiality they remain unnamed, but their contribution is firmly planted in my memory. I also thank the authorities of the Central African Republic government who granted authorization at the national and local levels for this research. Their cooperation was appreciated. In addition, I thank those who eagerly gave of their time as knowledgeable informants.

Without the help of Changement Maurice as translator, this research would have been impossible. His language ability in French, Sango and Suma and his relationship with the people were valuable assets to the data-collecting phase of this project. Many others assisted in numerous ways: typing the first two chapters—Isaac Kpademona; making maps and bibliography cards—Cecile Dullin; helping with cooking, household chores and babysitting—Abel Passi, Michel and Felix Wermenji, respectively. Lila Sheely's offer to sell her computer and orient me to it came as a surprise. She realized better than I how many hours would be saved in writing and editing. Margaret Hull's encouragement and editing abilities were greatly appreciated. I also want to thank Ann Lakes for editing the last two chapters. Jenifer
Roulette's word processing expertise and adeptness at making editorial changes was an asset for meeting manuscript deadlines. Charlotte Callahan and Mary Ann Ruffing-Rahal provided an indispensable service by sending me library materials with record efficiency. I also thank Sophie Gerlach of the World Health Organization Library for the services she rendered.

A special thank you goes to the World Health Organization Oral Health Unit and specifically to J. Sardo Infirri, M. H. LeClercq, and Peter Deleous. Their suggestions prior to starting the research and the materials and technical assistance supplied for the oral health survey made that aspect of the research project possible.

Collecting clinical data from 322 subjects was not an easy task. I thank the dental auxiliary students Etienne Feidangawei, Marc Merdet, and Daniel Lazare for their help. David S. Daugherty, D.D.S., merits commendation for his perseverence for what was at times a hot, tiresome, and exhausting job.

I would like to thank Grace Brethren Foreign Missions, my employer, for allowing me to undertake this research. The support I received from the Board of Trustees and from Tom Stallter, the Central African Republic Field Director, was reassuring.

Some very special friends have assisted me over the years in tangible and intangible ways. Judy Golec, Joan Neff Gurney, and Patrick Gurney, as colleagues at the Disaster Research Center and in the Sociology Department, forged the path ahead, showing me that it can be done. I am especially indebted to Judy who shared encouraging words with me on several occasions and whose dissertation was an inspiration and also an example that a case study can be an acceptable piece of research in these days of whirling computers and regression coefficients. A help throughout the dissertation process and during the early stages in particular was David Sternberg's book, How to Complete and Survive a Doctoral Dissertation. I highly recommend it. Eileen Ortlip graciously offered me the use of her home during the final days of writing. I am deeply grateful. Three individuals took chapters home to be mailed to my advisor. I thank Cecile Dullin, Margaret Hull, and Larry Warnemuende for willingly carrying the extra weight and going to the trouble of mailing the manuscripts. A host of friends have prayerfully supported this project. Thank you. Last but not least are my missionary colleagues in Africa—those persons who shared their concern and encouragement during the writing phase of this endeavor. Rosella Cochran, Jim and Martha Hines, Margaret Hull, and Bob and Denise Skeen, as teammates at Boguila, followed the ups and downs of dissertation writing most closely. I thank them and staff members at Bangui, Bata, and Yaloké for their prayers on my behalf. God answered.

David, my husband, knows how he helped me from start to finish. I can honestly say that without his support, assistance, and
encouragement this project never would have been completed. Thank you for seeing me through thick and thin. We "cracked the nut!" Nathan and Sean deserve medals for patiently waiting for Mom to finish that "book." They continually reminded me that there is much more to life than just dissertation writing.
VITA

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CHAPTER 1
INTRODUCTION

This dissertation is a study of oral health in a developing country. Specifically, it focuses on the oral health behaviors and beliefs and the oral health of the people of Nanga Commune in the Central African Republic.

This chapter begins with a presentation of the study. Second, attention is directed to the definition of oral health and related trends in the Third World. Third, the traditional model for disease assessment and treatment is discussed and critiqued. The oral health behavior model is then set forth as an alternative perspective. Finally, the chapter concludes with an overview of the study.

The Study

This research endeavor was conceived as a result of social and behavioral factors that affected my life's direction. Raised in Haiti, the poorest country in the Western Hemisphere, at a young age I saw the pain caused by dental disease; and not from afar. My father, an occasional "lay dentist," boiled the instruments on the kitchen stove for the Haitians waiting on the back porch for relief that they could not afford elsewhere. I am now married to a dentist who is starting a dental training program in a developing country and this situation
provides the opportunity to study oral health. My years as a research associate at The Ohio State University Disaster Research Center no doubt influenced the style and scope of the study.

This study seeks to enrich the literature in the area of socio-dental research, particularly in developing countries where oral health resources and research are limited. This research also provides data for the immediate task of organizing a dental service and training program. Prior to this study the World Health Organization (WHO) did not have any current data on the status of oral health in the Central African Republic. Studies done in other African countries on oral health have generally been epidemiological. Information about social and behavioral factors associated with oral health is scarce. Besides responding to the lack of oral health data and the dearth of socio-dental research; this study attempts to show the importance of using the oral health behavior model to assess and treat oral health problems. Included in the report are also those hard learned lessons on how to do research in Africa.

The purpose of the study is to describe and analyze the behaviors and beliefs which contribute to the present state of oral health in Nanga Commune. The intent of the research is to get beyond individual behaviors in order to gain an understanding of the meaning of oral health and oral disease for these people. This case study provides data which highlights the healthy and unhealthy features of their oral health and oral health behavior. In sum, the study develops an interpretive portrait or image of oral health behaviors and beliefs which serves as a basis for effective oral health care.
The study is guided by the assumption that a dental professional needs to have a thorough understanding of social and behavioral factors which affect oral health. The cultural differences between the highly educated professional and the patient are heightened in a developing country where class structure is very differentiated. In a developing country a foreign dentist will have little understanding of the social and behavioral factors affecting oral health unless he or she makes an effort to obtain this information. It is essential to look beyond clinical disease in order to determine appropriate oral health care.

Given this assumption, the principal research question is simply: what are the behaviors and beliefs associated with oral health?

This research question calls for the qualitative approach to inquiry which is the method of choice for exploratory research. The primary data consists of responses to open-ended questions along with information obtained from: participant-observation, knowledgeable informants, documents and official statistics.

A different type of question formulated and asked during the course of the research is: what is the present oral health state of the people of Nanga Commune? Responses to this question require the use of a clinical dental survey of six-year-olds, 12-year-olds and adults 35-44 years old. The survey identifies the oral health problems and clinical treatment necessary for Nanga Commune.

**Oral Health in Developing Countries**

The term "oral" limits the discussion to the health of the teeth, jaws and associated structures. The concept "health" as defined by WHO
embraces the notion that health is not merely the absence of disease, but is a state of complete physical, mental and social well-being. In dental literature the term "complete oral health" is defined as "the optimal function of teeth, jaws and related structures."2

Four general categories of oral health problems are identified: dental caries (cavities), periodontal (gum) disease, oral malignancies and dentofacial anomalies. The oral health goals as established by WHO deal mainly with the two most common problems; dental caries and periodontal disease. There is a lack of reliable base line data for oral malignancies and dentofacial anomalies, so the present goal is to improve the data base for these two conditions.

In May 1981 WHO, in its World Health Assembly, adopted a goal for world oral health by the year 2000. Although complete oral health is the optimal goal, this first global indicator of oral health status was set as an average of not more than three decayed, missing or filled (DMF) permanent teeth at the age of twelve. This goal refers only to dental caries, but it is viewed as an indirect measure of overall oral health. The DMF indicator is used to measure the oral health status of a population in the same way as the infant mortality rate expresses the health status of a given population.3

Dental caries have plagued mankind over the centuries and have characteristically been most severe among the wealthier, more privileged members of society. This pattern has been attributed to the cariogenic diets available to wealthier individuals and societies. Thus the traditional picture of caries is that it is endemic in the
more developed nations but not seen much in the less developed areas of the world.\textsuperscript{4}

This pattern has changed. Current trends indicate a decrease of caries in industrialized countries and an increase in developing countries. This is probably caused by dietary changes, notably an increase in sugar intake, without compensating oral hygiene activities.\textsuperscript{5} However, as Barmes points out, it may be simplistic to attribute the increase in caries solely to urbanization and its concomitant increase in refined dietary sugar. People may also be losing some protective factor as their environment changes.\textsuperscript{6}

The data available for ninety developing countries and twenty-eight industrialized countries shows that thirty-two developing countries have a rate of more than three DMF teeth. Twenty-one industrialized countries have a DMF rate of more than three teeth. Among the industrialized countries whose caries prevalence is decreasing, eleven countries are on the verge of reaching the three DMF teeth level. On the other hand, sixteen developing countries are approaching the three DMF teeth level as their caries prevalence increases\textsuperscript{7} (table 1).

The distribution of periodontal disease follows a different pattern. The greatest severity of disease is in the less developed regions of the world, especially Africa, the Indian subcontinent and Southeast Asia.\textsuperscript{8} However, there is no data to confirm the notion that periodontal disease is decreasing in developed countries. In fact, as populations age and people keep their teeth, there may be an increase in periodontal disease.
Table 1. Trend for Decayed, Missing and Filled (DMF) Teeth Levels for Industrialized and Developing Countries

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Periodontal disease is evident in all countries at moderate to high prevalence and results in extensive loss of teeth. All the mechanisms involved in the disease cannot be fully explained, but current knowledge is adequate for the prevention and control of the disease. Even so, rarely have large-scale prevention programs been implemented. Gingivitis (inflammation of gums) affects over 80% of young children and almost the entire adult population have experienced gingivitis, periodontitis (inflammation of the gums and other tissues that results in loss of the attachment of these structures to the tooth), or both. Research indicates that damage caused to these supporting structures of the teeth in early adult life is irreparable. During the middle years the disease destroys supporting structures thus depriving many people of their teeth long before old age.9

Of all the diseases encountered in dentistry, oral cancer represents the most serious threat to life. The occurrence of oral cancer and its site distribution within the mouth varies widely in different parts of the world.10 These differences appear to be chiefly due to the environmental factors with which they are linked. According to Pindborg, the most common environmental factor on a global basis is the use of tobacco in its various forms.11 The fact that males in the United States have an oral cancer rate two to three times greater than females is attributed to the use of tobacco, alcohol, and certain occupational activities.12 In India, oral cancer rates increase when the betel nut is chewed in conjunction with tobacco use.13 One type of oral cancer that is geographically localized to equatorial Africa is Burkitt's Lymphoma. It most commonly affects children between the ages
of two and fourteen. This tumor forms between 50 and 70 percent of all malignant tumors in children. It is thought that the disease is linked to a virus vector in the region since the disease is not race specific.

Dentofacial anomalies are difficult to define because opinions vary as to what constitutes a malocclusion (bite) problem. Work is still being done on developing an acceptable epidemiological index of malocclusion. Lack of reliable data makes it difficult to say to what extent dentofacial anomalies are a problem in the Third World. At present the distribution of this abnormality is not well understood.

A general look at the African oral health scene indicates that there is a gradual increase in dental disease conditions and that only a few efforts have been made to deal with the problems. Most studies have been conducted in East and West Africa, in countries such as Ghana, Nigeria, Tanzania and Kenya. Central African countries are poorly represented. However, on the basis of studies conducted it has been established that dental disease is afflicting the people of tropical Africa at an increasing rate. Resources such as dental professionals, dental facilities or public health programs are almost nonexistent. In fact, it could be hypothesized that the oral health situation in the Central African countries is probably worse than that of the countries of East and West Africa, especially in terms of health services. Only the countries of Nigeria, Senegal and Zaire have dental schools among the countries that form a band from east to west across Central Africa. Consequently, the countries without dental schools rely on the training of limited numbers of their nationals in foreign
countries or employ foreign dental surgeons. Thus, the countries which tend to be those with the youngest and fastest growing populations are also those with the lowest level of economic development and the greatest scarcity of dentists. Overall, these countries have a significant level of oral disease and few dental professionals. This is then coupled with a lack of information and research about social and behavioral factors associated with oral health.

The Disease and Treatment Model

Oral disease is a health problem affecting the human race in all parts of the world, and methods of treatment have spanned the centuries. About 3,700 years before Christ, Egyptian manuscripts refer to dental problems such as "blisters of the gums and gnawing teeth." There are records of dental problems and recommendations for treating them during the civilizations of Greece and Rome and into the Middle Ages and the Renaissance. Yet it was not until modern times that the care of oral health problems developed into a unified body of knowledge and skill.

The birth of modern dentistry is often equated with the eighteenth century work of the French dentist Pierre Fauchard (1690-1762). His published Le Chirurgien Dentiste, ou Traité des Dents was a two-volume book of more than 800 pages and remained the authoritative document in dentistry for over a hundred years. Fauchard had no formal training, but worked under the chief surgeon of the French Navy. He was gifted in being able to synthesize the knowledge and experience of
others. He recorded his keen observations and systematically described his methods of caring for dental problems. For more than a century there was no formal education for aspiring dentists. Their training took the form of apprenticeships.

According to Bremner, G. V. Black was a leader in dentistry during the latter half of the nineteenth century. His formal education did not exceed twenty months and his introduction to dentistry consisted of a "few weeks" with a Dr. Speers, considered not a particularly good dentist and whose dental library contained one book. Fortunately, Dr. Black held to the idea that a professional person has no choice other than to be a continuous student. In 1840, dentistry made the step of shifting from a vocation to a profession by the establishment of the first dental school in the world, the Baltimore College of Dental Surgery (later the University of Maryland). At about this same time the first professional dental journal appeared, The American Journal of Dental Science and the first national professional dental organization was organized, the American Society of Dental Surgeons. Dentists of this early era were trained to identify clinical problems and administer the appropriate technical treatment.

In general, these 250 years of dentistry have embraced the "medical model" focusing on the treatment of disease. Some change was instituted during the sixties which saw the introduction of behavioral scientists to dental faculties to teach behavioral aspects of patient care. However, the prevailing pattern of dental care has been: to focus on the presenting symptoms, to identify the disease, and to provide the appropriate technical treatment. This orientation
is based on the assumption that the need for care can be objectively
determined. "In dentistry the assessment of needs has traditionally
been defined in terms of technical procedures, manpower and
resources."26 For example, the WHO Oral Health Survey manual27
expresses dental needs in terms of the numbers of single and
multisurface restorations needed, and periodontal needs as the need for
oral hygiene instruction, scaling and surgery.28 Dental disease
affects populations in epidemic proportions, and is the most prevalent
group of chronic disorders. However, "neither the definition of dental
health nor current treatment methods correspond to or reflect the
origins of dental disease. Clinical criteria still largely determine
the assessment of dental health and the need for dental treatment."29

There are several weaknesses inherent in the disease and treatment
approach. First, it rules out the option of using alternative
treatments. For example, there are ways to clean teeth other than
using a toothbrush and toothpaste. A chew-stick and slender pieces of
wood can be used to clean teeth adequately with proper instruction.
Secondly, the most effective treatment is often stipulated, thus ruling
out the possibility of using a less effective, but cheaper treatment.
A missing tooth could be replaced by a bridge or a partial plate, even
though the bridge may be recommended to the patient as the treatment of
choice. In this case, the bridge may be more effective, but the
partial plate would be cheaper and might still satisfy the needs of the
patient. Thirdly, even though the need is defined by a professional,
it may not be an objective assessment. There is considerable latitude
for subjective decision-making even within the confines of the dental
profession. Intra-examiner variability is not uncommon and there is wide inter-examiner variability even when previously agreed upon criteria are used. Fourthly, by focusing on the technical aspect of need, often the attitudes and behaviors of the patient are not given enough attention. Consequently, the opportunity to promote health, well-being and the prevention of disease is lost. Concepts of health and disease are based on cultural and subcultural values. Thus, the assessment of health and the standards of care of the lay person may differ from that of the professional. In sum, the disease and treatment approach has resulted in treatment that is often mechanical, emphasizes pathology and neglects the importance of prevention, which results in treatment that is not optimally effective or successful.30

Although the "medical model" approach has its weaknesses, considerable advances have been made in dentistry. Fortunately, most dental diseases are virtually avoidable with preventive measures. In industrialized countries variations of the disease and treatment model have been implemented and recent achievements in dentistry indicate progress in dental caries prevention. In many developing countries, however, lack of manpower and resources contribute to dental disease of epidemic proportions. Periodontal disease, for example:

WHO data collected from 35 countries show a very high prevalence (over 75%) among persons aged 35-44 years in seven countries, a high prevalence (40-75%) in 13 countries, and a moderate prevalence (less than 40%) in 15 countries. The prevalence in each country was much higher when less advanced stages of the disease were included. Many surveys have shown the widespread nature of gingivitis in children; a prevalence of over 80% has been reported. The disease is much more prevalent and more severe in many Asian and African countries than in the USA or Scandinavia.31
The typical pattern in developing countries is that the few dental professionals available treat obvious disease in order to alleviate suffering. The treatment of disease is largely determined without considering the social dimensions of disease or those factors which predispose people to dental ill health. This focus on disease and treatment is heightened by the cultural barriers that exist between the technically educated professional and the typical patient. The limited understanding of cultural practices and beliefs by the professional results in a focus on what is familiar; the clinical diagnosis of disease and its treatment.

The goal of dentistry is to decrease and prevent dental disease. This goal requires a shift from the purely clinically oriented disease and treatment model to the behavioral aspects of a health oriented model of care.32

The Oral Health Behavior Model

The importance of the relationship between social and oral health is becoming more evident, yet relatively little is known about the social aspects of oral disease compared with the biological aspects. In 1978 the Oral Research Advisory Group of the World Health Assembly adopted the idea of calling a joint Fédération Dentaire Internationale/WHO Scientific Workshop for 1980. The primary aim of the workshop was: to further understanding between research workers in different countries and cultures, to exchange information regarding research directions and priorities, and to develop closer collaborative links between research institutions, individual workers and
international organizations. A report of the meeting states that, "social and behavioral factors are involved in oral disease processes in at least two major ways: they affect actual disease patterns and influence the use and distribution of preventive services." Consequently, social intervention strategies need to be considered when planning oral health programs. It is not enough to only consider the usual preventive measures. These social intervention strategies need to address several different levels of influence: individual, family, community, institutional and national.

The last two decades have seen social scientists from various disciplines working on the identification of social variables associated with oral health. Most references of socio-dental articles were written after 1965, with the majority being published in the seventies. Records of the National Institute of Dental Research indicate that basically, support of that institution for behavioral research began around 1970. Social variables such as socioeconomic status and lifestyles have been the focus of many studies. The social factors associated with oral diseases are often complex variables which require development of appropriate methods for their study. Although this type of research is costly and time-consuming, some promising studies have been done in the areas of individual and family adoption of preventive practices, professional education and community water fluoridation. Since much of the research has focused on the behavior of individuals as lay persons, there is a need for studies at institutional levels of social organization. An overview of the research also indicates that socio-dental research has been carried out
mainly in industrialized countries and much work remains to be done in developing countries.38

The oral health behavior model is based on the assumption that oral health is affected by social and behavioral factors. The goal of optimum oral health necessitates an understanding of social and behavioral factors so that ways of preventing disease can be taught in a culturally acceptable manner. Health and sickness are a matter of degree, not kind. The professional needs to understand the health and sickness continuum for the particular culture being studied. The patient's oral health habits, beliefs about disease and its causation, diet, attitudes, expectations, and economic status are all factors to be considered when choosing appropriate treatment. Often this type of information is not included as essential in determining the choice of treatment. Thus, the dental professional guided by the oral health behavior model does not purpose to eliminate disease by clinical judgment and mechanical techniques alone; but learns about those social and behavioral factors which will provide a basis for determining appropriate treatment and prevention.

To gain this understanding of social and behavioral factors is a challenge for the technically trained professional working with people of a non-technical orientation; and such is the case in most developing countries. Africa is no exception. Research of the social and behavioral aspects of oral health in developing countries is limited. Historically, the trend has been to clinically treat blatant disease, frequently getting rid of the infection by the extraction of teeth. Studies are needed that will look at those social and behavioral
factors associated with oral diseases,\textsuperscript{39} and especially, in those countries where oral disease is increasing and little is known about the behaviors and beliefs that affect oral health.

**Overview of the Study**

The following report includes seven chapters. Chapter two discusses the methodology. The research question is presented along with a general discussion of research methods and their use in Africa. A description of the research setting and details of gaining and maintaining research access are given. The chapter concludes with a presentation of the research procedures used in collecting and analyzing the data. In essence, this study is formulated out of a context of practical and theoretical constraints.

Chapter three describes the cultural and social context of Nanga Commune. Two general themes form the backdrop for understanding oral health behaviors and beliefs. These are the social organization, which revolves around clan relationships and the work of making gardens; and the cultural orientation, which is based on religious and health beliefs.

Chapter four presents the delivery of oral care in the public and private sectors. Particular attention is drawn to traditional healers and their practices in a rural setting, since the study basically deals with a rural population.

In chapter five, the oral health and treatment need assessment survey and results are described. This data of 322 six-year-olds,
12-year-olds and adults 35-44 years of age provides current base line data in the Central African Republic.

Chapter six attempts to describe the oral health behaviors and beliefs of the Nanga Commune people. The analysis is based largely on in-depth interviews and seeks to highlight the themes that prevail in Nanga Commune conceptualizations of the causes and cures of oral health problems.

Chapter seven is a synthesis of the study. The oral health behavior model is used as a means to direct the dental professional to: decipher the culture, delineate the behaviors and beliefs, determine the treatment, and develop the preventive care. It is simply the "how to use the oral health behavior model" chapter.

The last chapter, eight, summarizes the findings and discusses the implications that are drawn from the study. A final case is made for using the oral health behavior model for oral health care in Africa.


3. Ibid., 75.


6. David E. Barmes, "Epidemiology of Dental Disease," Journal of Clinical Periodontology 4 (1977): 92. Barmes cites the findings of research in New Guinea where populations which had no refined sugar intake presented with high levels of caries.


11. Ibid.


15. The disease is prevalent in the Central African Republic. Since our arrival one year ago four cases have been diagnosed.


25. The use of the term "medical model" refers to the approach to patient care that is based on the assumptions of a mechanistic and closed-system. The goal is to treat disease and this is done by 1) assessing the symptoms, 2) identifying the disease, and 3) prescribing appropriate treatment.


29. Sheiham, Maizels and Cushing, "The Concept of Need," 266.

30. Ibid., 265-266.


34. Ibid., 82.

35. Ibid.


38. Ibid., 85-86. The Scientific Workshop outlined social variables that need to be considered for both dental caries and periodontal diseases as follows:
1. Sociodemographic data such as age, gender, ethnic group, family income, education, occupation, urban or rural residence.
2. Preventive versus treatment orientations towards diseases and the use of general and oral health services in relation to actual general and oral health status.
3. The perceived risk of oral diseases, symptoms recognized as indicators of oral diseases and the use of recognized oral disease prevention measures including professional plaque removal.
4. General knowledge regarding the adequacy of diet and appropriate dietary composition and their relationships to health and oral health and the nature, type and frequency of mass media messages relating to diet, nutrition and health.
5. The amount and frequency of sugar consumption.
6. Specially for dental caries, the place of food preparation and consumption, the identity of food preparation decision-makers, the prices of sugar and sugar products, in particular those consumed between meals, in relation to alternative foods and sweeteners and the child rearing practices in which sugar is used as an incentive or reward.
7. Specifically for periodontal diseases, the cultural norms, religious rules and habits and the level of observance of such rules in relations to oral cleanliness and smoking practices.

CHAPTER 2
METHODOLOGY

Methodological issues related to this explorative study are discussed in this chapter. First, the research question which guides the inquiry is presented. Second, sociological research methods used in Africa are briefly discussed and key issues are highlighted. Third, the research setting is described. A discussion on gaining and maintaining research access follows, focusing on those aspects which are important when doing research in Africa. After a description of the field methods used in gathering the data, the chapter concludes with a description of the analysis and presentation of findings.

Research Question

The objective of the research is to gain an understanding of the oral health behaviors and beliefs of the people of Nanga Commune. The predominant research question is simply: what behaviors and beliefs are associated with oral health? The question is purposely stated in an open manner so as not to limit the range of possible responses. This allows the investigator to follow the natural direction dictated by the conditions of the research setting. The purpose of the research is to formulate an image of Nanga Commune oral health behaviors and beliefs that is constrained as little as possible
by the researcher's preconceived ideas, realizing that totally value-
free research is not feasible. The explorative nature of this question 
lends itself to qualitative methods of data collection.

A second and different type of question to be asked during the 
course of the research is: what is the present oral health state of 
Nanga Commune? The answer to this question is obtained by using a 
clinical dental survey instrument to examine a sample of six-year-olds, 
12-year-olds and adults 35-44 years of age. The survey data provides a 
basis for comparing the oral health status of Nanga Commune with other 
regions of the world and gives a clear picture of their most common 
oral health problems.

In sum, these two research questions serve as a guide for the 
conduct of the inquiry. Since the main question guiding this research 
is formulated in an open fashion, the research strategy calls for 
qualitative methods for the most part, which are applicable to the 
natural setting.

Research Methods in Africa

It was not my original intent to design a research project that 
advocated a multi-faceted approach involving both quantitative and 
qualitative methodologies. I would have been content to develop a 
study around one basic research methodology. However, the fact that 
there was no base line data describing either oral health behaviors and 
beliefs or the oral health status of the people guided me in the 
direction of using two approaches. To attack one of the research 
questions without obtaining answers to the other would have resulted in
a less than complete picture of Nanga Commune oral health. Research in an African or Third World country often presents unique challenges to the researcher. We will turn to a brief discussion of methodology in Africa and conclude by underscoring some key issues.

Qualitative methodology is often referred to as the humanistic approach to inquiry. Common synonyms for qualitative are naturalistic, ethnographic, interpretivist or constructivist. Quantitative methodology, on the other hand, is often referred to as the positivistic approach and terms such as positivist or empiricist are used to denote it. I do not intend to discuss the long-standing controversy in sociology between positivism and humanism. My purpose is to encourage the use of as many techniques as are necessary for understanding a given problem regardless of the research tradition with which the particular technique may be associated. Illsley cites Richard Titmuss' study of blood transfusion systems as an example of using a wide range of approaches to study an issue in-depth. More research of this type is needed in Africa even though the conditions that produce it are rare and costly.

Historically, Africa has been the focus of much research. Since World War II there has been both an increase in its volume and quality. Before 1950 survey research in Africa was done by colonial governments to meet their needs for basic demographic statistics for planning and administration. For example, most British territories employed a government sociologist to conduct surveys for "practical rather than purely academic purposes." Sometimes social
anthropologists worked on specific projects, but the most common type of survey was the census.

The early surveys of this century, "tended to be haphazard and sloppy by today's standards because it was not until the mid-1930's that survey techniques began to be refined in the West." In addition, many obstacles faced researchers doing field work. Long distances and poor communication made it difficult to collect comprehensive data. The lack of information about African populations in a continent where less than one-tenth of the population lived in urban areas made it almost impossible to select appropriate samples for study. Also, the information gathered from persons who were reluctant to cooperate with colonial regimes (for political reasons) was of questionable value. In sum, the researchers of this period communicated the obstacles they encountered and continued collecting data, assuming that any was better than none.

The research of this period was limited and the majority of those conducting research represented British social anthropology, French sociology, and French geography. The primary method used by the British anthropologists was participant-observation, which involved long-term residence in the communities they studied. "Most of their data were collected by means of intensive, repeated interviews with a small number of key informants." In the English speaking territories, British anthropologists studied many preliterate societies and contributed to the literature about traditional and rural Africa. Sometimes the traditional anthropological methods were supplemented with broader surveys. "In French-speaking Africa, geography and
sociology were the most prevalent of the social sciences, although
historiography was the dominant approach of some sociologists."\textsuperscript{12} In
North Africa, West and Equatorial Africa, the concerns of sociologists,
"paralleled those of their British colleagues in anthropology."\textsuperscript{13}
Other disciplines represented on an intermittent basis in Africa were
frequently part of large multidisciplinary teams conducting research in
the area of health and medical care. These studies were also plagued
with the common problems of the times, and "they tended to be sponsored
and controlled by colonial governments."\textsuperscript{14}

Since 1950 a vast amount of research has been done, in Africa, as
governments of independent nations have attempted to learn more about
themselves and to plan comprehensively for development. All of the
social sciences are well represented in Africa today. This explosion
of social research, in general, and the use of surveys which have taken
a place of prominence among research techniques can be accounted for by
two sets of factors.

First, the political and social upheaval of the 1950's indicated
that much of the continent was moving toward independence. National
leaders turned their attention to the promotion of social and economic
development. The excitement of these events drew large numbers of
observers to Africa. As the cities of Africa mushroomed,
anthropologists turned their focus from the rural to urban areas. This
shift of interest necessitated a change in methodological direction.
Anthropologists, at that point, led in the expansion of systematic
survey research in Africa.
Second, the development of survey research in Africa can also be attributed to the increased concern for empirical theory and quantitative research among social scientists. Africa served as a testing ground to check out the universality of sociological measures and psychological tests. Not to be overlooked as a contributing factor, was the behavioral revolution in the social sciences in the 1950's which popularized studies of individual attitudes and behavior patterns. A related consequence of the events of this period was the proliferation of African studies programs and also the growing emphasis on making the study of systematic and quantitative research techniques an integral part of graduate training.

Currently, systematic inquiry into a broad range of topics is being carried out in Africa by scholars from a large number of disciplines, although there remain substantive and geographic areas that need to be studied. Comprehensive and general studies have been replaced by in-depth, focused research. However, the expansion of research in Africa "has raised and intensified a number of issues."15 We now turn to a brief discussion of three issues that have relevance for doing research in Africa. These issues are not limited to Africa or even the Third World, but they need to be addressed especially for those who conduct research in non-Western cultural and political settings.

The first issue is related to the ethical implications of social research. Key questions need to be raised about what to study, how to conduct the study, by whom the study will be conducted and for what purpose the research findings will be used. Inherent in this question
is the need to determine what is permissible to study. Especially when research decisions are made by persons outside the society being studied, the potential for abuses increases considerably. It is not uncommon for scholars and political leaders in developing nations to question the motives of Western social scientists who want to work in their countries. It is essential that social scientists wanting to do research in these countries demonstrate their sensitivity to the needs of the people they study, and not only to the needs of the people who fund their research. It is important that the national goals of the host country and the personal goals of the people be taken into consideration when planning research. Ideally, research plans and priorities should be in the hands of the Africans and the research institutions should be in Africa. Implementing some of these suggestions would help alleviate the changes voiced against Western scholars that they are unconcerned about African problems and that they use their work in Africa to do little more than fill in gaps in Western scholarship. As the critics put it, some researchers are guilty of "academic colonialism." Implementing some of these suggestions would help alleviate the changes voiced against Western scholars that they are unconcerned about African problems and that they use their work in Africa to do little more than fill in gaps in Western scholarship. As the critics put it, some researchers are guilty of "academic colonialism."  

The second issue is an epistemological one that confronts social science and "stems from its attempt to emulate natural science." Some argue that social science should strive for "generality and parsimony in theory-construction" while others contend that the object of social research should be an "accurate explication of real and particular occurrences." This becomes an issue of importance in cross-cultural research and especially where Westerners conduct research in non-Western countries. The argument is raised that the
theories of those Western researchers are ethnocentric and culturally biased. Until research can solve this problem empirically, the question of whether Western social science enhances or distorts their understanding of the non-Western world will continue to be debated.20

The third issue relates to methodological problems and the fundamental questions are: can the same techniques be used in different societies? If they cannot, how is it possible to assure the comparability of the data produced by different research procedures? These questions confront researchers wherever they work, but are particularly relevant to the researcher working in a society different from the one where the techniques were developed. The researcher must repeatedly ask the question: is the technique appropriate for the setting and if not what must I borrow or modify in order to produce reliable and valid data? At times the researcher will face the challenge of developing imaginative techniques followed by the rigor of assessing their applicability.21

Research Setting

The research setting is often determined by practical constraints as well as theoretical considerations and this study is no exception. During the planning stages of the research I knew that my husband and I would be moving to Africa where we would be involved in setting up a dental training program. We had visited Africa for a month in 1979 to do dental work so I had some knowledge of the research setting prior to designing the research strategy. The general setting is the Central African Republic which is a land-locked country in Central Africa. The
specific setting is in the north-western part of the country 420 kilometers from the capital city. The jurisdiction studied is the Commune of Nanga which has a population of 14,507. Boguila, the village where we live, is the largest in the Commune with a population of 3072. Data was collected in Boguila and nine surrounding villages within a 33 kilometer radius.

A mission hospital is located at Boguila and 18 years ago an American dentist left a dental clinic that he established during a period of eight years. Except for a few brief periods since then, the dental clinic remained closed. Initially I envisioned only the people of Boguila as the target population, but upon further consideration I decided to include subjects from outlying villages who did not have easy access to health care or who might not have been as easily influenced by health teaching.

I chose the villages on the basis of various factors including: size, distance from Boguila, availability of health services in the form of a clinic or village pharmacy, health reputation, traditional healers and recommendation by Africans. The villages were north, south, east and west of Boguila and on primary and secondary roads. Their distances from Boguila ranged from 5 to 33 kilometers. Two of the villages had government clinics, although one of them stocked no medicines. Another had a village pharmacy established by the Peace Corps, where medicines for pain, parasites and malaria are sold. The village populations ranged from 70 to 657. Certain villages were recommended for inclusion in the study. I included a village noted as a commercially important one because it is located at a crossroads. It
is also known as having a high incidence of alcoholism. A well-known traditional healer lived in that village with whom I wanted to have an interview. A second village was depicted as dying with an overall poor level of health. I was told that the people of another village all had oral health problems because their ancestors had brought this curse on them. I wanted to learn more about this common-held belief, so I included it. Although I have just mentioned three villages which I included for what may seem as atypical characteristics, the other six villages which comprised the outlying village sample provided a balanced and varied sample.

The predominant tribe in the area is the Suma, which is a subgroup of the Gbaya peoples. I had originally considered studying the Arab population as a second group for the purpose of comparison, but after an interview with a knowledgeable African informant, it seemed best to concentrate on one major group for several reasons. First, accessibility could be a problem because the Nanga Commune is mainly rural and it would be difficult to find enough subjects of a second group for comparison in a confined area. Large cities would need to be included in a comparative study, of which there are none in the Nanga Commune. Second, communication in Arabic would be difficult and might necessitate extra translators and present other obstacles for data collection. Third, the Arab population has a history of tension with other African tribes and it seemed best to avoid occasion for rivalry.

As I gained understanding of the research setting it became apparent that if I were to develop an image of oral health behaviors and beliefs and determine the status of oral health for this Commune I
would need to include the Arabs as a part of the community even though they are in a minority numerically. They are an important group economically and as the business sector of the population, they are one of the few groups that can afford dental care for other than the relief of pain. Even though the Suma tribe is the major group of the area, intermarriage introduces individuals of other tribes into the community. To exclude all subjects not of Suma origin presented a research population that was artificial. The concern of contaminating the sample population with extraneous cultural habits of non-Suma subjects diminished as I realized that individuals who move into this area through marriage usually assimilate the habits of the tribe with whom they are living. The Arabs, however, presented a different situation because their behaviors are distinct from the rest of the population primarily because of religious reasons. For the purposes of this study I decided to include the Arabs although the study would focus on the major group of the area with the option of pointing out differences between the Arabs and the general population. The data obtained could serve as a base for a future study of Arab oral health. Consequently, the research strategy goal was to construct a portrait of oral health for the Nanga Commune without the exclusion of a particular ethnic group.

Gaining and Maintaining Research Access

The first step to gain research access as a researcher in a culture different from that of the researcher is to seek counsel about the way to approach the research endeavor. Fortunately, during the
planning stage of the research I was in France where I had contact with a knowledgeable African informant. He was a Central African working on his doctorate and knew the educational system. Our meeting proved valuable as we discussed guidelines to follow to open doors for research access.

It is essential to have government authorization for doing research in any country and in particular when a Westerner is conducting research in a Third World country. At the suggestion of my informant I met with the Director of the Cabinet of Education to request authorization for research. His office directed me to the Director of Graduate Programs who then referred me to the Minister of Education. The Minister of Education was out of town at the time so I wrote a letter requesting research authorization. The letter, written mid-July, 1985 was short and included essential information, assuming that I would be called in at a later date to answer specific questions about the research. I anticipated a slow response, so after a month and a half without receiving a reply I went to the Minister of Education's office. Much to my surprise, when I arrived at this office the secretary explained that the Minister's letter of research authorization had been filed three weeks after I submitted the letter of request. The secretary had not been sure where to send the letter because the return address was in the capital and he realized that I did not live in the capital. When I voiced surprise and gratitude for the authorization the secretary explained that approval for research was a matter of routine. Besides giving research access to all
community levels, the letter also provided access to the National School of Administration Archives and the National Museum Archives.

An American researcher working with a government project anticipated, as had I, that I would encounter delays in receiving government approval and much bureaucratic red tape. In assessing the reason why approval was so readily granted we could only speculate. Factors which may have contributed to a rapid response may have been related to the fact that the Minister of Education, a physician, was formerly the Minister of Health and was familiar and supportive of the type of research proposed and aware of its need. Other factors may have been that I was working with an established mission organization of long standing although that was not emphasized in the letter of request. In fact, the letter was written as a personal request and not an organizational one. The fact that I was a missionary committed to long term service and the wife of the dentist who would be most involved in providing that service may have been viewed positively. In any case, I was delighted to have in hand the letter of government approval which was the first step in gaining research access.

The next step involved getting the daily cooperation of participants. This depended largely on the hearty approval of the research project by the local village authorities. Again, I considered myself most fortunate. I visited the mayor's office in January 1986 on a day that happened to be two days before the annual Commune budget meeting. My husband and I were invited to attend this meeting to present the plans for dental service and the dental research, respectively. The chiefs of all the villages in Nanga Commune were in
attendance as well as the village quartier chiefs. The sous-prefectural (roughly equivalent to a United States county) authority acknowledged the government authorization letter in the presence of these local authorities and gave his approval for the research project. He also authorized the police to provide personal protection should the need arise. Thus, at one meeting I was introduced to the Commune and the project was publicly approved by the appropriate authorities. This was a start in building trust and legitimacy.

At the meeting I gave a brief overview of the research project emphasizing the fact that we had newly arrived in Africa in May of 1985 and we wanted to learn about the oral health of the people of this Commune. I emphasized two points: first, that the inclusion of a village in the study did not indicate that future dental services would be provided for that village, and second, that the interviewees' comments would be confidential and they should feel free to give their honest opinions. I explained that ten villages in the Commune would be included in the study and that the interviews would be done over a three-month period. Other research projects in this country have at times been the source of discontentment because the communities involved assumed that they would receive future rewards for their participation in a given study. I wanted it to be clear from the beginning that no promises of future service were being made.

The research interviews and the dental survey were scheduled from mid-January to the end of March or mid-April, if necessary. The timing was ideal for several reasons and in retrospect collecting data would have been either impossible or it would have taken much longer at a
different time of year. These months are during the dry season so that travel over dirt roads and the threat of rainy days presented no problem. More importantly, the people had harvested their cotton, which is the main cash crop, in December and January. Now they awaited their money and the spring rains to start the planting cycle for another year. This meant that the people could be found in the villages unless they had gone hunting, and they were less fatigued from long hours of manual labor working the soil. In a developing country where gardening is the sole source of food acquisition for most of the population it is essential that the planting cycles be taken into consideration if full cooperation of the subjects is to be obtained.

The minor obstacles encountered during the course of the research stemmed from lack of interest, lack of understanding, fear, or an inability to see the value of the research. These problems were encountered on an individual basis when the research team was looking for subjects for the dental survey, in particular. In no village was there ever a group of adults waiting for the dentist to examine their teeth, even with prior notification of our arrival. In several villages school children were prepared and waiting for the dentist's arrival. In one village we had an involved discussion with the village chief before being able to proceed with the interviews and dental exams. This occurred because the community was waiting on that day for their cotton money and the chief thought that the dental research would interfere with that event. After clarification we were able to accomplish the planned research for the afternoon.
Field Work

The research questions and the research setting direct the choice of the methodological approach and the specific types of field work. This study is guided predominantly by qualitative research methods; however, a clinical dental survey is used to collect data on the oral health state of the Nanga Commune. Although the primary data base for the research findings is obtained through in-depth interviewing, the supplementary methods of participant-observation, knowledgeable informants, documents, official statistics and the oral health and treatment survey are also presented. A description of the types of data gathered will follow an introductory paragraph discussing issues particular to a researcher crossing cultures to conduct research.

I was struck by the cultural barriers that I faced upon my arrival in the Central African Republic. From every angle I was in a culture very different from my own.24 These differences were found in every area: social, cultural, language, economic, racial. It was not that I felt uncomfortable or that I found the research setting strange;25 rather it was a realization that my values and lifestyle were not relevant. The question I pondered was: how can I attempt to bridge the gap so that some understanding can develop between the researcher and the individuals of the research setting?

I could communicate in French, but the majority of the population speaks a trade language, Sango. In the rural areas very few people speak French and some do not even speak Sango. A beginning point was to start learning Sango. During the Fall of 1985 I took a three-month
Sango course. It proved helpful to have had this course before the data collection phase of the research. I also minimized differences in dress when I went into the research setting. I wore the long African wrap-around skirt. This was appreciated by the Africans and showed them that I liked their form of dress. My paid translator served as the most beneficial help in bridging the gap between the researcher and the research subjects. He was a Suma, spoke French, was well-known and respected in the community and was able to speak to the people in their tribal language, Suma. The research would have been impossible without his assistance or someone of similar qualities. One final note: as I showed genuine concern for the subjects by spending time with them and showing interest in their activities, the cultural gap became less pronounced and mutual acceptance increased.

Participant-Observation

Participant-observation has played a major role in social and cultural studies since the turn of the century. In this study it was used to grasp the routine features of daily living and to serve as a check on the information obtained through other field methods. Over the course of the research period my activities varied between observation and participation, although the bulk of the data gathered by this method was based on observation.

The African lifestyle is well suited to this kind of field work because Africans basically live outdoors. Houses are used primarily for storing material goods and sleeping. It is not considered impolite to greet a family member who is doing some activity of daily living in
the yard, such as taking a bath or brushing their teeth. Nor is it unnatural to stop, observe and talk. In fact, the African culture provides an environment conducive to the use of participant-observation. Care was taken to avoid behavior that would be considered intrusive.

On my arrival in Boguila I made a point of renewing contacts with acquaintances from my previous visit in 1979. I was able to start developing some new friendships which provided opportunities to spend time with the people as they performed activities of daily living. I presented myself as a learner, new to the setting, who was eager and interested in learning about their way of doing things. One of the women I spent time with had a limited knowledge of French so we were able to communicate on a basic level. I went to the fields with her family and participated in clearing the land for planting. They appreciated the fact that I was willing to help them hoe and were impressed with the blister I developed. A neighbor woman showed me how to prepare several types of African food. I made a point of visiting other people on numerous occasions at different times of the day.

I lived in a brick home at the medical center which was a ten-minute walk from the center of the village. I purposefully made treks to the village to look at African material in the Arab shops and pick up food items like sardines, rice or onions, even though most of my food was purchased in the capital city of Bangui during monthly or bimonthly trips. I also visited the local markets and bought various wild fruits or fresh vegetables. At the market I would ask the vendors what they were selling so that I could learn the African names. These
outings along with the daily walks to the village during the interviewing phase of the research gave me opportunities to observe the people as they carried out activities of daily living. I would often stop at a house for a few minutes to observe and ask a few questions before continuing on. Even though I was living in proximity to the village and had African neighbors close-by, because I was a foreigner with a different lifestyle, I had to purposefully make occasions to spend time with the Africans.

It became apparent early in the research process that it was impossible for me to do anything without being noticed. Other than the outings that I discussed above, the other situations that I had for observation took place while waiting on an official at the mayor's office or during invitations at social gatherings. The culture did not lend itself to the notion of hanging around so that customs and conversations could be unobtrusively observed. I was often asked, "Where are you going? What are you doing?"

Whenever I was invited to a social gathering or home I always accepted. On a couple occasions I was invited to an African home. These invitations to tea, a meal or a house warming dinner provided occasion to watch the African in a setting different from that of the interview context. They introduced me firsthand to the types of food that are so important to the African culture.

The information that I gathered from participant-observation was significant for the interviewing phase of research. It stimulated ideas for questions for the interviewing process that I might not have thought of otherwise. It also heightened my awareness of contradicting
information, which prompted me to ask questions for clarification. Most importantly, when the Africans saw that I was familiar with some of their ethnic dishes, or knew the name of one of their wild vegetables or fruits, they realized that I was interested in more than just a surface knowledge of their culture. Their attention was sparked.

In-depth Interviewing

The predominant research question of this study calls for an examination of the behaviors and beliefs associated with the oral health of the residents of Nanga Commune. The method of choice for this explorative search is the in-depth interview. Initially, I anticipated using a snowball technique for acquiring participants. This involves choosing the sample based on referral by participants from previous interviews as well as theoretical criteria. However, when I learned that the village of Boguila was comprised of 12 quartiers and that their informal names indicated variation in the social dimensions of the quartier populations, I turned to a more systematic method of drawing up the sample so that all quartiers would be represented. A sample of 55 was drawn up representing the quartiers proportionally according to population. The number of proposed participants per quartier ranged from two to 19. I followed the same process of proportional sampling for the nine surrounding villages, many of which were comparable in population to one quartier of Boguila (figure 1). A sample of forty-five was drawn from those villages which gave a total of 100.
The participants in Boguila were chosen by my translator on a day to day basis so as to include a cross-section of the population. At one point, I considered using a purely random sampling technique based on lists of persons in each quartier according to age, sex and economic status. However, no information of this sort was readily available. In actuality, the subjects were chosen semi-randomly. If for some reason the person whom we had planned to interview was not available, someone else would be asked to participate. Even in Boguila, not all interviews were scheduled ahead. In the surrounding villages we stopped at a house and asked if someone there would be willing to answer questions about their mouth and teeth and describe any experiences related to oral health. An attempt was made to include male and female individuals along all points of the adult life-span (table 2). The aim was to develop a portrait of the typical, not atypical experience. Consequently, individuals with chronic oral health problems were included as well as those who had never had any problems that they could remember.

Most of the interviews were conducted out of doors either in front of or to the side of the subject's house. Occasionally an interview was conducted on a porch. Once or twice at one of the outlying villages my translator and I were invited inside for a cup of tea. We remained indoors to conduct several interviews for the sake of convenience and protection from the heat of the sun. An advantage to conducting the interview indoors was the privacy the setting afforded. Whenever we approached a house to request an interview, a crowd always gathered. It was difficult to keep observers away. After one request
Figure 1. Interviews Conducted in Nanga Commune Villages
Table 2. Nanga Commune Interview Sample Population by Age and Sex

<table>
<thead>
<tr>
<th>Age</th>
<th>Female</th>
<th>Male</th>
<th>%</th>
<th>Number in Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 - 34 years</td>
<td>26</td>
<td>20</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>35 - 55 years</td>
<td>27</td>
<td>18</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>56 - 66 years</td>
<td>2</td>
<td>7</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>45</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

the onlookers would back off only to draw near again after a few minutes. The interviewing process was essentially an "event" for these people and the level of curiosity on the part of the bystanders was high.

In general, the subjects did not mind an audience and in fact, one sensed at times that a neighbor's presence was appreciated. It provided support for this unusual experience.32 One by-product of this volunteer audience which I had not taken into prior account was the breadth of information it at times contributed. Individuals other than the interviewee interjected their comments from time to time and the reaction of the audience to either the interviewee's comments or the researcher's questions were supplementary data that would have been otherwise missed.

Upon arrival at a house we introduced ourselves. After the participant agreed to do the interview, my translator and I were
offered stools or chairs which were often brought to us by a child from a neighboring hut. As a white person I was usually offered the best chair or stool. Sometimes I accepted and other times I passed it on to my translator. When my translator and I were situated in proximity to the interviewee in a triangle, the translator explained the necessity for informed consent and that the participant needed to sign a paper to grant us permission to talk to them about their mouth. This notion was totally foreign to the subjects. Hesitancy to sign the paper after the statement was read to them stemmed from the fact that nearly all the participants did not know how to write their names and in many cases they were not sure how to hold the pencil. The consent form simply stated that we needed permission to talk to them about their mouths and that the information they told us would be confidential. Although individuals were the unit interviewed, at times the whole family was present which afforded a natural opportunity to ask questions about the children's oral health and include their ideas. Sometimes, the spouse of the interviewee would add information he or she felt was relevant.

The aim of the interview was to allow the participants to casually describe their oral health experience in a setting that was comfortable and natural to them. The interviewing style was unstructured so as to capture the candid narrative of the subject on this topic. Probes were used to obtain information which was not included in the initial narrative, such as, more detail about an oral health problem, what they did for the problem or the cause of the problem. I remained as neutral as possible during the course of the interview allowing the subject to describe as freely as possible his or her ideas with a minimum of
interruption. I maintained an active listening stance with the use of silent probes or non-verbal cues. After the initial narrative I followed-up with specific open-ended questions. I had anticipated more flow between participant-observation and the interview itself, but something as unusual as a white person's visit for a specific purpose turned the participant's attention away from what they were doing, to us. Also, the fact that we did not have time for extended participant-observation in the introductory period of every interview changed our strategy to some extent. It was not uncommon, however, for the participants to continue doing whatever they were involved in at the time of our arrival. It was usually an activity that did not interrupt the interview process, such as shelling seeds or weaving a basket.

As I took a more active role (after the initial narrative) in order to ask specific questions about diet, hygiene, habits, ideas about prevention and general knowledge of dentistry, it became apparent that answering questions of this nature was an uncommon cognitive task which demanded a lot of focused attention on the part of the interviewee. The participants were not used to thinking in terms of cause and effect nor being questioned about activities of daily living. As the interview progressed some participants would show signs of fatigue; such as yawning, giving slow responses or short answers. A few commented, "You ask a lot of questions."

The interviews varied in length from one-half hour to two hours or more. I attempted to keep them within a 45 minute limit especially when I noticed that we were interviewing someone who found the questions tiresome. On one occasion we returned a second day in order
to spend a total of four hours with one interviewee who also served as a knowledgeable informant. As the interview phase of research progressed and responses started falling into repetitive categories I was able to simplify certain questions by providing options for the participant. Information about diet, for example, did not require the in-depth questioning necessary initially, once it became apparent that we had covered the range of foods common to this area. Because I noticed that the quality of the answers changed as the interview progressed in time, at the 37th interview I reversed the order of the questions except for the introductory question about oral health experiences, problems, treatment and causation. At that point I already had a nearly complete diary of foods which had been the first question asked after the initial narrative. Reversing the order meant that the diet question which was quite involved because of the numerous responses it required was near the end of the interview. At that stage of the research it did not need to be dealt with in-depth if the respondent showed signs of fatigue. By using this strategy, I was able to tap more complete and richer responses for the questions that had formerly been toward the end of the interview. I also noted that in order to get detailed responses, specific and frequent probes were necessary.

As could be expected, the participants frequently defined the researcher's purpose as that of looking for and being interested only in those persons who had oral health problems. Occasionally, someone would say, "You don't want to talk to me because I don't have any problems." We would then explain that we wanted to learn about people
who did not have problems as well as those who did. Actually, the fact that we did not encounter more resistance from individuals who had no apparent oral health problems is noteworthy in light of their problem-oriented view of health care. At the end of the interview the demographic data about the participant was noted on a separate index card. Debriefing sessions with the translator took place informally as we walked to and from interview sessions. The trust that we developed over time provided an openness that allowed me to discuss guarded issues and check out hunches.

These one hundred interviews were preserved in the form of handwritten notes. Although I had the capability of taping the interviews, the potential distraction of the tape recorder and the multiple languages that we worked in made it inadvisable. At the beginning of the interviewing phase of the research I introduced our work in Sango with the occasional assistance of the translator. I would then ask the initial question in Sango at the onset of the interview. The responses were sometimes difficult for me to follow because of my lack of comprehension. The translator would then translate the response into French for me and I would note the response either in French, English, Sango or at times in Suma when there was no equivalent in Sango or French. After only a few interviews it was clear that the participants were most comfortable speaking in their mother tongue, Suma. I also realized that because Suma is a true tribal language its vocabulary was richer than that of Sango. Sango as a trade language is of recent origin. For example, Suma has a specific word for dental carie, whereas, the Sango word is "hole in the tooth." In light of the above
reasons and the fact that some villagers did not know Sango, the majority of the interviews were conducted in Suma. The transition from Sango to Suma evolved naturally and it seemed wise to work in Suma if the goal of the research was to try to understand oral health as it was conceptualized in the Suma culture. I regret that I am not proficient in either Sango or Suma. Much richness and the flavor of the culture is lost through translation.

Knowledgeable Informants

The type of information obtained through knowledgeable informants provided guidelines for conducting research in Africa and also technical information not available from other data sources. These contacts were made at the village level as well as the national dental health service level. Informants for this study included village officials, nurses, dental nurses, medical director, dentists, stomatologist, traditional healers, sociologists, researchers in the areas of food processing and agriculture, Peace Corps volunteers working in the area of health education, World Health Organization Oral Health Division personnel and missionaries of long standing in the Central African Republic.35

One informant explained that giving gifts to key informants would benefit the quality and quantity of data gathered. In the African culture it is a common courtesy to present gifts to persons of authority or those who are highly respected for their wisdom and maturity. The gifts need not be of great value; it is the gesture that
is important. The persons to whom I gave gifts were very appreciative.36

Documents and Official Statistics

Documents and official statistics gathered from various sources provided information of a general nature about the Central African Republic and to some extent specific facts about the geography, demography, ethnography and history of Nanga Commune. Resources specifically describing Nanga Commune were limited. Detailed maps of the local area were unavailable from public sources. Private organizations serving the area shared materials that were of help.

In the Central African Republic library sources in the social sciences can be described as scant. I visited all the major libraries in search of documents and statistics relevant to my research, with little success. Works of value are generally guarded by the author or those few privileged persons who happen to have a copy. The libraries had a fair representation of materials until the 60's then there was a rapid decline in works representing the past 25 years. This is not to say that no research has been done in this country. There are areas and particular tribes that have been the focus of research originating out of France and the University of Bangui. However, documents pertinent to the study of oral health behaviors and beliefs were rare. Fortunately, during my stay in Europe I was able to do library work at the World Health Organization Library and tap the expertise of the officers of the Oral Health Unit.
Demographic statistics with a breakdown by adult and children, male and female were available for Nanga Commune as a whole and for each village. Statistics on mortality, however, were not complete because most people do not pay the fee to obtain a death certificate. The population statistics are compiled by listing all individuals by name at a given point in time on an annual basis. During the data collection phase of research there were no base line statistics on the oral health status of the people of the Central African Republic. This meant that I had no data for comparative purposes. Later, a 1982 study of four to six-year-old children in Bangui was found.

Oral Health and Treatment Survey

This survey was conducted to obtain some base line data on the oral health status of Nanga Commune. The World Health Organization Oral Health Unit's Combined Oral Health and Treatment Assessment Form was the instrument used for the survey. This instrument is used by the World Health Organization (WHO) to determine the level of oral health in any given population. They offered to analyze the data, providing this study was approved by the Central African Republic government. The survey consisted of a simple clinical exam by a dentist, of six-year-olds, 12-year-olds and adults 35-44 years of age. The total of 322 included 114 six-year-olds, 104 twelve-year-olds and 104 adults 35-44 years of age. The samples were drawn from Boguila and nine surrounding villages, as was done for the interviews.

The analysis of this data provides an assessment of oral health status for specific problems such as cavities and gum disease. It then
delineates the need for treatment for each problem category. In sum, the results are presented so as to identify major oral health problems, and then the types of treatment necessary are specified. A detailed description of the oral health survey and the results are presented in chapter five.

Analysis and Presentation

The data gathered during the course of this explorative, qualitative study are analyzed in order to present a portrait based on the frequently reported and observed behaviors and beliefs of the people of Nanga Commune. The actual work of producing a general yet accurate analytical description of Nanga Commune oral health behaviors and beliefs requires a systematic and rigorous analysis of the various forms of data collected. The analysis is done through a process of going over the data from all sources again and again in order to formulate an analytic-interpretive description.

To develop this thematic portrait I started by using Namboze's categories of "beneficial," "harmless," "uncertain," and "harmful" for the behaviors, and the categories of "supernatural/magical," "infection," and "heredity" for the beliefs related to disease causation. After categorizing the behaviors and beliefs, I systematically reviewed the interviews looking for relationships between concepts and behavior. I carefully recorded the context of the interviews and compared the answers participants gave for global causation with the reason that they gave for individually contracting the oral health problem. I searched for patterns, themes and
relationships in three areas: in terms of what the subjects said was the appropriate behavior or belief; what they said they did in relation to those behaviors and beliefs; and, when possible, the behavior the person actually carried out. As I repeatedly went over the interview data I attempted to keep the larger social and cultural context in mind in order to grasp as complete a picture as possible of the behaviors and beliefs of these people within their worldview.

The data, is drawn from three levels: clinically identified dental disease, individual behaviors and beliefs and the existing oral health care system. It permits a comprehensive analysis of oral health. The findings of this descriptive study are presented in a narrative format since the exploratory nature of the data does not lend itself to a propositional form of presentation. Chapter three presents the general social and cultural context in which the individual behaviors and beliefs are practiced.
NOTES TO CHAPTER 2

1. The Commune is a jurisdiction in the French system which is the smallest territorial division, roughly equivalent to our municipality. The Commune of Nanga is comprised of 100 villages and Boguila is the seat of government offices for the Commune.


4. The following works are representative of quantitative methodology and include discussions of scientific explanation and theory construction. See, for example, Hubert M. Blalock, Jr., Theory Construction: From Verbal to Mathematical Formulations (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1969); Jack P. Gibbs, Sociological Theory Construction (Illinois: The Dryden Press,


5. For an excellent and concise presentation of the controversy between positivism and humanism see, Judith A. Golec, "Aftermath of Disaster: The Teton Dam Break" (Ph.D. dissertation, The Ohio State University, 1980), 31-35.

6. For a discussion on the lack of clarity in presenting philosophical and technical issues in the context of the quantitative and qualitative debate, see Alan Bryman, "The Debate About Quantitative and Qualitative Research: A Question of Method or Epistemology?" The British Journal of Sociology 35 (March 1984): 75-92.


10. Ibid.

11. Ibid., 8.

12. Ibid., 9.

13. Ibid.

14. Ibid.
15. Ibid., 12.


17. O'Barr, Spain and Tessler, "History and Conduct of Survey Research in Africa," 16.

18. Ibid., 14.

19. Ibid.

20. For a discussion of the application of survey methodology to subjective data in Africa or other developing nations see, Pierre L. van den Berghe, "Social Science in Africa: Epistemological Problems," in O'Barr, Spain and Tessler, eds., 25-35.


22. The quartier is a jurisdiction in the French system which is equivalent to our ward precinct or informally a neighborhood. Each quartier has a chief who is elected for life. He or she is generally a personage who commands respect and is of middle-age when elected. The position is accepted as one of honor and the chief's medal is usually worn with pride. If the chief was available when we visited the quartier we explained what we were doing, accepted his approval and in several cases included the chief as a participant.

23. As anticipated, to gain Arab cooperation, it took several discussions with leaders in which research goals were clarified. This may have been due to the fact that both Arab quartier chiefs were out of town at the time of the interview phase of research. An extra translator was used with some female participants because they did not have a working knowledge of Sango.

24. For an introduction to the study of cultures different from one's own, see, for example, Robert B. Edgerton and L. L. Langness, Methods and Styles in the Study of Culture (San Francisco: Chandler & Sharp Publishers, Inc., 1974).

25. I had already been exposed to Third World living. I grew up in Haiti during the first fifteen years of my life except for three years in the United States taken at four year intervals. I had also made multiple return trips to Haiti since my initial departure, besides the trip to the Central African Republic in 1979.
26. It was interesting to me that the first compliment that I received on dress, having been in the country for seven months, was given to me the first day that I wore a long African skirt. Other compliments followed.

27. Bruyn, Human Perspective in Sociology.

28. Hanging around is used to convey the idea of being present in public places and in various settings at different times of the day so that behavior and conversations can be unobtrusively observed.

29. I was also invited to serve as photographer for a local Arab wedding. This provided contacts on several occasions with the parties involved and an ideal setting to watch the community participate in a special event.

30. Although his primary function was that of translator, in many ways he served as a research assistant. I relied on his judgment for decisions that required an insider's perspective of the culture. His orientation and training consisted of several meetings. After I interviewed him in French, I explained the purpose of the interview guide and the research in general. During the initial interviews I would check his translation by asking him to repeat back to me in French what he had just said to the participant. The fact that the interviews were conducted for the most part in Suma made it impossible for me to have someone verify his translation. I knew of no one in this area who spoke both English and Suma.

31. In the Central African Republic the age of majority is 15. One young man interviewed said that he was 14 years of age. Although he was under the adult status limit I included him in the sample because of the perspective his responses provided.

32. In order to understand how unusual it is for someone in one of these rural villages to have a visitor of European descent, one must realize that most of the villages were on secondary roads and were small. The likelihood that these people had ever had a visitor come to their house to sit with them and ask them questions about their oral health or any other matter was remote.

33. I had not anticipated that the signing of the consent forms would provide a rare experience for the participants. Some revelled in it, others were wary of trying to do something that they had never done before. One woman refused to take the pencil in hand, choosing to give it to her son who knew how to write. They were never sure exactly where to sign even though we pointed out the place on the line. Most fascinating to watch was how they decided when to stop writing their "signature." Usually, they would hesitate, look up and upon cue from the bystanders or a nod of
approval from the translator or myself, stop writing. The look of
delight on participant's faces and the glee and claps expressed by
the bystanders for a job well-done were priceless. One day when
the interview was over, the female participant raced to her
neighbor beaming from ear to ear to tell her that, "Today I held a
pencil for the first time in my life and I wrote on paper."

34. See Appendix A, Field Guide for In-Depth Interviewing.

The Field Guide was translated from English into French then from
French into Sango. During the translation of the Field Guide I
interviewed nurses and acquaintances in French to test the guide
in order to evaluate its applicability in terms of culture and
language. Responses that I obtained from the interviewees and
advice from informants were heeded in preparing the final draft of
the Field Guide. At the interview setting my translator used the
Sango copy for asking the questions in Suma. The Field Guide was
used as its name implies; a guide for phrasing questions in a way
that communicated to the participants.

35. The fact that I lived 420 kilometers from the capital limited the
contact that I could have with many knowledgeable informants,
especially those in institutions of higher learning or research
organizations. I scheduled about four weeks in Bangui during the
course of the data gathering process to make contacts and search
for library resources. On occasion my best efforts resulted in an
informant being out of town during my time in the capital.
Telephone communication was not an option. I felt fortunate to
have made the many contacts that I did, considering the
limitations of time, transportation and communication.

36. Gifts can be in the form of salt, sugar, tea, coke, soda, or a
book, which is highly appreciated by someone who reads. Any food
product that is used in the culture is acceptable. I was also the
recipient of a few gifts. At the end of one interview with a
chief I was given a hen in appreciation for the work I was doing.

37. See Appendix B, World Health Organization Oral Health Unit's
Combined Oral Health and Treatment Assessment Form.

38. See the following classic articles on the collection and analysis
of data. Barney G. Glaser, "The Constant Comparative Method of
Barney G. Glaser and Anselm L. Strauss, "Discovery of Substantive
Theory: A Basic Strategy Underlying Qualitative Research,"
American Behavioral Scientist 8 (February 1965): 5-11.

39. Josephine M. Namboze, "Health and Culture in an African Society,
CHAPTER 3
CULTURAL AND SOCIAL CONTEXT

Among Africa's admirers, an English princess wrote some seventy years ago, "It is a marvellous country. What is its spell? It lays its hands upon you, and, having once felt its compelling touch, you never can forget it." It is a land of tantalizing mystery. However, to many Americans and Europeans, Africa is still the "dark continent".

Samuel P. Verner, an American missionary, explorer and commercial entrepreneur, wrote of a popular view of Africa as a continent "cursed with pestilential fevers, malarial marshes and deserts, burning sands and deadly atmospheric conditions." This impressionistic picture was supplemented by American "visions" of Africa that were composed exclusively of "black people" and "burning sunshine".

Michael McCarthy in his book, *Dark Continent, Africa as Seen by Americans*, points out the errors of this misrepresentation.

Africa, on the one hand, a land that is four times the size of the continental U.S. and equally varied, has been condensed by them (Americans) into a powerful geographic stereotype. When Americans have formed pictures of Africa, they have imagined that a major portion of the topography is either desert, jungle, or an ill-defined combination of both. African people, on the other hand, comprise literally hundreds of distinct cultural societies and are as different from one another as the many ethnic groups of America. Yet they have been seen, all too frequently, as a single homogeneous race with their strange customs and "savage" behavior being their only distinguishing marks.
These notions about Africa continue to abound and influence the way problems are perceived and dealt with in Africa. McCarthy continues:

Even today, by concentrating almost exclusively upon the sensational and unusual, much of the writing in American newspapers and magazines and much of the focus in American films and documentaries have done little to counter the idea that Africa must be a strangely unreal land. As it might be descriptively called, this "dark continent" image of Africa as a mixture of desert and jungle, savage beasts and beastly savages, has persisted to such an extent that it has become over time the essential way in which most Americans have come to understand African realities.

Basil Davidson poignantly counteracts these ideas in The Story of Africa.

If we look at all these matters with eyes of understanding, and as far beyond sentiment or prejudice as any of us can get, we may begin to find a revelation of the human genius that has known how to tame these lands for habitation and fulfilment...We see that African peoples succeeded in reaching a viable and even a very successful balance with nature, overcoming a range of environmental obstacles that opposed their survival and development. We see that they did this at a pre-industrial and even pre-mechanical level of material development, but were nonetheless repeatedly inventive and creative.

Davidson explains that, whereas at one time African people existed in self-sufficient harmony with nature, they now are dependent on the richer nations of the "North". The slave trade, hierarchical views of the nineteenth century and the imperialism of the long colonial period stamped the prejudice of racism into American and European cultures. These years of dark history for Africa resulted in blurred realities, persistent myths about white supremacy and false conceptions about Africa's brilliant artistic and archeological past.

The purpose of this chapter is not to present a history of Africa, but rather to focus on Nanga Commune, in the Central African Republic. However, in examining this smaller entity, the influences of the larger
African context cannot be neglected. Therefore, frequently in this chapter pertinent general information about the continent or the Central African Republic will first be discussed. This will be followed by a description of the social and cultural aspects of Nanga Commune that have relevance to this study.

This chapter is organized into four basic sections. First, the social ecology and the social demography of this region are explained. Discussions of the social organization and the cultural orientation follow. In the section on social organization the two major themes are the clan and life work. Religious and health beliefs dominate the presentation of the cultural orientation. The chapter seeks to portray the environment in which oral health care is delivered, oral health problems are experienced, and oral health behaviors and beliefs are practiced.

Social Ecology

The Central African Republic is a land-locked country of 623,000 square kilometers (242,000 sq. mi.) in the heart of the African continent at almost the precise center, about 640 kilometers (400 miles) from the nearest ocean (figure 2). It is slightly smaller than Texas and bound to the north by Chad, to the east by Sudan, to the south by Zaire and Congo and to the west by Cameroon. This region is known as sub-Saharan Africa and the Central African Republic is in the middle subregion as classified by the United Nations.

Its average elevation is about 600 meters (2,000 ft.). The terrain is mainly a vast, well-watered plateau drained by two major
Figure 2. Map of Africa Showing the Central African Republic
river systems. This northerly river system, which includes Nanga Commune, flows into the Chari Basin and eventually into Lake Chad. The southerly system drains into the Oubangui, a confluence of the Zaire River. Navigation is limited to the Oubangui and short sections of the Lobaye and Sangha. These rivers produce several spectacular waterfalls; the best known are on the Kotto River at Kembe and the Mpoko River at Boali, the latter being the source of 90 percent of the nation's hydroelectric energy.10

Vegetation varies from tropical rain forest in the extreme southwest to semidesert in the northeastern tip. Most of the country is wooded. Wildlife abounds in the virtually uninhabited northeast and eastern sections. The Central African Republic is the last great refuge of the African elephant; an estimated 50,000 were counted in 1975. Poaching from the northeastern border area is reported to be reducing the elephant population by 3000 annually.11

The Central African Republic has ample rainfall without the oppressive tropical climate found in many coastal areas. In the western highlands, the climate can be quite cool. Average monthly temperatures at Bangui range between 27 and 32 degrees C (80 - 90 degrees F). Annual rainfall in the Oubangui River valley is about 180 centimeters (70 in.). In the extreme northeast, annual rainfall averages only 80 centimeters (31.5 in.).12 Much of the precipitation falls in June through November, although heavy rain occurs intermittently throughout the year in some areas. Sunny skies generally prevail from December through April. December and July are
the coolest months of the year being dry and moist, respectively. March, April and September are the hot and humid months.

The Central African Republic's economy is closely linked to its political history. The precolonial history of the area was marked by successive waves of migration, and little is known about this era. These migrations account for the complex ethnic and linguistic patterns today. In 1889, the French established an outpost at Bangui, on the right bank of the Oubangui River. In 1894, Oubangui-Chari, as it was then called, became a territory. In 1910, it became part of the Federation of French Equatorial Africa along with Chad, Congo, and Gabon. After World War II, the French Constitution of 1946 inaugurated the first of a series of reforms that led eventually to complete independence for all French territories in western and equatorial Africa. The nation became an autonomous republic within the newly established French Community on December 1, 1958, and acceded to complete independence as the Central African Republic on August 13, 1960.

The first president, Barthelemy Boganda, died a premature death in a plane crash. His nephew, David Dacko, who followed him as president, was overthrown by a coup on January 1, 1966. Colonel Jean-Bedel Bokassa took over and ten years later instituted himself as Emperor on December 4, 1976. On September 20, 1979, the former President Dacko led a successful bloodless coup while Bokassa was out of the country. The new government stated as its primary aim to build democratic political institutions and to restore health to the country's moribund economy. These aims proved difficult to achieve and the political
opposition became increasingly vocal and restive. On September 1, 1981, the commander in chief of the armed forces, General André Kolingba, seized power. The government implemented an austerity program designed to turn the economy around by 1985.\textsuperscript{14}

The republic enjoys a relatively diversified resource base in the areas of forestry, mines, fishing and cattle, but physical isolation from major markets, a deteriorating transportation system and increasing oil import prices resulted in worsening terms of trade. Current priorities are to improve the deteriorated farm-to-market feeder roads and to surface principal trade routes. Given continued political stability and appropriate fiscal and development policies the nation's timber, coffee, cotton, tobacco, diamonds, uranium, gold and other ores could allow for economic growth.\textsuperscript{15}

Nanga Commune, in the jurisdiction of the Ouham prefecture (state) and the Markounda sous-prefecture (county), is situated in the northwestern part of the Central African Republic (figure 3).\textsuperscript{16} It covers an area of 4,900 square kilometers. The topography is relatively flat plateau at an elevation of about 500 meters (1500 feet) with occasional lava rock formations. The climate consists of six months of almost no rainfall and six months of rainy season which usually extends from mid-April through mid-October. A few marshes and one large river provide water throughout the dry season. Other water sources for the commune include some small rivers, streams, swamps and shallow wells, most of which dry up towards the end of the dry season. Vegetation is a mixture of savannah and wooded areas. The soil is sandy with a medium to low iron content.
Figure 3. Map of the Central African Republic showing Nanga Commune in the Region of Ouham
The economy of the commune is agriculturally based on the sale of cotton and small subsistence farming. A French company provides cotton seed and sells fertilizer and pesticides during the growing season and later buys the cotton at a government regulated price. The company also serves as a source of technical assistance for the farmers. For food production the people plant manioc, sesame seeds, peanuts, millet, corn, ockra, melons, black-eyed peas and squash for the consumption of the seeds. Wild fruits, green leaves, and other diverse foods are gathered during specified seasons. Hunting of small game such as antelope is still possible in parts of the commune, but the numbers and types of game have decreased markedly in the past twenty years. Freshwater fish provide another source of protein and are dried for preservation.

The annual per capita income of the country is reported at 310 U.S. dollars. According to local sources, both national and foreign, Nanga Commune per capita income for the average farmer is probably closer to 100 U.S. dollars per year. The only salaried persons in Nanga Commune are government, hospital and mission employees.

Social Demography

The population of the Central African Republic is about 2.7 million inhabitants with a growth rate of 2.5 percent annually. Twenty-six percent of the inhabitants live in urban centers and 74 percent live in rural zones. The majority of the population lives along the roads and the Oubangui River in small villages (figure 4). Seventy-seven percent of the villages have an average population of
Figure 4. Map Showing the Population Distribution of the Central African Republic
less than 190 persons. These small rural villages are highly mobile. A mapping study done in 1974 counted 6,984 villages. The following year 911 new villages had been added and 600 had disappeared. Central and western parts of the country are most densely populated with the eastern 40 percent of the country supporting only 6 percent of the population. Even with this unequal distribution the country is sparsely populated. The overall population density of the country is only 3.7 persons per square kilometer.

As a consequence of a high birth rate and a high mortality rate, the population of the Central African Republic is relatively young. It is estimated that 75 percent of the urban population is eighteen years of age or younger. Statistics for the country as a whole report the infant mortality rate at 148 deaths per 1000 births. Estimates go as high as 200 deaths per 1000 births. Infant mortality for the sub-Saharan region ranges from 35 to 200 deaths per 1000 live births compared to a rate of 20 deaths per 1000 births in developed countries worldwide. Life expectancy is 44.4 years for males and 47.6 years for women. The overall male to female ratio is 944 men to 1000 women while in the city of Bangui the ratio is almost equal at 999 men to 1000 women. This is probably due to the fact that men are more likely than women to go to the city for education and work. Polygamy exists as evidenced by census data that shows 125 married women for 100 married men. The average age at first marriage for males is 22.9 years and for females 17.8 years.

More than 80 ethnic groups comprise the population of the Central African Republic. The largest group, the Gbaya, inhabit the western
part of the country. It consists of 13 or more subgroups of which the Suma of Nanga Commune is one. The Banda who live in the central and eastern regions spread over the largest area of the country. Banda subgroups are numerous and difficult to classify and number more than 23. Other smaller groups numerically include the Bantu, Pygmy, Oubanguien, Ngbandi, Nzakara-Zande, Mbum, and Sara peoples and their subgroups. Although every group and subgroup identifies itself with its own language and ethnic customs, similarity of language structure within the main groups allows for some communication between subgroups. However to facilitate progress and a spirit of unity, the national language chosen for the country is the trade language Sango and the official language is French, as previously discussed in chapter two.

Education, which follows the pattern of the French system including instruction in French, is compulsory until age 15. Even so, the percentage of children who attend school is 50 percent or less for the nation as a whole. In Bangui, the capital, close to 90 percent of the boys 10-14 years of age attend school as do 75 percent of the girls in the same age group. Statistics for rural areas for 10-14 year-olds indicate that just over 60 percent of the boys and less than 40 percent of the girls attend school. After 15 years of age, when school is no longer required, the attendance statistics drop markedly. In rural areas 15 percent of the boys 15-19 years of age attend school and only about 5 percent of the girls. The University of Bangui provides advanced degrees and technical schools prepare individuals for work in rural development and agriculture, mining, geology, public works and administration. Classroom attendance statistics do not give an
accurate picture of rural class participation because during various times of the year many of the children are out in the fields helping their parents plant and harvest crops. Frequently students have work assignments during school to assist the teachers with their gardens.

The morbidity rate of the population is high due to tropical and infectious diseases, sanitary conditions and limited health services. Many of the dispensaries and hospitals are poorly equipped. It is anticipated that this situation will improve to some extent because 10 to 15 medical students per year have been graduated from the University of Bangui since 1982. Frequently, however, professionals are not eager to move to rural areas where their services are most needed. Progress has been made against some of the communicable diseases that formerly caused many deaths. Yellow fever and smallpox are considered to have been eradicated and sleeping sickness and cholera are also under control. International health organizations have helped in the fight against leprosy. The Institute Pasteur (a French organization) in Bangui is conducting research in the areas of viral diseases such as hemorrhaghi fevers and AIDS and is equipped to do the necessary laboratory tests.

The three main killers of infants under five years of age are gastro-intestinal diseases, respiratory infections and malaria in that order. There is little evidence that the infant mortality rate has decreased from its level of twenty-five years ago, which indicates that there remains a vast amount of work to do. The World Health Organization continues to assist in the identification and treatment of sexually transmitted diseases. Tuberculosis is still prevalent.
Other diseases associated with poor nutrition are common, such as goiter, kwashiorkor and anemia. A heavy load of parasites contribute to low hemoglobin among a large percentage of the population.  

Many of the health problems can be traced to the environment; lack of clean water, inadequate sanitation and a climate that supports a variety of parasites. Less than 10 percent of the rural population have access to safe drinking water. It is estimated that 80,000 people in the country are infected with internal parasites due to impure water. Another 30,000 people contract schistosomiasis (a parasite which affects the liver) each year. Malaria, typhoid, and onchocerciasis (river blindness), which are water-related diseases, are prevalent. Alcoholism is a problem and the consumption of European alcoholic drinks has increased since their introduction into the culture at the time of World War II. Gradually weaker homemade brews are being replaced by beverages of higher alcohol content.

Nanga Commune with its 100 villages records a population of 14,507 persons according to 1985 census data. Boguila, the commune seat, with a population of 3072, is the largest village in the commune and includes 12 quartiers. The average size of a Nanga Commune village is about 160 persons with the smallest village having 25 inhabitants. Villages are located along the roads which is typical of the country as a whole.

Statistics indicate that 54 percent of the Nanga population is under 15 years of age. This figure is lower than the national average partly because children move out of the commune for junior high and high school education. Table 3, which is based on statistics from the
early 80's, gives a breakdown of the population by sex and class of age. The drop in population between the ages of 10-19 can be attributed to some extent to the lack of schools in the commune and the fact that young people leave rural villages to search for a better life in urban settings. Figures for 1985 show a ratio of 2,927 men to 3,705 women. The great difference between the number of men and women may be due to the rural setting which affords minimal educational and vocational opportunities to males, thus encouraging them to move to the city. Another contributing factor is the lower mortality rate of women.

Current mortality rate statistics for Nanga Commune were not available. Table 3 reveals a marked drop in population between the 0-5 and 6-9 age categories. Indirectly the decrease in the population could be due to a high birthrate during the years that the 0-5 year old children were being born. It could also be indicative of a high mortality rate among the 0-5 age group with a resulting dip in numbers of children in the 6-9 year old group. Lack of adequate statistics prevents a definitive analysis. As stated earlier, statistics for the whole country indicate an infant mortality rate of 200 deaths per 1000 live births. However, a pediatrician working within 130 kilometers of Boguila in an infant health center estimates the infant mortality rate to be closer to 400 deaths per 1000 live births. Other individuals involved in rural projects confirm this estimate. In the course of collecting data for this study I found that over 70 percent of the families interviewed had experienced the death of one or more children.
Table 3. Population of Nanga Commune by Age, 1980

<table>
<thead>
<tr>
<th>Age</th>
<th>0-5</th>
<th>6-9</th>
<th>10-14</th>
<th>15-19</th>
<th>20-29</th>
<th>30-39</th>
<th>40-49</th>
<th>50+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Persons</td>
<td>3059</td>
<td>2017</td>
<td>1046</td>
<td>620</td>
<td>1438</td>
<td>2167</td>
<td>2162</td>
<td>746</td>
</tr>
</tbody>
</table>

Source: Nanga Commune Census Data
Communicable diseases such as whooping cough, tetanus and measles continue to cause many deaths, although they are not listed among the top three killers of infants. Within the past five years a polio outbreak swept through Boguila. Vaccination programs are currently being organized.

Nanga Commune morbidity remains high due to malaria, liver damage from shistosoma, tuberculosis, meningitis and tropical parasites. Whereas cases of chloroquine resistant malaria have been recorded in Zaire for a number of years, only in the past few years has it been found in the Central African Republic. The level of chloroquine resistant malaria is higher in urban areas where a greater percentage of the population is transient. This variation in incidence is also true for sexually transmitted diseases such as acquired immunodeficient syndrome. 38

Education in Nanga Commune is limited. Larger villages have schools although instruction only goes through the lower primary grades. Villages lack qualified teachers. Girls may start going to preschool and to the early elementary grades, but as their capability to help carry water and babysit younger siblings increases, their chances of continuing in school decrease. There are few girls in the upper grades at the Boguila elementary school. As the harvest season approaches and children are needed to help work in the gardens, school attrition rises. At the beginning of the 1986 school year, the principal said that over 600 students were enrolled. Mid-year enrollment was down to 400 students. The quality of education is questionable because of few qualified teachers, crowded classrooms and
a lack of educational materials. Not much emphasis is given to teaching students how to make things that are necessary for daily living in the village, for example, traps, baskets, tools, sieves, mats, nets, musical instruments and storage stands and weapons. Consequently, persons who do get an education are often not prepared to survive and earn a living in the village where jobs for the "educated" are limited. The culture holds to the idea that an educated person should not return to a lifestyle that requires the use of "village" skills. Some of the older villagers realize the danger that faces villages where agricultural and craft skills are being neglected by the current generation.

The Suma number about 20 to 25,000 in the prefecture of Ouham. Although the Suma comprise the majority of the 14,507 Nanga Commune inhabitants, this figure includes a rather large group of Muslim merchants, nurses of other tribes employed by the mission hospital, government officials and non-Suma spouses. The Suma, as a subgroup of the Gbaya peoples, speak an Adamawa-Ubangian language which belongs to the Nile-Congo family. Their language varies from that of other Gbaya groups in the Ouham prefecture because it makes use of three distinct tones (high, middle, low) instead of the usual two tones (high and low) which characterizes the speech of most Gbaya.

Social Organization

Nicholas David stated in 1979 that the cultural history of Central African Republic peoples and their neighbors who speak similar languages, "is less well understood than that of any area of comparable
size in the whole of Africa." It is not that there are no source materials, but rather that they are rarely used. These include primary sources dating to the early French colonial era as well as the knowledge and traditions of the savannah peoples themselves.

Recorded history on the Suma dates from after the French "pacification" of the area, yet no monographs or other publications were available until 1985, when an ethno-botanical and socio-economic study about the Suma was written by Bradshaw in the form of a working paper. Prior to this, Gosselin conducted research for a brief period in 1963 among the Gbaya whose culture is similar to that of the Suma. Bradshaw's research challenges Gosselin's interpretation of Gbaya society, although he credits the data gathered as valuable. An excellent alternative to Gosselin's work is Opportunity and Constraint in a Savanna Society: The Gbaya of Meiganga, Cameroon by Philip Burnham which focuses on the Gbaya in Eastern Cameroon. His findings shed light on the Suma and provide a useful analysis for understanding Suma life.

The Clan

Nanga Commune life appears mistakenly simple to the untrained eye and untuned ear. Family units which usually include father, mother, children and occasionally a nephew, niece or some other family member dwell in plain mud block homes. Life seems to revolve around elementary farming, the collection of water for cooking and washing, market days to buy or sell and time to sit and contemplate beside the evening fire. Actually, a complex social structure is in operation
with a labyrinth of rules and beliefs which regulate all aspects of Suma conduct.

Tribal identification is important and automatic within the culture, even though the government discourages tribal distinctives for the sake of national unity. Members of the same tribe enjoy ready acceptance from one another even if they have never met before. However, in Nanga Commune, the clan is the critical social unit. The Suma tribe is divided into clans which assume descent from a common ancestor. Each clan has its own clan symbol such as a monkey, lion, or panther. Sumas of Nanga Commune identify themselves as the "Snake-Bite-You" group because of their frequent use of the curse, "May a snake bite you!" Their Suma neighbors to the north and east are known as the "Lion-Claw-Your-Mouth" curse-group and to the south and west live the "Hard-Spear-Enter-Your-Side" group.

These distinctions are more than just dialect differences. Members of the same clan symbol may marry someone from a different dialect group. Therefore, a monkey clan male of the Snake-Bite-You curse group could take as his wife a monkey clan female of the Lion-Claw-Your-Mouth group. As a general rule, clan exogamy is practiced. Where identification with a particular dialect group is no longer important, or that aspect of Suma identity is lost, geographical location is considered as a criteria for marriage eligibility. For example, a panther clan male may marry a panther clan female from another village.
The web of family ties extends beyond those who live in the same house. All men and women within the clan are considered kin. Cousins are referred to as brothers or sisters, and uncles and aunts are deferred to as parents. However, the Suma are not a gerentocracy, although Gosselin claimed such.\textsuperscript{46} Control over resources is individual as is the choice of residence as long as one lives with fellow clan members; that is, individuals with the same clan symbol and within the same dialect group. Burnham explains that

individual control of resources even characterizes relations between spouses. Husbands and wives both have their own fields and although one may aid the other at certain stages in the production cycle, proceeds from the sale of a crop remain the individual property of whichever spouse initiated the cultivation of the field. For example, in the production of manioc, men do all the clearing and women do all the processing, but when manioc is to be marketed in bulk for cash, the cultivator (male or female) makes the decision to sell personally.\textsuperscript{47}

Bradshaw concurs with Burnham's observation that this social structure has been remarkably stable over the last century. This is in spite of determined efforts on the part of the French colonial administration to develop large composite towns along major routes.\textsuperscript{48}

The Suma have an Omaha-type kinship system, which is characterized by a complex system of relationships and titles for paternal and maternal cousins, nephews, nieces, uncles and aunts. For example, "relations between a maternal uncle and his sister's son are very marked in Suma society."\textsuperscript{49} Rules are carefully kept which serve as directives for behavior between all kin. As an illustration, a son-in-law is not allowed to eat in the presence of his mother-in-law. Failure to follow guidelines results in castigation, or worse, sorcery, which can result in some mishap, illness, or even death.
Life is replete with obligations. In fact, 13 percent of income is used for gifts to keep the person in good standing in the clan and the community. Often gifts are solicited and to refuse to give them blacklists the individual within the clan. An additional 9 percent goes for paying the dowry. A family member who is successful is expected to supply income to relatives who are less fortunate. Consequently, those who "make good" often attempt to break ties with family by not communicating or visiting. Some decide that working hard for a decent salary is hardly worth it since the benefits are spread so thin. A Peace Corps volunteer working in fish pond development tells of a fish farmer who requested that his friends and family be told that the fish and pond belonged to the Peace Corps. This way the fish farmer would not be obligated to share his profits when the fish were harvested.

Life Work

The Suma maintain subsistence farming, which is complemented by frequent hunting and gathering.

November to March, corresponding with the dry season, is the time when the collective and individual hunting is most active. By February, many families take up residence for periods in the bush while hunting still predominates. Hunting itself is exclusively a male activity but women participate in the outings by collecting small insects like grasshoppers and crickets which are grilled in the flames of the bush fires, or digging out small field rats from their terriers with hoes...The Suma environment offers potentially rich and variegated food resources which are not in high demand from the pressure of population.

Once the Spring rains start, men and women focus their attention on the arduous task of clearing the fields for planting peanuts,
manioc, sorghum, sesame, melons, diverse minor crops and the one cash crop, cotton. The planting and harvesting of cotton requires much work and a sizeable financial investment. Agricultural tasks dominate Suma life well into the dry season.

Bradshaw's research indicates that historically the Suma economic base shifted from hunting with some gathering, to yams and then to sorghum. During the nineteenth century sorghum was replaced by manioc as the primary staple. However, sorghum continues to serve an important function socially and economically because of its beverage making properties and other uses. Its stalk is used in virtually hundreds of ways including construction for food storage platforms, traps, cutting instruments, scrapers, stirrers, kindling fuel, and objects with which to curse. Rituals and beliefs that accompanied the distribution of meat after the hunt were subsequently adapted to sorghum. Today, the Suma continue to adapt by merely substituting certain ingredients, while retaining their basic outlook and social structure. Whereas, certain rituals previously required sorghum dough, now manioc dough is an acceptable substitute.

A walk through a Suma village such as Boguila provides a glimpse of Suma life. However, what I saw while taking an afternoon walk during dry season, did not show the hard labor that is so much a part of subsistence farming or the tensions that are so much a part of Suma life.

...weaving sleeping mats, spinning cotton thread, sewing clothes, sifting sorghum flour, combing a friend's hair, bathing children, shelling seeds, pounding manioc, repairing watches, making beehives, brewing coffee, steeping tea, drawing water from a well, drinking honey beer, watching the cooking pot, washing clothes,
reading a book, dismantling houses, making mud blocks, building houses, listening to the radio; chickens scratching, dogs wandering, goats resting, and a father and son lying on a straw mat sleeping.

Behind this tranquil picture exists a communal life that is characterized by dispute, suspicion and fear. Women, in particular, carry heavy responsibilities physically and socially. They farm, cook, buy, sell, draw water, bear and care for the children. In addition, they are often accused of causing misfortune; be it the inability of the couple to have children; illness; or death in the family.

Although Suma society is egalitarian, women, as Bradshaw so aptly expressed it, "seem to bear the greater part of subsistence labor in their society but more indicative of their status are certain methods of social control which seem to affect them unfairly."妇女 often accused of causing misfortune; be it the inability of the couple to have children; illness; or death in the family.

Although Suma society is egalitarian, women, as Bradshaw so aptly expressed it, "seem to bear the greater part of subsistence labor in their society but more indicative of their status are certain methods of social control which seem to affect them unfairly."54 Two of the ways that they are controlled are by accusations of sorcery and adultery. While men are the practitioners of fetish cults, it is women who primarily practice sorcery which is believed to be inherited by daughters from their mothers. Women are more susceptible to the accusations of sorcery and suffer psychological harassment even to the point of being incarcerated. A double standard exists in the area of sexual relations. Extra-marital affairs are common, but it is the woman who is consistently blamed for any ill effects while the man's status is sometimes heightened.55

Cultural Orientation

A quote summarizing the findings of Father Tempels among the Baluba of the Congo captures the essence of the African world view:
African thought is conditioned by their ontology, that is, their theory of the nature of being; for them being is a process and not a mere state, and the nature of things is thought of in terms of force or energy rather than matter; the forces of the spirit, human, animal, vegetable, and mineral worlds are all constantly influencing each other, and by a proper knowledge and use of them a man may influence his own life and that of others. 56

Almquist, who spent over a decade working as a medical missionary in Central Africa reflects on the African orientation, "There is a basic unity in such a world, and it is precious to the African."57 In light of that perspective, Nida states, "No distinction can be made between sacred and secular, between natural and supernatural, for Nature, Man and the Universe are inseparably involved in one another in a total community."58 The African lives in a religious universe, subject to a distant and powerful God. Spiritual intermediaries provide the communication link to this God who is not clearly understood.

In practical terms, the Suma cultural orientation is that of a traditional society.59 Man is in a fallen state in relation to God and therefore needs to appease the spirits. Man is subjugated to nature and lives in the present time dimension without much thought of the future. The type of personality most valued is that of "being" rather than a "doing" or "achieving" orientation. Relationships between Suma to Suma are predominantly collateral although there is an element of lineal that is emphasized when recognizing someone who is older or has achieved high status because of money or position.

For the Suma all aspects of life are interrelated. Therefore one is not surprised to find religious belief intertwined with health
belief. However, for clarification, a brief overview of religious tenets will be presented before the discussion of health beliefs.

**Religious Beliefs**

The traditional religious orientation among the Suma is animism, or the worship of ancestral spirits. Thus, it is believed that ancestral spirits exert control over matters of everyday life by demonstrating their approval or disapproval of descendants' actions through favorable or harmful acts. Roman Catholic and Protestant groups have been established in Nanga Commune for close to thirty years and most residents identify themselves with one of the two groups. However, many individuals still hold to traditional animistic beliefs and syncretism is common.

According to Bradshaw, almost all Suma males practice rituals that are associated with fetish cults. Men can be qualified at one time or another to participate in various types of cults such as affliction cults. It is easy to be initiated into a cult either by a kinsman or by purchasing a cult in the same manner that a wife is "bought". However, by virtue of birth, everyone, for instance, is a member of an ancestral cult, each descent group having their representative who, although he may be called a "fetisher", is only one of the "fetishers", or "ancestral cultists" of his descent group, for whom he simply serves as an intermediary with the ancestors. He is by no means the only intermediary, uterine nephews being the most commonly called upon persons to serve in this role on a day-to-day basis for any Suma male who feels compelled at any time to propitiate the ancestral spirits.
The fact that the spirits control all aspects of life means that their influence must be taken into account in every situation. This includes: planting, harvesting, fertility, illness, death and disputes.

When wrong is committed, the Suma do not turn to arbitrators within the society, but rather to the powerful beings who live in the spirit world, and to their many affliction cults which are often associated with animals.

Sorcery is commonly practiced. During this year two women were put in jail for sorcery in Nanga Commune because they were accused of "eating a person's spirit", thus killing the person. Poison ordeals are often initiated to prove one's innocence. It is believed that if the person survives the poison, she or he is not guilty. Even so, stigma ensues.

A Roman Catholic priest who has worked in this area for many years explained that animistic ritual is strongly linked to the planting and harvesting of sorghum. Regulations require abstainence from sexual relations between husband and wife during planting. Detailed guidelines are followed about how and when sorghum should be planted and harvested in order to ensure a bountiful yield. He explained that converts to Catholicism find it difficult to cultivate sorghum without following the rites. The planting and the rites are almost inseparable.

Likewise, the spirits are taken into account in every situation. They are part of the fabric of life. It is therefore not surprising that when illness strikes, the Suma mind naturally turns to a supernatural or magical cause.
Health Beliefs

In the African world view, health is related to the life force, the central principle, the world energy of which man is a part, to whose influence he is subject, and which he may on the other hand influence himself...In such a world view health is quite simply having the fullest vital potency, and sickness by contrast is any diminution of vital force. It may be caused by another's curse, by visitation from the shade of a neglected relative, or by one's sins.62

Whereas in Western thought illness is usually attributed to physical or psychological causes, in traditional African thought, an all-encompassing third category is added, the supernatural. "This is the realm of spirits and divinities, of evil and witchcraft, of God Himself."63 This is not to say that traditional healers completely ignore physiological and psychological causes, but with limited understanding of disease processes, they excel in what they know best. Actually, some traditional medicines are effective pharmacologically and are in fact used in a refined form in Western medicine.

In 1981 Oubah-Tessoube conducted a study of social and cultural conceptions of health in the Central African Republic. He found that the foundation for good health is believed to reside "in the maintenance of harmony and equilibrium between man and all that surrounds him (human beings, ancestors, animals, natural and supernatural elements...)."64 Health is thus determined by compliance to a moral order, which when violated, results in illness to oneself or a family member. Thus,

...in general, the Central African bases the interpretation of all phenomenon of everyday life, and particularly health, on purely cultural concepts.
To explain notions of life, health, illness or death, it involves criteria or norms which leave very little room for a scientific outlook.

Consequently, when illness strikes, the individual searches for supernatural causes rather than a scientific explanation. Causes of illness may be related to a lack of respect for parents, not meeting obligations of one's in-laws, or a problem in relationships with other members in the social setting including infidelity in marriage. Other causes of illness may be attributed to; fetishers, magic, poison, divinities, sorcerers, and spirits of the ancestors. As LaPlantine found in his study of illness and traditional medicine in the Ivory Coast, "even if a person knows that he has malaria because the mosquito that bit him carried malaria, he still wants to know why the mosquito bit him and not someone else.""66

For the Central African maintaining health is more than an individual matter. Illness is disquieting to the individual, but also disrupts the family, neighbors and even the entire village. Even individuals who are educated and understand physical causes of illness continue to embrace these traditional beliefs. For example, within the past two years, the mother of an educated village official in Nanga Commune was hospitalized with a stroke. When she died, the process of inquiry was set in motion to determine the "real" cause of her death. Peace did not prevail until the convicted man and his family were evicted from the village.
Summary

The Central African Republic, in the heart of Africa, is a vast, undeveloped, sparsely populated country that is not frequently mentioned in tourist brochures. It is best known as the home of the infamous Emperor Bokassa who is now noted as being the first former head of an African state to have returned home for trial. Tropical and communicable diseases contribute to a high mortality rate. The government is, however, placing physicians in posts outside of the capital now that it is training Central African physicians. Public health and prevention programs are being implemented in some areas.

Nanga Commune in the northwestern part of the country is the home of the Suma tribe, and specifically the "May-a-Snake-Bite-You" curse group. Although households are usually comprised of a single family, the clan is the important social unit in day-to-day living. Life work follows a pattern throughout the year of subsistence farming, hunting and gathering. The cultural orientation is firmly grounded in an animistic philosophy which pervades all aspects of life including health beliefs. The remaining chapters of this report look at oral health; the delivery of oral health care, the oral health status of Nanga Commune residents, and their oral health behaviors and beliefs.
NOTES ON CHAPTER 3


3. McCarthy, Dark Continent, xvi.

4. Ibid.

5. Ibid.


7. See Chapters 1 and 2 in Davidson, The Story of Africa, for an excellent historical account of myths and realities about Africa. Davidson presents evidence that the ancient Greeks held that Africans were different, but equal. He also shows how Europeans greatly wished to believe that Africans did not and could not have accomplished remarkable feats in their past.


12. Ibid.


18. Ibid., 28-29.


20. *Africa South of the Sahara*, 265. The average world population density is 31 persons per square kilometer. The Central African Republic population density of 3.7 may seem very low, but one must take into account the low capacity of production for large tracts of land and the amount of land being cultivated.

21. *Background Notes*, United States Department of State.


24. Ibid., 30.


26. Ibid., 24.

27. Ibid., 30.


36. The term village is used for one or more quartiers. Most of the commune villages are single quartiers, but some villages include more than one quartier.

37. The accuracy of any statistics can be questioned because of the recording system. Death certificates, for example, are only filed for those who pay the fee for such and very few people buy death certificates. Likewise, the year of birth is often stated as, "born around" a particular year. The census, however, is an actual count of all residents by going to each quartier and sitting down with the chief to compose lists of all residents.

38. A study done in a large urban area in Zaire claims that 11 percent of the population is either a carrier or victim of AIDS. It is apparent that among certain urban populations the incidence of AIDS is alarmingly high. In Nanga Commune there are no statistics available on the incidence of AIDS, but one would expect that the rate is much lower. The local hospital has however, confirmed several cases during the past year. The Institute Pasteur conducted studies which were reported in, "Table 1. Prevalence of Serum Antibodies Against Human Immunodeficiency Virus, as Measured by at Least Two Different Screening Tests in Selected Populations, Selected Studies, 1984–1986," Population Reports Series L, No. 6 (July–August, 1986), L-219. These population studies report the percentage of the population with HIV Antibodies. 1,263 persons
from randomly selected households in Bangui (1985) - 4%; 327 persons age 15-34, randomly selected from urban population (1985) - 2%; 930 persons age 15-34, randomly selected from urban population (1986) - 4%; 55 "hospitality girls" (low SES) (1985) - 16%; 179 "hospitality girls" (middle SES) (1985) - 12%.


42. Ibid.


45. I am indebted to Richard Bradshaw for a considerable amount of background information on the Suma. He made available to me notes on the Suma that he compiled during his six years in the Central African Republic; two of those years he lived with the Suma at Boguila.


49. Ibid., 30.


53. Ibid., 15-16.

54. Richard Bradshaw, Notes, Ohio University, Athens, Ohio, 1983.


57. Almquist, Missionary, Come Back! 113.


61. Ibid., 31.


63. Ibid., 113.


65. Ibid.

CHAPTER 4
DELIVERY OF ORAL HEALTH CARE

A conference on oral health, research needs and training in Africa, sponsored by WHO, took place in 1982 in Lagos, Nigeria. Chief dental officers and research workers in dentistry from nineteen African countries attended. The Central African Republic and Zaire were not represented although other neighboring countries participated. In sum, the conference concluded "that oral health services in Africa are poorly developed both in terms of the quality and quantity of services available, including a lack of appropriately trained personnel and appropriate equipment and materials."1

Given this assessment of the African Region and the social and cultural context of the Central African Republic as presented in the proceeding chapter, we now look at the existing oral health care system. Following is a description of oral health services available through the public and private sectors, and care given by traditional healers, which is a significant factor for the majority of the population in this rural country.

The Public Sector

The Service of Public Health and Social Affairs of the Central African Republic was created by law in 1960. Thus the organizational
structure for a health service was set up with six levels of care. At Bangui the national hospital serves as the referral hospital for cases from all over the country. Five large towns maintain general hospitals (Berberati, Bouar, Bossangoa, Bambari and Bangassou). Smaller hospitals provide care in nine other towns. Health centers total 30, sub-stations are located at the commune level, and village health posts number about 200. The national oral health service functions as a department in the Service of Public Health and Social Affairs.

In Bangui the oral health service is located on the first and second floors of the general hospital. The staff includes two stomatologists (a physician with a specialty in dentistry), four dentists, a dental nurse, and a prosthetics lab technician. The stomatologist from France is paid by the French government. The other one is African. The French stomatologist, who arrived in the Central African Republic during the winter of 1986, is the director of the department. Two of the four dentists are Central African, one of whom practices part-time. A third is French and the fourth Egyptian, both of whom are paid by their respective countries of origin. The dental nurse completed nursing studies in the Central African Republic then went to Dakar, Senegal for a two-year dental training program. This qualifies him to practice as an infirmière spécialisé en odontologie (I.S.O.), which translates, "nurse specialized in dentistry." This dental nurse practices with the Egyptian dentist, serving as an expanded duty assistant. The French prosthetics technician, whose lab is at the hospital, also makes his services available to private dentists in the capital. He, and the other French staff, work as cooperants of France.
This is a person who volunteers to work in some service position, in a developing country, assisting and training nationals.

As can be expected with a multinational staff, educational backgrounds vary considerably. The Egyptian was trained in Cairo. French personnel studied in France. One of the African dentists studied in France, another in Dakar, Senegal and the third in Roumania. This mixture of educational experiences and nationality leads to varying philosophies of practice and treatment. Basically each dentist operates an individual practice under the administration of the national dental service. If they have a preference, the clinic patients can choose their dentist. Once assigned to a particular dentist for treatment, patients are usually followed by that dentist throughout the treatment plan.

The dental clinic serves the public during the morning hours and in the afternoon appointments are scheduled for private patients who pay for services rendered. Financial policy states that patients treated in the clinic pay no fees. The only costs to the patient are for prescription drugs and supplies which the patient purchases at a pharmacy.

National health service staff not located at the general hospital include an African dentist who is working at a newly established community hospital in Bangui. At this time the statute under which the community hospital will function has not been determined. Consequently, during the interim a consultation fee of 2000 Central African francs (about six and a half U.S. dollars) is charged. A second dental nurse also trained as an I.S.O. works in Bouar at one of
the five general hospitals outside of Bangui. At the hospital
dispensaries in the regions beyond Bangui there are nurses who on
occasion treat dental problems by extracting teeth. Otherwise,
antibiotics and pain medication are prescribed and patients are
referred to Bangui for treatment.

Most clients seen at the government-operated oral health service
centers reside at Bangui although cases are referred in from outlying
dispensaries when necessary. Each full-time dentist treats 25-35
patients per day, six days per week. An estimated 30,000 patients per
year are seen by these dentists.

Common problems treated include dental caries, gum disease, and
even cellulitis (inflammation of the connective tissue and other soft
tissues of the mouth). Among children there is a high incidence of
calculus (tartar). Advanced stages of gum disease are frequently seen,
some of which have developed into noma, also known as cancrum oris.
This is a serious, sometimes fatal, infection of the soft tissue of the
mouth, often seen in the young. Both stomatologists function as oral
surgeons, treating severe oral infections, surgical and pathological
cases, and accident victims. As summarized by a staff member of the
oral health service, the predominant oral health problems stem from
1) lack of fluoridation, 2) lack of oral hygiene and 3) the consumption
of sugar.

The Private Sector

In Bangui there are two private dental offices which serve the
upper class African, French and other foreign populations. One of the
dentists is French and she works within the confines of a small private French hospital. The other dentist is Iranian and he has established over a number of years a private practice in the city. A prosthetics lab technician also maintains a practice in which he gives direct patient care. His practice is predominantly with prosthetic cases but is not strictly limited to that specialty.

A new 400-bed hospital is being built in Bangui by the Chinese government. The type of oral health services to be provided and the population this facility will serve is not yet known.

Outside of Bangui private mission dental clinics function at three locations; Kaga Bandoro, Berberati, and Boguila. A fourth clinic in the far eastern part of the country at Rafai, was formerly directed by an English missionary dentist, who trained dental auxiliaries. Some of these Africans still work within the mission hospital dispensary system although the dentist left several years ago.

At Kaga Bandoro a specially trained American lay-dentist provides oral health care and trains African dental nurses in a clinic furnished with modern American equipment. Fees charged for service do not cover all the costs, yet the clinic is able to remain open because it is subsidized.

In 1986 a Swedish dentist arrived at Berberati to re-open the clinic in that town. The former dentist left for health reasons and the clinic was closed for a few years without a replacement dentist. This dentist will remain there for another year. At present a replacement has not been found. The cost of operating the clinic is
subsidized by gifts from Sweden which help keep the fees for service within an affordable range.

Three African nurses entered a dental training program at Boguila in March 1986 under the directorship of an American dentist. The nurses had worked three to five years within the already established hospital dispensary system before being chosen as students by the African medical director. The aim of this program is to prepare them to practice independently in outlying mission dispensaries. Teaching objectives of the curriculum include preparing them to teach prevention, do cleanings, extractions, simple fillings, and make simple prosthetic appliances (replacing one or two missing anterior teeth).

The Boguila Dental Center had been closed for 18 years. The equipment necessary to refurbish the clinic and lab areas was donated by churches, interested dentists and individuals, and other private organizations. The goal of this program is to become self-supporting or financially independent of the founding mission organization. Thus the fees for service must eventually pay for the cost of supplies and the salaries of the African dental personnel. The medical hospital dispensary system with which the dental training program is affiliated currently operates with minimal subsidies from outside sources. The hospital dispensary system is run by Africans. An American physician whose services are donated, serves as an advisor and medical consultant. Few mission hospitals are as "Africanized" or as financially independent.

In addition to the treatment attainable through private practices and clinics, pharmacies and Arab shops in practically every village
sell aspirin and various sorts of antibiotics. In rural areas medicines are sold in small Arab shops or by itinerant Arab merchants. Thus prescription drugs are readily available and relatively inexpensive. These medicines can be obtained upon demand and without a medical exam or consultation. Overtreatment is not uncommon even in remote areas of the country. The people think that if someone is very ill they need medicine. Consequently someone may be treated with chloroquine tablets, aspirin and a penicillin injection when they actually never had malaria or an infection. In other cases, the drug is appropriate but the dosage given is inadequate. The long term detrimental effect of this situation is the development of chloroquine-resistant parasites and penicillin-resistant strains of bacteria.

An assessment of the availability of oral health care for the Central African Republic population reveals grim statistics. In the capital city of Bangui where there is a reported population of 300,000, the dentist to population ratio is 1:33,333. Outside Bangui there are three dentists for 2,400,000 persons or a distribution of 1:800,000. An overall dentist to population ratio for the country is 1:225,000. As a means of comparison, the United States dentist to population distribution is about 1:2000, and that of Chad, to the north, is 1:1,049,250.

More of a concern than the dentist to population ratio is the accessibility of oral health care. Even though dentists work in three geographical locations (see figure 5) outside of Bangui, the care provided at these centers is not accessible for the vast majority of the
Figure 5. Map Showing Location of Oral Health Services in the Central African Republic
population. The cost of treatment, the difficulties and expense of travel, the problem of lodging in an area populated by a different tribal group and the loss of time all add up to make dental care unaffordable and impractical.

In addition to the problems of availability and accessibility is that of acceptability. Is the treatment perceived as helpful or worth making the effort to obtain? In a society in which one learns to endure pain, where scraping together a couple dollars is a challenge, and where the average person thinks that the number one job of the dentist is to extract teeth, it is apparent that oral health care is generally not acceptable.

For most of the population, dental treatment, even simple emergency care, is not an option. The lack of oral health care professionals, the reports of high costs, the anticipation of painful dental procedures and a poor understanding of the benefit of oral health care all contribute to this dilemma. It is not surprising that the average Central African who experiences an oral health problem turns to that which is available, accessible and acceptable: traditional medicine.

**Traditional Healers**

In a rural setting such as Nanga Commune, the oral health services described as part of the public sector and private sector are usually not available to most people. The chance of having a clinic, dispensary or village pharmacy in one's village or even nearby is remote. However, aspirin and antibiotics may be for sale by the local
Arab merchant when he comes through town or at his shop in larger villages.

Nanga Commune has a couple government dispensaries, one of which stocks no medicines. A few years ago the Peace Corps piloted a village pharmacy program in Nanga Commune so at least five villages have medicines for sale on a somewhat regular basis. Even though there happens to be a private dental clinic and a mission hospital in Boguila, the communal seat, oral health care is still not considered accessible for the majority of the commune population.

So what does one do when the pain of a toothache becomes unbearable? Initially, advice is sought from a relative or friend. When "home" remedies are not effective other options include the help of a traditional healer or fetisher. An investigation of sorcery and its use for oral health problems was not part of this study. It appears that the services of a sorcerer are usually sought for illnesses that are perceived to be more life threatening than oral health problems, but I would not rule out its use for oral health problems.

During the data collection phase of this study three reputable traditional healers lived in Nanga Commune. Others of lesser distinction also practice in this commune. I tried to meet with the three most frequently mentioned. One week before my visit to one small village for an interview with one of the healers, he and all the villagers evacuated because of an incident in the area in which the villagers were implicated as having been partisan. The village was deserted except for one pregnant woman and numerous goats resting in the shade
of the huts. Thus, the information presented here stems from interview sessions with the other two healers.

These traditional healers learned their art from their fathers, who were knowledgeable in their use of plants and organic materials for physical ailments. The process of becoming healers in their own right took the form of an apprenticeship where they observed and then gradually participated to a greater extent in the actual prescription of treatment. Women may practice as healers; however, the ones I interviewed were men.

Payment for services varies with the type of problem and the amount of work required of the healer for the particular cure. Fees are usually set before the service is rendered and a verbal agreement specifies the animal, amount of grain or monetary sum necessary. In cases of treatment over a period of time, partial fees are required and if the treatment is successful, the final payment is made. Healers are frequently the recipients of gifts as well. Fees for well-known healers can be around fifty dollars or more which is considered a lot of money in this economy.

For the most common ailments traditional healers provide care by explaining to the client what should be done for the particular problem. In cases where the plant or organic product is not commonly known or is not readily available, the healer will make the necessary effort to go out in the woods to locate the product. The healer maintains secrecy about certain products and their method of preparation. A demonstration of how to prepare the more common remedies and how to apply them is sometimes part of the treatment. For
some illnesses the healer requires that the client visit his house
twice a day to drink a medicinal broth. In most cases, it is knowledge
that is requested and given rather than physical manipulation or
treatment. One of the healers interviewed will say a prayer to God
requesting healing when he gives the medicine. While interviewing one
of the healers, a woman with a sick child walked up to the brush arbor
where we were sitting. She sat down on a stool in the yard until he
asked her to approach his chair. After her explanation of the problem
he told her what kind of leaves to boil and how to use the resulting
mixture to wash the child. Although the number of clients that request
help for oral health problems is small compared to those having other
types of illnesses, the healers readily described the kinds of
treatment that they recommended and expressed the expected results.

Practices and Prognoses

At the outset of an interview the healer explained that the types
of products used for treatment vary according to the traditional
healer. He listed a few plants which people in the community use,
adding that he uses those he prefers although the effect is similar.
See appendix E for a complete list of plants cited as useful for oral
health problems. Both healers use the root and bark of plants as well
as some inorganic products for oral health remedies and stated that
they do not pull teeth. One of the healers highly praised the
effectiveness of an organic non-plant product. There was little
overlap in the type of plants that the two healers used. Only the bark
of one plant was mentioned by both men.
All clients who seek the help of the healer for an oral health problem have one major complaint; pain. The underlying causes, which are the source of this pain, are divided into three categories. First, infection which is frequently in the form of an abcess; second, a large cavity; and third, painful sores in the mouth. Each category will be discussed in terms of the practices employed and the prognoses promised by the healer.

One of the treatments for infection consists of a mixture of three plants:

You take gbokola bark, papaya root, (which is especially good for infections), and sory root and boil them in water. When the solution is hot the person rinses with it. In five to ten minutes the abcess will pop and the pain will ease.

The other treatment indicated for an abcess combines the following:

You make a solution by boiling in water the tara root, the bark of dinh and the bark of doma. You rinse the mouth three times and spit. Take extra juice of the dinh and put it in the place where the pain is the worst. The dinh is especially effective in decreasing pain. Tara will neutralize poison since it is an anti-poison agent and the doma cleans the "white blood" (pus) in the mouth. The bug comes out to suck the doma juice. You place the extra juice of dinh in the area where it hurts and the dinh kills the bug.

Practices recommended for pain caused by a "hole in the tooth" incorporated some of the same products as those used for treating infections. Four protocols are presented. First,

If someone comes complaining of a toothache, they are given the sory root. When they rinse with the sory solution it takes the pain away. It kills the bug, too. Sometimes the bug falls out and sometimes not.
Second,

For pain caused by a hole in the tooth due to little bugs (microbes), it is recommended that the person cleans the teeth with ashes, charcoal and salt. The ashes whiten the teeth. Charcoal cleans the teeth by ridding the mouth of food particles and the salt is used to kill the little bugs and calm the pain. The salt won't kill the larger worm-like bug.

Third,

Take a piece of dinh and fit it to the hole in the tooth. On the end of the stick of dinh put some natron (salt from Lake Tchad) and stuff it in the hole. After 12 to 24 hours the bug is dead forever. The natron has an effect on the dinh which potentiates it. Both dinh and natron are bitter and work together. You need both together.

Fourth,

The best treatment is to take the excrement of elephants and mix it with natron that has been browned over the fire. Put the mixture in the hole whether the person has swelling or not. It kills the bug forever. It is very effective, more effective than dinh. It's hard to find elephant dung, but sometimes you can get it near Markounda.

Suggested treatment for the third type of problem which is pain caused by sores in the mouth, is to rinse with a solution made from doma bark. Salt water was also mentioned as a soothing agent for sores.

The practices of the healers are palliative and to some extent curative. If the pain subsides the client is satisfied. The fact that a few remedies were touted as being able to kill the "bug" forever implies that often remedies provide temporary alleviation of the ailment.

In sum, the healers' practices abate pain and in some cases produce bactericidal effects. For example, rinsing with salt water is a scientifically sound way to kill some destructive oral bacteria.
Essentially, in a culture where one is minimally concerned about the future and one is accustomed to living with discomfort, the traditional healer provides acceptable prognoses: pain may diminish, swelling may go down, and the offending "bug" may die. On occasion the pain may subside permanently although the precipitating problem remains. The fact that there is unlikely to be a promise of cure is not of concern.

Summary

Public sector oral health services consist of government-operated clinics in the capital and one auxiliary stationed in an outlying city. The private sector includes a couple foreign dentists who have practices in the capital and three mission-run clinics in remote areas beyond Bangui. The existing oral health system which includes public and private sectors is summarized in table 4 (see appendix F).  

Most residents of the Central African Republic do not have what Barmes refers to as available, accessible or acceptable oral health care services. The oral health care system is marked by a paucity of oral health care professionals and auxiliaries. This problem is heightened by the fact that the population is 70-80 percent rural and services are located mainly in urban areas. Traditional medicine and over-the-counter sales of antibiotics and aspirin serve the vast majority of the population with palliative care for oral health problems. The high cost of oral health services combined with a constituency that is hampered with a lack of education, economic
problems and geographic obstacles contribute to the challenge of delivering oral health services in this country.
NOTES TO CHAPTER 4


2. Dentists are defined as individuals who are licensed to practice dentistry. I included the lay-dentist who has a certificate, but did not include the prosthetics technician. There are seven dentists and two stomatologists in Bangui and three dentists in rural areas making a total of 12.


5. These healers had developed reputations beyond the isolated villages in which they lived. I was told about them by persons in Boguila. One healer lived in Boguila. Two others practiced in outlying villages 18 and 33 kilometers from Boguila.

6. Appendix E lists the Suma name and the scientific Family or Species name when that information is available. A description of the plant family is included along with its importance to the Suma. The plant directory is not complete, but is an initial compilation of local plants which have been identified and serves as a basis for future plant analysis. Richard Bradshaw and Michael Fay compiled this information as found in, "Local Plant Names from Various Gbaya Ethnic Family Dialects and Their Scientific Identification," Manuscript, n.d. The most comprehensive information on Central African plants which includes illustrations, scientific information about the plants and African uses is Central African Plants with Illustrations and Uses. However, Suma names are not listed and the volumes are not indexed. Plants are listed according to scientific Family. See, Richard Bradshaw and Gaston Youkouyema, Flore Centrafricaine avec Illustrations et Emplois [Central African Plants with Illustrations and Uses] 5 vols. Copy available at the Facultés des Sciences Naturels, University of Bangui.

7. Chapter 6 on oral health behaviors and beliefs discusses the commonly-held beliefs about the cause of oral health problems.
CHAPTER 5
DIAGNOSIS OF ORAL HEALTH

This survey, in the form of a clinical exam, was conducted to obtain base line data on the oral health status of Nanga Commune. These findings should serve as a guide to providing appropriate oral health services and developing an effective program of prevention for this population.

At the time of the data collection no known studies had been done to assess the oral health of Central African populations. Since then a study of preschool-age children living in Bangui has been found. This study was done in 1982 to fulfill the thesis requirement for an African studying dentistry in France.

This chapter describes the oral health survey of Nanga Commune. The survey instrument is explained and the conduct of the survey including details about the sample, the subjects and the statistics are also discussed. Pertinent findings are presented for three age groups followed by an analysis of oral health problems diagnosed and the treatment needed.

Oral Health and Treatment Need Assessment Instrument

The WHO Combined Oral Health and Treatment Need Assessment (with CPITN) 1983 E Form is designed to determine the nature and extent of
oral diseases or other conditions in the community for the purpose of planning and developing an oral health programme." An added feature of the Combined Health and Treatment form is that, "it will provide data for each oral health status section, enabling health administrators to obtain more comprehensive estimates for preventive, curative, and restorative action and for manpower requirements than are possible from oral health status measurements alone." The one-page form, which was used in the French version, is organized into seven sections. They are: 1) personal and demographic information, for example, sex, age, ethnic group, occupation, name, geographic location and the examiner, 2) other conditions which can be specified by the investigator, 3) denture status and need for such, 4) fluorosis and its severity, 5) oral mucosa and dentofacial anomaly, 6) community periodontal index of treatment needs, and 7) dental caries status and treatment of teeth. All sections of the form were filled out for this study, however, the two sections that were particularly relevant measured periodontal disease and dental caries. References that explain to the examiner how to use the form are available from WHO.

Periodontal disease is recorded for six quadrants in the mouth; three on the upper jaw and three on the lower. The five-point scale indicating levels of health are; healthy, bleeding, calculus, a pocket depth of four or five millimeters and a pocket greater than six millimeters. At the initiative of WHO this index for assessing periodontal disease was tested and instituted because it is, "simple, rapid and reliable." The dental probe used to measure gum disease was developed by WHO as well.
The dental caries section of the form records the caries, their severity and recommended treatment for primary and permanent teeth. Filled and missing teeth are identified and treatment needs are noted as either restorations (fillings and crowns) or extractions. The section in which the investigator could specify other conditions was used for identifying defects of teeth and esthetic alteration of dentition.

**Oral Health Survey**

For reasons of economy in terms of time and money the guidelines for a WHO "pathfinder" study were followed. This type of survey limits the number of age groups included in the sample. Children six years old, 12 years old and adults of 35-44 years provided an assessment of 1) children entering primary school, 2) children exiting primary school and 3) the adult caries and periodontal disease pattern. Data from the oral health survey, along with the examiner's coding system and basic population information on Nanga Commune (see appendixes C and D) were sent to the Oral Health Unit of WHO at Geneva. 8

Ten villages were chosen for conducting the survey as described in chapter two of this report. In Boguila, the largest of the villages, each of the 12 quartiers were proportionally represented for the adult sample. The smallest quartier had a sample of two and the largest 19 subjects, for a total of 58 subjects. Within quartiers the subjects were randomly chosen by going to homes and asking if the adults were 35 to 44 years old and whether they would be willing to undergo a simple dental exam. If they agreed, they signed a consent form at the time of
Figure 6. Oral Health Survey Exams Conducted in Nanga Commune Villages
the exam. Samples from the nine surrounding villages were drawn on the same basis as the quartier samples with a total of 46 adult exams, giving an adult sample of 104. The six-year-old and 12-year-old subjects were also chosen proportionally with the exception of Boguila where all of the six-year-olds and 12-year-olds at school were examined. See figure 6 which shows the number and location of survey exams.

Approximately 1.5 percent of the adult population of the commune was examined. The percentage of the 35-44 year-olds that were examined is not known because no statistics by age were available. The sample was predominantly Suma, but since the study was designed to assess Nanga Commune oral health, Arabs and persons of other tribal origin were not excluded.

Six-year-olds and 12-year-olds for the most part, were examined at school. Age determination was sometimes difficult and estimates had to be made. At Boguila arrangements were made to examine children on a specific day. A couple of the surrounding villages prepared for our arrival by having the school children lined up for exams. Consent forms were signed by a responsible adult because parents were usually not nearby. At the other seven villages the six-year-olds and 12-year-olds examined were either curious bystanders or found at their homes. Over 90 percent of the sample were categorized as school attenders. That may or may not be the case. Children who do not attend school frequently or at all, when asked, often respond by saying that they go to school. General statistics indicate that 35-45 percent of rural children attend school. The survey sample probably had a
higher percentage of school attenders than the average. Approximately 3 percent of the population under 15 years was included in the survey. Again, because no population statistics by age were available, one can only guess at the percentage of six-year-olds and 12-year-olds that were examined.

Since Nanga Commune is an agricultural community it is not surprising that 70 percent of the adults identified themselves as farmers. Another 20 percent, who were women, reported their occupation as housewife. Essentially, the work of the housewife is that of food provider and most farm as well. Thus about 90 percent of the sample were farmers. Other occupations listed include teacher, businessman, laborer and shepherd. Although no data was available from which to estimate disease prevalence, a high level of periodontal disease and a moderate to low level of caries was expected. The sample can be considered reasonably representative of the Nanga Commune population because of population homogeneity; educationally, economically and occupationally, which results in similar types and levels of oral health problems and the anticipated prevalence of dental caries and gum disease in the population. A precision level not greater than \( \pm 1.0 \) DMF with a confidence level of 95 percent was considered adequate.

Typically, we notified a chief or church leader from the village about the date of our arrival. In one case we were to return to a village in two days but were advised not to return as planned because of a homicide. We went back three days after our scheduled rendezvous. As mentioned previously, all the chiefs heard about the research at the annual commune budget meeting.
We took the necessary equipment for the exams with us. The dentist transported a portable dental chair and the instruments to do the survey. In several villages emergency dental care was provided. A table for the instruments was obtained from a dispensary or a nearby house where we were working. Exam sites were set up at central locations in the villages such as a dispensary, church, school or under a tree near the chief's house. Working outside afforded better lighting than inside. When the quota of subjects had not been met at the examination site, the dentist and one of his three assistants, who were nurses studying in a dental auxiliary program, would go house to house looking for subjects who met the age criteria. The subjects would either return to the examination site or be examined at their homes. Rarely did individuals come to the dentist to get treatment, so the sample was not taken from persons seeking dental care. Most subjects were not aware of the extent of their dental problems. Frequently at the end of exams an attempt was made to explain what problems were found and what treatment was recommended. On occasion after a subject was examined some emergency treatment was given.

In more than one village it was difficult to find adults for the exams. Age determination was not easy. Very few people knew their age and even if they had a birth certificate it rarely gave an exact date of birth. Frequently an approximation of age was made based on appearance or in the case of women, the number of children borne. Potential subjects exhibited hesitancy to be examined for reasons that may have included embarrassment, fear and uncertainty about the unknown. For most of these people this was the first time they had
ever seen a dentist. It would have been advantageous to have a private well-lit area for the exams. As the dentist examined subjects it became evident that the subjects appreciated privacy during procedures which involved the oral cavity. While the dentist and his assistants collected oral health survey data, I interviewed individuals about their oral health behaviors and beliefs. The information I gathered confirmed subjects' need for privacy. I assisted the dentist as time permitted, most importantly in helping to find subjects.

Prior to the first day of the oral health survey, the dental auxiliary students were given a lecture on the purpose of conducting the study. They were then oriented to the instrument being used and given explanations about the subject numbering system, consent forms and codes. The importance of accurate coding and proper organization of the survey forms was emphasized. Former hospital record clip boards worked well in providing a hard surface on which to write and also kept the exam forms with their similarly numbered consent form. I checked the forms to make sure that all the necessary data was recorded after leaving each data collection site.

Several pretest exams were done to acquaint the dentist to the oral health instrument and check for coding errors. Two types of potential errors were evident; within-examiner variability, especially for the sections on periodontal disease, and errors in recording the examiner's findings, due to noise level and lack of concentration or fatigue on the part of the assistants who recorded the codes. The assistant sat as close to the dentist as possible, but even so ideal conditions were not always the case.
Duplicate exams were conducted during the course of the survey on 19 subjects. Four of the 19 exams had complete reproducibility. An assessment of the number of errors showed a 5.5 percent variability between the codes recorded on the first exam and those recorded on the duplicate exam for the periodontal and caries sections of the form.

The most common errors involved variation in coding the state of health for gum disease. For example, during the first exam a sextant would be coded as having calculus and the duplicate exam would be coded bleeding or vice versa. My hunch is that the errors in the caries section were more frequently errors in transcription of codes because of the speed and concentration required to code without error.

Assistants were instructed to ask the dentist to repeat his findings if they were not sure what he said or if they thought they might have gotten mixed up in the recording sequence.

After the data collection phase of the research, I made duplicates of the WHO survey forms, then bundled them for mailing in groups of about 100. In making duplicate forms, I checked and re-checked for copying errors. I kept the originals on file. WHO Oral Health Division staff key punched the data onto computer punch-cards for computer processing. I received the computer printouts about two months after mailing in the data. The results are in the form of simple percentages, mean numbers and cross-tabulations which were analyzed with the Statistical Package for the Social Sciences (SPSS). Categories used for cross-tabulations, such as occupation and ethnic group, produced cells that for the most part were too small and did not serve the purposes of this study.
When I mailed the data, I included 19 duplicate exams which I had marked with a numeral two along with the first exam form which was identified with a numeral one. It appears that the duplicate exams were included in the sample of subjects to be analyzed, although for the adult subjects the \( n \) reported by WHO is two less than it should be if that is the case. This may have been due to a clerical error. Consequently, the \( n \) for adult exams is 107 for the caries statistics and 108 for the periodontal statistics instead of 104; for six-year-olds 119 instead of 114; and for 12-year-olds 113 instead of 104. Because the number discrepancy involved is small and the kind of information sought does not require a high level of accuracy, I proceeded with an analysis of the results without seeking a re-processing of the survey data.\(^{11}\)

Out of pocket costs for the survey were minimal. Cash expenses included; 1) fuel for transportation, 2) a per diem wage for my translator, whose primary job was helping with interviews but who also made contact with most villages and accompanied us on outings, 3) the salary of a young lad who served as a sitter for my sons who traveled with us, and 4) postage costs for mailing the survey forms to Geneva. The dental nurse students were not paid because their help with coding was part of their educational experience. The fact that this survey was conducted in Nanga Commune with all villages within 33 kilometers cut costs considerably.\(^{12}\)
Nanga Commune Six-Year-Olds

The percentage of six-year-olds with decayed, missing or filled (DMF) primary teeth is 66.4 percent as shown in table 5. In the mouths of these children an average of 2.6 decayed or missing teeth are found. Among the six-year-olds examined, the average child has 2.5 decayed teeth, 0.1 teeth missing and none filled. The percentage of boys with DMF teeth is 71.1 percent compared to 58.1 percent of the girls. Boys have a DMF mean of 2.9 affected teeth and girls 2.2.

The percentages of six-year-olds who need treatment for caries among primary teeth are identified in table 6. No treatment is necessary for 32.8 percent of the subjects; 32.8 percent need a one-surface

<table>
<thead>
<tr>
<th>Subjects</th>
<th>N</th>
<th>Percent Subjects with DMF</th>
<th>Mean No. of Teeth DMFT</th>
<th>Mean No. of Teeth D</th>
<th>Mean No. of Teeth M</th>
<th>Mean No. of Teeth F</th>
<th>Mean No. of Teeth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>43</td>
<td>58.1</td>
<td>2.2</td>
<td>2.1</td>
<td>0.1</td>
<td>0.0</td>
<td>11.5</td>
</tr>
<tr>
<td>Male</td>
<td>76</td>
<td>71.1</td>
<td>2.9</td>
<td>2.8</td>
<td>0.1</td>
<td>0.0</td>
<td>12.8</td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td>66.4</td>
<td>2.6</td>
<td>2.5</td>
<td>0.1</td>
<td>0.0</td>
<td>12.3</td>
</tr>
</tbody>
</table>

DMFT—Decayed, Missing, Filled, or Treated
restoration (filling); 51.3 percent need a two-surface restoration; and 12.6 need a three-surface filling. Extractions for caries among primary teeth are recommended for 11.8 percent of six-year-olds. Table 7 shows that an average of 9.8 teeth need no treatment. The mean number of teeth requiring treatment are; 0.8 teeth need a one-surface filling, 1.3 teeth a two-surface filling, 0.2 teeth a three-surface filling, 0.0 a three surface filling or crown and 0.2 teeth an extraction for caries.

Table 6. Treatment Requirement for Caries in Primary Teeth, Percentages of Six-Year-Old Subjects Requiring Care, (N=119)

<table>
<thead>
<tr>
<th>No Treatment</th>
<th>1 Surface Filling</th>
<th>2 Surface Filling</th>
<th>3 Surface Filling</th>
<th>More Than 3 Surface Filling or Crown</th>
<th>Extractions For Caries</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>32.8</td>
<td>32.8</td>
<td>51.3</td>
<td>12.6</td>
<td>0.0</td>
</tr>
</tbody>
</table>

The caries incidence of permanent teeth is 57.1 percent of six-year-olds and the mean DMF is 1.3. As with primary teeth, a higher percentage of boys have caries than girls; 60.5 percent and 51.2 percent, respectively. Table 8 also shows the mean number of decayed teeth as 1.3 for both boys and girls.
Table 7. Mean Number of Primary Teeth Requiring Treatment Among Six-Year-Old Subjects, (N=119)

<table>
<thead>
<tr>
<th>No Treatment</th>
<th>1 Surface Filling</th>
<th>2 Surface Filling</th>
<th>3 Surface Filling</th>
<th>More Than 3 Surface Filling or Crown</th>
<th>Extractions For Caries</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>119</td>
<td>9.8</td>
<td>0.8</td>
<td>1.3</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Table 8. Caries in Permanent Teeth of Six-Year-Old Subjects, (N=119)

<table>
<thead>
<tr>
<th>Subjects</th>
<th>N</th>
<th>Percent Subjects with DMF</th>
<th>Mean No. of Teeth DMFT</th>
<th>Mean No. of Teeth D</th>
<th>Mean No. of Teeth M</th>
<th>Mean No. of Teeth F</th>
<th>Mean No. of Teeth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>43</td>
<td>51.2</td>
<td>1.3</td>
<td>1.3</td>
<td>0.0</td>
<td>0.0</td>
<td>11.3</td>
</tr>
<tr>
<td>Male</td>
<td>76</td>
<td>60.5</td>
<td>1.3</td>
<td>1.3</td>
<td>0.0</td>
<td>0.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td>57.1</td>
<td>1.3</td>
<td>1.3</td>
<td>0.0</td>
<td>0.0</td>
<td>10.5</td>
</tr>
</tbody>
</table>

DMFT-Decayed, Missing, Filled, or Treated

Recommended treatment for permanent teeth among six-year-olds indicates that 45.4 percent of subjects need no treatment. A one-surface filling is required for 53.8 percent of the six-year-olds; a two-surface filling for 2.5 percent; a three-surface filling for 0.8
percent. The mean number of permanent teeth which need no treatment is 9.8. One-surface restorations are needed for 1.2 teeth. The extent of disease is low enough among the permanent teeth of six-year-olds as to require no two-surface or three-surface fillings (see tables 9 and 10).

Table 9. Treatment Requirement for Caries in Permanent Teeth, Percentages of Six-Year-Old Subjects Requiring Care, (N=119)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>No Surface Filling</th>
<th>1 Surface Filling</th>
<th>2 Surface Filling</th>
<th>3 Surface Filling</th>
<th>More Than 3 Surface Filling or Crown</th>
<th>Extractions For Caries</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>119</td>
<td>45.4</td>
<td>53.8</td>
<td>2.5</td>
<td>0.8</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Table 10. Mean Number of Permanent Teeth Requiring Treatment Among Six-Year-Old Subjects, (N=119)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>No Surface Filling</th>
<th>1 Surface Filling</th>
<th>2 Surface Filling</th>
<th>3 Surface Filling</th>
<th>More Than 3 Surface Filling or Crown</th>
<th>Extractions For Caries</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>119</td>
<td>9.3</td>
<td>1.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>
No periodontal disease is found in 5.9 percent of six-year-olds and 30.3 percent have only bleeding as a symptom of gum disease. However, 46.2 percent of six-year-olds show signs of calculus and 17 percent had shallow gingival (gum) pockets. None of the six-year-old subjects have deep pockets (see table 11).

Table 11. Periodontal Status for Six-Year-Old Subjects by Percentages, (N=119)

<table>
<thead>
<tr>
<th>N</th>
<th>119</th>
<th>5.9</th>
<th>30.3</th>
<th>46.2</th>
<th>17.6</th>
<th>0.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>N with No Periodontal Disease</td>
<td>5.9</td>
<td>30.3</td>
<td>46.2</td>
<td>17.6</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>N with Bleeding Only</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N with Calculus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N with Shallow Pockets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N with Deep Pockets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Survey results as shown in table 12 indicate that for six-year-olds, the mean number of sextants with no periodontal disease is 2.1. Bleeding is apparent in 3.9 sextants, calculus in 2.0 sextants, shallow pockets in 0.4. No sextants with deep pockets are found.

The prescribed treatment for periodontal problems (see table 13) is that 63.9 percent of the subjects need prophylaxis (removal of calculus which cannot be done with a toothbrush) and none required complex care, which potentially involves surgery or extensive
Table 12. Periodontal Status for Six-Year-Old Subjects, Mean Number of Affected Sextants, (N=119)

<table>
<thead>
<tr>
<th>N</th>
<th>Mean Number of Sextants with No Periodontal Disease</th>
<th>Mean Number of Sextants with Bleeding</th>
<th>Mean Number of Sextants with Calculus</th>
<th>Mean Number of Sextants with Shallow Pockets</th>
<th>Mean Number of Sextants with Deep Pockets</th>
</tr>
</thead>
<tbody>
<tr>
<td>119</td>
<td>2.1</td>
<td>3.9</td>
<td>2.0</td>
<td>0.4</td>
<td>0.0</td>
</tr>
</tbody>
</table>

sextant—the mouth is divided into six sextants; three in the upper jaw and three in the lower

shallow pockets—defined as 4 or 5 millimeters and a deep pocket as 6 millimeters or more

Table 13. Periodontal Status and Treatment Needs for Six-Year-Old Subjects by Percentages and Mean Number of Sextants, (N=119)

<table>
<thead>
<tr>
<th>N</th>
<th>Oral Hygiene Instruction TN1 (percentage)</th>
<th>Prophylaxis TN2 (percentage)</th>
<th>Prophylaxis TN2 Mean Number Sextants</th>
<th>Complex Care TN3 (percentage)</th>
<th>Complex Care TN3 Mean Number Sextants</th>
</tr>
</thead>
<tbody>
<tr>
<td>119</td>
<td>94.1</td>
<td>63.9</td>
<td>2.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

prophylaxis—cleaning of teeth which usually includes the removal of calculus which is not possible to remove with a toothbrush alone

complex care—refers to care that may include surgery, antibiotic therapy and aggressive oral hygiene care

TN1, TN2, TN3—denote three levels of treatment
antibiotic treatment and aggressive oral hygiene care. Prophylaxis treatment is recommended for an average of 2.0 sextants per six-year-old subject.

Nanga Commune 12-Year-Olds

Results of the survey show that 88.5 percent of the 12-year-old subjects have caries. These are cavities in permanent teeth. The average number of teeth affected per subject is 4.1. There are no missing teeth or filled teeth. Twelve-year-olds have an average of 25.6 permanent teeth indicating that close to an average of two 12-year molars have already erupted as seen in table 14.

Table 14. Caries In Permanent Teeth of 12-Year-Old Subjects, (N=113)

<table>
<thead>
<tr>
<th>N</th>
<th>Percent Subjects with DMF</th>
<th>Mean No. of Teeth DMF</th>
<th>Mean No. of Teeth D</th>
<th>Mean No. of Teeth M</th>
<th>Mean No. of Teeth F</th>
<th>Mean No. of Teeth</th>
</tr>
</thead>
<tbody>
<tr>
<td>113</td>
<td>88.5</td>
<td>4.1</td>
<td>4.1</td>
<td>0.0</td>
<td>0.0</td>
<td>25.6</td>
</tr>
</tbody>
</table>

DMFT-Decayed, Missing, Filled or Treated

Among the 12-year-olds 11.5 percent of the subjects need no treatment. One-surface restorations are recommended for 88.5 percent of the
subjects, two-surface fillings for 11.5 percent. More extensive restorations involving three surfaces are not needed. The mean number of teeth per subject requiring treatment are as follows; 21.6 need no treatment, 3.9 need a one-surface filling, 0.2 need a two-surface filling, and none require more extensive fillings. Tables 15 and 16 depict these results.

Table 15. Treatment Requirement for Caries in Permanent Teeth, Percentages of 12-Year-Old Subjects Requiring Care, (N=113)

<table>
<thead>
<tr>
<th>No Treatment</th>
<th>1 Surface Filling</th>
<th>2 Surface Filling</th>
<th>3 Surface Filling</th>
<th>More Than 3 Surface Filling or Crown</th>
<th>Extractions For Caries</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>119</td>
<td>11.5</td>
<td>88.5</td>
<td>11.5</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Table 16. Mean Number of Permanent Teeth Requiring Treatment Among 12-Year-Old Subjects, (N=113)

<table>
<thead>
<tr>
<th>No Treatment</th>
<th>1 Surface Filling</th>
<th>2 Surface Filling</th>
<th>3 Surface Filling</th>
<th>More Than 3 Surface Filling or Crown</th>
<th>Extractions For Caries</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>119</td>
<td>21.6</td>
<td>3.9</td>
<td>0.2</td>
<td>0.0</td>
</tr>
</tbody>
</table>
As expected, the incidence of periodontal disease increases with age. The percentage of 12-year-old subjects who show no signs of gum disease is 0.9. Only 5.3 percent have bleeding as their only symptom of periodontal problems. Forty-four percent have calculus and 48.7 percent have shallow pockets. Less than 1 percent have deep pockets (see table 17).

Table 17. Periodontal Status for 12-Year-Old Subjects by Percentages, (N=113)

<table>
<thead>
<tr>
<th>N</th>
<th>Percentage of Persons with No Periodontal Disease</th>
<th>Percentage of Persons with Bleeding Only</th>
<th>Percentage of Persons with Calculus</th>
<th>Percentage of Persons with Shallow Pockets</th>
<th>Percentage of Persons with Deep Pockets</th>
</tr>
</thead>
<tbody>
<tr>
<td>113</td>
<td>0.9</td>
<td>5.3</td>
<td>44.2</td>
<td>48.7</td>
<td>0.9</td>
</tr>
</tbody>
</table>

In table 18 the average number of sextants requiring no treatment in the 12-year-old group is 1.1. Treatment is recommended for an average of 4.9 sextants with bleeding, 3.6 sextants with calculus, and 1.2 sextants with shallow pockets. No sextants need treatment for deep pockets.
Table 18. Periodontal Status for 12-Year-Old Subjects, Mean Number of Affected Sextants, (N=113)

<table>
<thead>
<tr>
<th>N</th>
<th>Mean Number of Sextants with No Periodontal Disease</th>
<th>Mean Number of Sextants with Bleeding</th>
<th>Mean Number of Sextants with Calculus</th>
<th>Mean Number of Sextants with Shallow Pockets</th>
<th>Mean Number of Sextants with Deep Pockets</th>
</tr>
</thead>
<tbody>
<tr>
<td>113</td>
<td>1.1</td>
<td>4.9</td>
<td>3.6</td>
<td>1.2</td>
<td>0.0</td>
</tr>
</tbody>
</table>

sextant—the mouth is divided into six sextants; three in the upper jaw and three in the lower

shallow pockets—defined as 4 or 5 millimeters and a deep pocket as 6 millimeters or more

Based on the extent of periodontal disease found among 12-year-olds, the following treatment needs are delineated: ninety-nine percent of 12-year-olds need oral hygiene instruction; 93.8 percent need prophylaxis for an average of 3.6 sextants per subject, and 0.9 percent of these subjects require some sort of complex care for gum inflammation. These figures are shown in table 19.

Nanga Commune Adults 35-44 Years Old

The final group of subjects examined as part of this survey are the adults 35-44 years old. Having looked at the six-year-olds and 12-year-olds the picture of adult oral health follows the pattern expected. In the area of caries 88.8 percent of the subjects show
Table 19. Periodontal Status and Treatment Needs for 12-Year-Old Subjects by Percentages and Mean Number of Sextants, (N=113)

<table>
<thead>
<tr>
<th>Oral Hygiene Instruction</th>
<th>Prophylaxis TN2 (percentage)</th>
<th>Prophylaxis TN2 Mean Number Sextants</th>
<th>Complex Care TN3 (percentage)</th>
<th>Complex Care TN3 Mean Number Sextants</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>113</td>
<td>99.1</td>
<td>93.8</td>
<td>3.6</td>
</tr>
</tbody>
</table>

prophylaxis-cleaning of teeth which usually includes the removal of calculus which is not possible to remove with a toothbrush alone

complex care-refers to care that may include surgery, antibiotic therapy and aggressive oral hygiene care

TN1, TN2, TN3—denote three levels of treatment

signs of caries. The mean number of affected teeth per subject is 6.8. A subject has an average of 5.4 decayed, 1.4 missing and no filled teeth as shown in table 20 below.

Given this level of disease the recommended treatment for caries as outlined in table 21 shows that 13.1 percent of adults need no treatment; 57 percent need a one-surface restoration; 60.7 percent need a two-surface restoration; and 10.3 percent need a three-surface restoration. Extractions are needed in 78.5 percent of the subjects. Caries are given as the reason for the need of extractions in 54.2
Table 20. Caries in Permanent Teeth of Adult Subjects 35-44 Years Old, (N=107)

<table>
<thead>
<tr>
<th>N</th>
<th>Percent Subjects with DMF</th>
<th>Mean No. of Teeth</th>
<th>Mean No. of Teeth</th>
<th>Mean No. of Teeth</th>
<th>Mean No. of Teeth</th>
<th>Mean No. of Teeth</th>
</tr>
</thead>
<tbody>
<tr>
<td>107</td>
<td>88.8</td>
<td>6.8</td>
<td>5.4</td>
<td>1.4</td>
<td>0.0</td>
<td>30.4</td>
</tr>
</tbody>
</table>

DMFT-Decayed, Missing, Filled, or Treated

Table 21. Treatment Requirement for Caries in Permanent Teeth, Percentages of Adult Subjects 35-44 Years Old Requiring Care, (N=107)

<table>
<thead>
<tr>
<th>N</th>
<th>No Treatment</th>
<th>1 Surface Filling</th>
<th>2 Surface Filling</th>
<th>3 Surface Filling</th>
<th>More Than 3 Surface Filling or Crown</th>
<th>Extractions For Caries, Gum Disease and Other Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>107</td>
<td>13.1</td>
<td>57.0</td>
<td>60.7</td>
<td>10.3</td>
<td>0.0</td>
<td>78.5</td>
</tr>
</tbody>
</table>

percent of the subjects. Gum disease necessitates the removal of teeth for 18.7 percent of the subjects and other reasons for the remaining 5.6 percent of the subjects.

A mean of 24.6 permanent teeth per subject need no treatment. One-surface restorations are recommended for an average of 2.0 teeth per subject, two-surface restorations for 1.7 teeth and three-surface
restorations for 0.1 teeth. Extractions for caries are required for a mean of 1.6 teeth per subject (see table 22).

Table 22. Mean Number of Permanent Teeth Requiring Treatment Among Adult Subjects 35-44 Years Old, (N=107)

<table>
<thead>
<tr>
<th>N</th>
<th>No Treatment</th>
<th>1 Surface Filling</th>
<th>2 Surface Filling</th>
<th>3 Surface Filling</th>
<th>More Than 3 Surface Filling or Crown</th>
<th>Extractions For Caries</th>
</tr>
</thead>
<tbody>
<tr>
<td>107</td>
<td>24.6</td>
<td>2.0</td>
<td>1.7</td>
<td>0.1</td>
<td>0.0</td>
<td>1.6</td>
</tr>
</tbody>
</table>

It is known that periodontal problems increase with age and this group of subjects substantiate that fact. Less than one percent of the adults are free of periodontal disease as is also the case with the 12-year-olds. The percent of subjects with only bleeding is 0.9. Calculus is found in 13.9 percent of subjects. The majority of subjects have shallow gingival pockets and deep pockets with percentage levels at 51.9 and 32.4, respectively. Table 23 clearly shows that over 80 percent of the subjects are in the categories of having either shallow or deep gingival pockets, which are signs of moderate to severe gum disease.
Table 23. Periodontal Status for Adult Subjects 35-44 Years Old by Percentages, (N=107)

<table>
<thead>
<tr>
<th>N</th>
<th>Percentage of Persons with No Periodontal Disease</th>
<th>Percentage of Persons with Bleeding Only</th>
<th>Percentage of Persons with Calculus</th>
<th>Percentage of Persons with Shallow Pockets</th>
<th>Percentage of Persons with Deep Pockets</th>
</tr>
</thead>
<tbody>
<tr>
<td>107</td>
<td>0.9</td>
<td>0.9</td>
<td>13.9</td>
<td>51.9</td>
<td>32.4</td>
</tr>
</tbody>
</table>

shallow pockets-defined as 4 or 5 millimeters and a deep pocket as 6 millimeters or more

The mean number of sextants with no periodontal disease is 0.5. An average of 5.5 sextants show signs of bleeding. Exams revealed 5.1 sextants with calculus; 3.1 sextants with shallow pockets and 0.8 sextants with deep pockets (see table 24).

Table 25 outlines the treatment necessary for the specific periodontal problems found. Ninety-nine percent of the subjects need oral hygiene instruction; 98.1 percent need prophylaxis for an average of 5.1 sextants and 32.4 percent need complex care for a mean of 0.8 sextants.

Among the 46 female subjects examined 20 percent had their two lower central incisors extracted at puberty. This custom appears to be practiced for tribal esthetic reasons. However, two other explanations were also given; tribal identification and the ability to feed someone who cannot open the mouth.
Table 24. Periodontal Status for Adult Subjects 35-44 Years Old, Mean Number of Affected Sextants, (N=107)

<table>
<thead>
<tr>
<th>N</th>
<th>Mean Number of Sextants with No Periodontal Disease</th>
<th>Mean Number of Sextants with Bleeding</th>
<th>Mean Number of Sextants with Calculus</th>
<th>Mean Number of Sextants with Shallow Pockets</th>
<th>Mean Number of Sextants with Deep Pockets</th>
</tr>
</thead>
<tbody>
<tr>
<td>107</td>
<td>0.5</td>
<td>5.5</td>
<td>5.1</td>
<td>3.1</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Sextant—the mouth is divided into six sextants; three in the upper jaw and three in the lower.

Shallow pockets—defined as 4 or 5 millimeters and a deep pocket as 6 millimeters or more.

Table 25. Periodontal Status and Treatment Needs for Adult Subjects 35-44 Years Old by Percentages and Mean Number of Sextants, (N=107)

<table>
<thead>
<tr>
<th>N</th>
<th>Oral Hygiene Instruction TN1 (percentage)</th>
<th>Prophylaxis TN2 (percentage)</th>
<th>Prophylaxis TN2 Mean Number Sextants (percentage)</th>
<th>Complex Care TN3 Mean Number Sextants</th>
</tr>
</thead>
<tbody>
<tr>
<td>107</td>
<td>99.1</td>
<td>98.1</td>
<td>5.1</td>
<td>32.4</td>
</tr>
</tbody>
</table>

Sextant—the mouth is divided into six sextants; three in the upper jaw and three in the lower.
Analysis of the Survey

The survey met the primary objective for which it was designed; that is to provide base line data on the oral health status of Nanga Commune. The results of the survey confirm hunches about the oral health of these people that had not previously been substantiated by survey data. The information gathered will also be useful for planning the type of treatment necessary for this population. Education, as part of a prevention program, can be geared to those aspects of oral health that need the most attention. In addition, having a clear idea of the types of problems people are facing aids in understanding their behaviors and beliefs about oral health.

Some findings of interest cross all three age groups. No subjects show any signs of fluorosis, which is staining of the teeth caused by high levels of fluoride in the water. To my knowledge, analysis of water for fluoride content has not been done on a wide scale in this country. The fluoride level from the well where we get our water is 0.3 parts per million, considerably lower than the recommended 1 part per million.

As expected because of the limits of the sample size, no cases of cancer of the mouth are reported in the survey. However, four cases of Burkitt's Lymphoma among young children have been seen at the dental clinic during the past 18 months.

Among the 322 subjects examined, no fillings are recorded and only a mean of 1.4 permanent teeth is missing among the 35-44 year-olds. These figures attest to the lack of oral health care available since
treatment in the form of extractions is recommended for 78.5 percent of the adult population for a mean of 1.6 teeth. Only 13.1 percent of the adults need no treatment in the form of fillings or extractions. Fifty-seven percent of the adults need a one-surface filling and 60.7 percent need a two-surface filling.

Among 12-year-olds there is a slightly greater percentage of girls affected with caries; 92.3 percent of girls compared to 87.4 percent of boys. However, the boys have a mean of 4.3 DMF compared to the girls' 3.2 DMF. About the same percentage of adult males and females have caries. The difference between males and females affected by caries is only a few percentage points and is not considered of significance. Female adults do have an average of 2.0 more carious teeth than males. This could be related to diet and frequent pregnancies.

The first global indicator of oral health status as set by WHO is an average of not more than three decayed, missing or filled (DMF) permanent teeth at the age of twelve. Survey results indicate a DMF of 4.1 for 12-year-olds, which means that the average Nanga Commune 12-year-old has between 3.1 and 5.1 DMF teeth at the ± 1.0 precision level. Adults have an even higher rate of DMF with an average of 5.8-7.8 teeth at the ± 1.0 precision level. Eighty-eight percent of 12-year-olds and adults 35-44 years of age have caries. Sixty-six percent of six-year-olds have caries in primary teeth and 57 percent have carious permanent teeth. The caries incidence for Nanga Commune is high considering this is a rural, non-privileged population and it is probably increasing.
As a means of comparison, in 1982, data collected from developing countries recorded, for the first time, a higher mean caries prevalence than for industrialized countries. Thirty-seven data sets from developing countries reported a weighted mean of 4.1 DMF teeth per 12-year-old. The 17 industrialized countries had a weighted mean of 3.3 DMF teeth per 12-year-old. Although forty-four developing countries had a mean of no more than 2 DMF teeth at 12 years, all had higher levels in their urban populations, frequently in the range of 3-5 DMF teeth. Thirty-two developing countries had a DMF teeth mean between 2 and 4 at 12 years, and 23 had a mean above 4; no representative data existed for 39 countries. In the Central African region Zaire reports a low level of caries and Sudan a very low level. The one known Central African study which was done in the urban area of Bangui, reported that 47 percent of the 4-6 year-olds had caries either in primary or permanent teeth.

Periodontal disease, which is primarily an affliction of adulthood, increases in prevalence and severity with age. Almost 6 percent of six-year-olds showed no signs of periodontal disease. However, only 0.9 percent of both 12-year-olds and adults 35-44 years of age were disease-free. The difference between the 12-year-olds and adults is evident in terms of the severity of disease. Table 26 shows how the severity of disease increases with age. Bleeding and calculus are the most common effects of the disease among six-year-olds. For the 12-year-olds this shifts to calculus and shallow gingival pockets. The majority of adults fall in the categories of having shallow and deep pockets.
Table 26. Percentages of Six-Year-Old, 12-Year-Old, and Adult Subjects Affected by Periodontal Disease

<table>
<thead>
<tr>
<th>Age</th>
<th>Percentage of Persons with No Periodontal Disease</th>
<th>Percentage of Persons with Bleeding Only</th>
<th>Percentage of Persons with Calculus</th>
<th>Percentage of Persons with Shallow Pockets</th>
<th>Percentage of Persons with Deep Pockets</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>5.9</td>
<td>30.3</td>
<td>46.2</td>
<td>17.6</td>
<td>0.0</td>
</tr>
<tr>
<td>12</td>
<td>0.9</td>
<td>5.3</td>
<td>44.2</td>
<td>48.7</td>
<td>0.9</td>
</tr>
<tr>
<td>35-44</td>
<td>0.9</td>
<td>0.9</td>
<td>13.9</td>
<td>51.9</td>
<td>22.4</td>
</tr>
</tbody>
</table>

shallow pockets—defined as 4 or 5 millimeters
depth pockets—defined as 6 millimeters or more

Overall, 12-year-old females show a greater incidence of periodontal problems as evidenced by 61.5 percent having shallow and deep pockets compared to 46 percent of the boys. Among adults, 15.7 percent more women have shallow pockets than men, but 15.8 percent more men have deep pockets than women. This difference may be related to diet, pregnancy and alcohol consumption.

Ninety-nine percent of the subjects aged 35-44 years have periodontal disease which is considered a very high prevalence by WHO standards. Using only the two most advanced stages of disease as criteria for periodontal disease, there is still a prevalence of 84.3 percent among the 35-44 year-olds. Data collected from 35 countries...
showed a very high prevalence (over 75%) of disease among seven countries, a high prevalence (40-75%) in 13 countries and a moderate prevalence (less than 40%) in 15 countries. The level of periodontal disease in Nanga Commune places it among those countries with a very high prevalence.

Summary

This chapter has presented a clinical survey of the oral health of Nanga Commune based on the findings from 322 subjects; 114 six-year-olds, 104 twelve-year-olds and 104 adults of 35-44 years. The DMF for 12-year-olds is 4.1 with a precision level of ± 1.0, which is above the WHO goal of not more than 3 DMF teeth per 12-year-old. Eighty-eight percent of the adults have caries with a mean DMF of 6.8 ± 1.0 teeth. Periodontal disease is very prevalent as indicated by the finding that 94 percent of six-year-olds and 99 percent of 12-year-olds and adults have either bleeding, calculus or gingival pockets. Among the adults 84 percent have either shallow or deep pockets. Given these results for Nanga Commune subjects I am willing to say, allowing for a reasonable margin of error, that the Nanga Commune population has a moderately high level of caries and a very high level of periodontal disease.

The need for treatment involves a high percentage of the sample. Fifty-five percent of six-year-olds need fillings, 89 percent of 12-year-olds and 87 percent of adults. Extractions are recommended for 78.5 percent of the adult subjects. For periodontal problems oral hygiene instruction is needed for 94 percent of six-year-olds and 99
percent of 12-year-olds and adults. Ninety-three percent of 12-year-olds and 98 percent of the adults need a cleaning to remove calculus which they cannot do themselves. Thirty-two percent of the adult subjects require complex care for gingival problems.

Considering the fact that an urban population is not part of this survey, I expect that the national DMF lies in the range of 3.1 to 5.1 DMF. Some of the more severe periodontal diseases such as cancrum oris are not evident in this area, but are commonly seen in other parts of the country. Poor oral hygiene and malnutrition contribute to this serious illness. A conservative estimate is that periodontal disease is highly prevalent in this country. The need for treatment is great.

We now turn to chapter six which describes the behaviors and beliefs that contribute to this state of oral health.
NOTES TO CHAPTER 5


4. Ibid., 41.

5. Three publications that were used were; WHO, Oral Health Surveys Basic Methods, WHO, "Leaflet for Field Use with the WHO Pathfinder Oral Health and Treatment Assessment Form with CPITN," Revised 1976, (Geneva: World Health Organization, Oral Health Service, 1976), and WHO, Guide to Epidemiology and Diagnosis of Oral Mucosal Diseases and Conditions, (Copenhagen, Denmark: P. J. Schmidt Tryk, Vojens, 1980), reprinted from Community Dentistry and Oral Epidemiology (1980): 1-26 They are available in French also from the Oral Health Unit, World Health Organization, 1211 Geneva 27, Switzerland.


7. Ibid., 282. The probes used for the survey were obtained from the Oral Health Unit of WHO.

8. See appendix C for the Survey Summary - WHO Oral Health Assessment and appendix D for the Check List of Data for Survey Planning and Sampling Design which were sent to WHO along with the survey forms.

9. Arabs were included in the sample and identified as a separate ethnic group so that in a future study with large numbers of Arabs a comparison of Arabs to other groups can be done. It appears that Arabs have a higher level of caries due to their sugar intake and possibly a lower prevalence of periodontal disease for oral hygiene reasons, but this has not been proven. A total of 18 Arabs were examined in this sample; four 6-year-olds, five 12-year-olds and eight adults. Nine other ethnic groups were
represented: 17 - Kabba, 4 - Gbanou, 4 - Dagba, 3 - Pana, 4 - Banda, 2 - Tali, 1 - Yakomo, 6 - Gbaya, and 1 - Madja for a total of 42.

10. Equipment taken on the survey outings included: probes, mirrors, explorers, basins, water, towels, emergency treatment instruments for extractions, cold sterilization solution, and dental chair.

11. I did not explicitly request that statistics be calculated for the duplicate exams because I assumed that was evident by their inclusion. Also, there was one question at the end of the Check List for Data that stated, "Do you want duplicates?" I thought it was referring to duplicate copies of the sample data and entered no. This situation illustrates the challenge it is to communicate clearly when various aspects of a research project are handled in different locations. It also highlights the fact that one can never be too careful about asking questions or expressing oneself clearly.

12. A total of about $125 covered the costs of translator/contact person ($55), sitter ($15), transportation ($35) and postage ($20).

13. WHO calculated sample size for levels of precision and a 95% confidence level for populations having a high prevalence of caries (ie., four or more DMF teeth at 12 years) and a wide variation in DMF scores. Because specific population information is not available for the various age groups in this study, I relied on WHO's experience. As stated earlier, the purpose of this study allows for a larger margin of error than might be otherwise acceptable.


CHAPTER 6  
DISCOVERY OF ORAL BEHAVIORS AND BELIEFS

An image of rampant disease, as reported in the proceeding chapter, is often the only kind of information upon which oral health treatment is planned and administered. At the individual level as well, presenting pathology is frequently the sole basis on which treatment is determined. The medical model, as described in chapter one, focuses on clinical disease and inherently limits the understanding of features that are fundamental to appropriate curative and preventive oral health care. Knowledge about disease is only part of the picture. There is a need to look into: values about the mouth; oral behaviors such as diet, oral hygiene, habits, and customs; beliefs about the cause of oral health problems; and how people respond to oral health problems on a day-to-day basis. Data from one hundred in-depth interviews enhances our understanding of Nanga Commune oral health.

The principal question which guides this inquiry is: what are the behaviors and beliefs associated with oral health? The intent of the analysis is to look beyond individual behaviors and beliefs in order to develop an understanding of the meaning of oral health and oral disease in Nanga Commune. The resulting interpretive portrait highlights healthy and unhealthy behaviors that are part of daily life as well as beliefs which influence the philosophy about oral health care.
This is done by first presenting a background sketch of salient values and views commonly-held by Nanga Commune residents. An attempt is then made to describe and explain the essential features of Nanga Commune oral health behaviors and beliefs. Namboze's categories of "beneficial", "harmless", "uncertain," and "harmful" are used to classify behaviors which may affect oral health and the categories of "supernatural/magical", "infection," and "heredity" are used to delineate beliefs about the cause of oral health problems. Finally, the typical pattern of illness behavior is presented, and this clarifies how oral health problems are identified and treated.

Values and Views

Certain questions were asked during the interviews in order to gain an understanding of values related to social aspects of the mouth; its importance in terms of function and those qualities which make it acceptable and enhance its beauty. I tried to learn what people thought a dentist did, the kinds of changes in dentition they anticipated as they advanced through life and whether they thought oral health problems were preventable.

Responses indicate that because the mouth is the organ with which one eats, that function alone makes it very important. Without food there is no life and if the mouth can no longer function as the avenue by which one eats, the consequence is death. The other primary function of the mouth is to talk. They see it as the instrument of communication: it sings, smiles, cries, prays, laughs, blesses and curses. In this culture when an illness renders someone unconscious
the person is described as "not being able to talk." This is a sign of serious illness and impending death. The mouth's importance may best be conveyed by one resident's comment, "When the mouth doesn't work, it's the end of the world."

The mouth often serves a utilitarian role to tear twine or thread, rip bark off branches, peel sugar cane, hold things and occasionally take the cap off a bottle. The mouth also drinks, which is a pleasurable experience, whether the beverage is water to quench thirst, coffee and tea to sip around the fire or alcoholic and non-alcoholic drinks that serve important social functions.

A few individuals described the mouth as that part of the face that conveys beauty. The implications of that notion will be elaborated upon when oral beautification customs are discussed.

Attention is given to the appearance of teeth. It is embarrassing to have missing anterior teeth and young people make fun of an edentulous person. False teeth are a status symbol, in part because only the well-off can afford them. The following statement summarizes these views.

People mock you if your teeth aren't clean--it didn't use to be so important, but now with advertising on the radio it's important to have clean, white teeth that don't smell. A pretty mouth is white teeth. After a dentist pulls a tooth he puts in a new tooth just like the one before, but even prettier because it's nice and white. You can eat like before except you can't chew bones.

Kissing is another function of the mouth that was mentioned. A common greeting for family and friends involves kissing the cheeks alternately once or twice, followed by a concluding peck on the lips.\(^2\) This is practiced male to male and female to female and across sexual
lines. Kissing also communicates affection between sexual partners. However, only one interviewee during the pre-test of the interview guide mentioned, unsolicited and with some embarrassment, that kissing is a function of the mouth. An elderly gentleman explained that kissing is a custom that was acquired from the Europeans, "before the days of French colonization Africans hugged and blew in each other's ears." Now it is only the older Africans who still hold to the pre-colonization custom.

Nanga Commune residents' desire for privacy during oral exams came as a surprise in this seemingly open culture where most activities of daily living are conducted outside in full view of neighbors or passers-by. As mentioned in chapter 5, this became apparent during the oral health status survey exams and during my interviews. At the end of the interviews I asked if it would be all right to count the respondent's teeth. Individuals exhibited embarrassment and sometimes hesitation, although no one refused. The interviewees often smiled nervously and at times bystanders snickered and made comments. Noteworthy was the fact that when I started looking at the individual's mouth to count the teeth, my translator got up out of his seat and usually walked a few steps away with his back to the interviewee.

Additional investigation and experience established the fact that persons want privacy during dental procedures. On the first dental tour to dispensaries conducted by the dental center, clients were treated outside because of better lighting. The second tour during rainy season forced the team to work indoors even though the lighting was not optimal. Several clients mentioned how pleased they were that
the dentist was working indoors. They explained that the reason they did not have their dental problems taken care of before was because the dentist was working outside.

Satisfaction with the state of the mouth is related primarily to the ability to function without pain. If an individual is not satisfied with his or her mouth, it is almost always because of pain. As long as there is no pain, everything is all right. One respondent's comment is typical, "I have a tooth that's breaking down and I have some pain in the root...it's the pain that makes me not satisfied."

When asked whether the mouth will change with age about half of the respondents are not sure that there will be changes. The responses fall into several categories; "I do not know," "It's up to God," "I'm not sure", and "No, my mouth won't change." Those that claim there will be a change say that they will lose teeth. Usually they expect to lose some teeth, however one fifth of the respondents anticipate losing all of their teeth. The process of losing teeth is viewed as a natural phenomenon that accompanies old-age. There may be factors that initiate and encourage the process, but if one lives long enough eventually the teeth begin to fall out. Occasionally a respondent mentioned that this process might be preventable by taking care of the teeth. The general consensus is as follows:

You can't prevent the teeth from falling out—with age the hair whitens, the face changes, the veins get tired and weak and all that holds the teeth will weaken; the teeth fall out and you have to grind meat to eat.
In order to gain some understanding about the ideas that Nanga Commune residents have about dentistry, I asked the interviewees; what does the dentist do? One fifth of the respondents said they did not know what the dentist does. "What you've seen you speak, but what you haven't you can't discuss. I can't imagine what a dentist does." The majority of respondents claim that a dentist pulls teeth in order to calm pain. Other types of work done by the dentist include; making, repairing, replacing, treating and cleaning teeth.

A few respondents explained that the dentist fills teeth. The fact that there was a previous dentist who worked in this commune at one time increased the probability of people having heard about dental procedures. Only two respondents mentioned the idea that a dentist teaches people how to take care of their teeth in order to prevent disease.

**Oral Health Behaviors**

The term oral health behavior in this report is defined as any behavior which may have an effect on oral health; that is behaviors that are preventive, destructive or even neutral. This is opposed to Rosenstock's classic definition that health behaviors are those "preventive" behaviors performed in an asymptomatic stage of health. In general, the residents of Nanga Commune do not believe that they can do anything positive to prevent oral diseases. The idea of maintaining a set of behaviors aimed at avoiding oral health problems is very poorly understood. Prevention, therefore, has little to do with why people behave as they do. For the most part oral health behaviors are
a matter of habit in a setting where a minimum of thought is given to the reasons that they are performed. Behaviors that affect oral health are described under four categories; diet and nutrition, oral hygiene, habits, and customs.

Diet and Nutrition

Diet A list of foods consumed by residents of Nanga Commune shows a surprisingly wide variety of available foods over a year's time (see appendix G). This diversity stands in stark contrast to the poorly nutritious staple food which is manioc. Typical preparation of the manioc root involves soaking, drying and pounding it into a flour so that it can be eaten as a thick mush. Green leaf sauces, prepared from manioc leaves or other dried vegetables and legumes, are eaten with this manioc "boule" (ball of manioc the consistency of cookie dough). Sorghum, corn and guinea corn are substituted for manioc, but their importance to the diet of this area is secondary. The main food groups are starches; leafy vegetables, which provide essential minerals and vitamins; wild and cultivated fruits, which contain vitamins; and meat from domesticated animals and wild game, which are a source of rich protein.

The consumption of meat by the general population is at a very low level even though there is a wide variety of acceptable meat sources. Cost and the difficult task of hunting contribute to its scarcity. There is also a rather frequently voiced idea that eating a lot of meat is not healthy. Most families eat meat one to two times a week and sometimes even less often. The amount of meat eaten is directly
related to social and economic status. Women eat less meat than men because men are always served first; then women and children eat what is left. During the dry period which is the hunting season, meat is eaten more often. Other sources of protein, which include peanuts, dried beans and seeds, are added to vegetable sauces, but in relatively small quantities. The amount of protein in the diet is barely adequate according to a researcher working in this area in food processing and storage. Dietary taboos\textsuperscript{4} that prohibit women from eating chicken, eggs, pig and certain other wild meats decrease even more the intake of protein for this group. Of all groups, the women, with their hard physical labor and frequent pregnancies and lactation, desperately need more protein in their diet.

The daily recommended dietary allowance of protein for a woman is 46 grams; if she is pregnant that increases to 76 grams.\textsuperscript{5} Manioc protein content is 0.9 grams per 100 grams and manioc leaves contain 5.8 grams of protein per 100 grams of leaves. When compared to the protein content of beef at 18 grams or of chicken at 12 grams per 100 grams, it is obvious that comparatively speaking the protein level is low. Sorghum, which is described by respondents as being more nutritious, has 10 grams of protein per 100 grams,\textsuperscript{6} but is not eaten on a regular basis. Fortunately, the diet includes varieties of legumes which enrich its protein content.

Milk and cheese are not part of the Nanga Commune diet. Small cans of sweetened condensed milk are occasionally purchased to drink with tea or coffee. Arabs buy powdered whole milk on a limited basis. The main source of calcium in the diet is found in dark leafy
vegetables. DePaola and Kuftinec state that "the development of teeth, salivary glands, and other oral tissues can be seriously compromised by a deficiency of a number of essential nutrients," so these dietary factors may play a role in the better understanding of oral health of Nanga Commune residents.

Another factor which should not be overlooked in assessing the adequacy of nutrition is that the diet consists primarily of unrefined foods, which are gathered and eaten while still fresh or preserved by natural drying methods. As women and men go to their gardens they snack on wild fruits in season. Vegetables such as pumpkin, okra and mushrooms as well as sesame and squash seeds are dried. Reviews of the literature indicate that some researchers have found no correlation between the intake levels of certain nutrients and the incidence of periodontal disease. However, nutrition cannot be ruled out as being a possible contributory factor in periodontal disease and general oral health. The lack of refined foods in the diet contributes to the total nutritional value of foods eaten, but the overall nutritional adequacy of the diet, in terms of protein, minerals and vitamins necessary for healthy oral tissues and dentition is uncertain.

Sugar Caries would probably not be as prevalent throughout the developing world, Nanga Commune included, were it not for the spread of refined sugar into every village and home no matter how isolated or poor the residents. Refined sugar in the form of sugar cubes is an integral part of the diet. Only economic constraints prevent a greater use of sugar than current levels. Great quantities of sugar are consumed in beverages. Almost everyone drinks coffee or tea.
We didn't use to know about coffee or milk, but when the white man came, drinking coffee started. We drink three cups a day—morning, noon and night and I use seven to eight cubes of sugar per cup.

Eighty percent of respondents drink coffee and over 70 percent drink tea. If money is not available to purchase coffee and tea at the market, various herbs serve as substitutes. An average of three to five cubes of sugar are used per cup of coffee or tea, with some people using as many as six or more. Hot drinks are most frequently served in the morning and evening. Porridges made from rice, manioc, sorghum and guinea corn are also sweetened with sugar.

Carbonated beverages such as orange soda are available in Boguila. Because of the cost of soda only about half of the respondents are able to enjoy it, and then only on an occasional basis. Likewise, the number of people who eat candy and the quantity eaten are limited by economy. Almost half of the respondents claim that they eat candy or give it to their children for a special treat. However, candy and chewing gum are also sold on a regular basis by school-aged children who buy a large bag at the Arab shops and then sell it by the piece to their friends for a profit.

Residents on the low end of the economic scale make comments like, "We have no money to buy coffee or soda and the children just get one candy per day." On the other hand there are those who can afford to drink soda, "I drink soda two to three times per week, When I'm happy I drink it." There is no question about the effects of sugar consumption on dentition. This harmful behavior is accentuated by the accessibility of candy at any time during the day and the failure to
understand that sugar contributes to tooth decay. This situation is even more acute among the Arabs because parents freely dispense shop candy to their children. No attempt is made to eat sweets with meals or rinse and brush the teeth after having a candy or a cup of sweetened coffee or tea.

Alcohol Honey beer and several different kinds of sorghum beer are made with a yeast base. These drinks serve important social functions in the society and the level of consumption varies with the season.

During dry season I drink alcohol everyday, but during the rainy season I don't drink often. Since the sale of cotton I've been drinking everyday—today is the first day I haven't and it's been about three weeks. Either I drink at home or with others.

It is not clear to what extent alcoholism is a problem among females. Most of the respondents who said they drank alcoholic beverages were men. Observation of those sitting around the beer pot indicates that men drink more than women, but since women are usually involved in making and selling the beers, they have access to the beverage.

Certain villages are noted for their high consumption of alcohol, as mentioned earlier in this report. The Arabs, for religious reasons, as a general rule do not drink alcoholic beverages. Alcohol consumption directly affects nutrition by decreasing the absorption of necessary nutrients and substituting "empty calories" for needed nourishment. The drinking of alcohol, which is common in Nanga Commune, is categorized as a behavior which is harmful to oral health.
Oral Hygiene

This discussion about oral hygiene behaviors describes the instruments and cleaning agents used to clean the mouth, and explains how and why the mouth is cleaned.

Respondents report that they use the toothbrush, finger, chew-stick, toothpick and natural or synthetic fibrous materials to clean the teeth and mouth. The toothbrush is the object of first choice, but because it costs money, the finger and chew-stick are frequent substitutes. Hard bristle toothbrushes are the only kind for sale. Rarely does every family member have a toothbrush. Individuals who do not have a toothbrush use something else because it is clearly understood that a toothbrush is not to be shared, even among family members. Over half of the interviewees claim that they use a toothbrush. Economic factors require that these be used until the bristles are well worn before discarding. When it is not possible to buy or replace a toothbrush, the finger or some other object is used to clean the teeth. Almost half of the respondents say that they use their finger while less than 20 percent report that they use a chew-stick. This may be misleading, because even though someone uses the finger to clean the teeth in the morning, later in the day this same person may use a chew-stick on the way to work.

Two plants, kury and sere, are reportedly the source of chew-sticks. These plants are identified as being in the ROSACE and MIMOSA families, respectively. (See appendix E). The chemical composition of these plants has not yet been researched. However, some
chew-sticks used in other parts of Africa have been chemically analyzed. Researchers have found that certain ones contain anticariogenic substances and also astringent and hemostatic (checks bleeding) properties. Whereas Arabs buy chew-sticks which are imported from Chad and used over an extended period of time, the Suma break off a twig from the kury or sere plant while walking through the savannah on the way to the garden. The end of the stick is chewed to make the fibers bristle-like, then the stick is rubbed over the teeth to clean them. The sere chew-stick is noted for foaminess which enhances its cleaning properties. After one usage, the stick is discarded. One of the reasons that the chew-sticks are not kept is that the natural juices dry up and the bristles become stiff. This of course can be remedied by chewing it again or by soaking it. However, the ease with which these chew-sticks are obtained probably is a determining factor in their disposability.

Nanga Commune residents also use other materials to clean the teeth in place of a toothbrush or their finger. These include the loofah, which grows in this area, and pieces of sugar or salt bags, which are made of tough synthetic fibers. Residents make toothpicks from a piece of straw pulled from the thatched roof or from a small twig found on the ground or broken off a bush. Some individuals whittle a toothpick out of kury wood.

Individuals listed the following oral hygiene products: bar soap, toothpaste, salt, charcoal, ashes and warm water. Bar soap is the standard cleaning agent but when individuals are out of all products to clean the mouth, they simply use warm water. Over half of the
respondents say they use soap, although toothpaste is the product of choice if there is enough money to purchase a small tube. Almost a third of the respondents claim that they use toothpaste, but when they are out of toothpaste, soap is substituted. In the absence of toothpaste and soap or sometimes because of personal preference charcoal or a mixture of ground up charcoal, ashes and salt is used. One fifth of the individuals interviewed claim to use charcoal, and it appears that charcoal is considered a good cleaning agent for occasional use. A traditional healer explained that,

Ashes or cinders are used because they whiten teeth. Charcoal is a cleansing agent that washes away food particles. Salt is used to kill the little bugs (microbes) in the mouth and it also calms sores in the mouth. It won't kill the larger bug that eats the teeth, only the tiny ones.

A few respondents mentioned that in former times when they were children, sand was used as an abrasive agent to clean the teeth.

The most common brand of toothpaste on the market is Colgate without fluoride. In fact, "Colgate" is the word used for toothpaste. In Boguila, only small 25-39 milliliter size tubes of toothpaste are sold. The cost is equivalent to about one U.S. dollar. In Bangui, a medium-sized tube with fluoride is sometimes available. Some European brands which usually do not have fluoride are occasionally marketed in rural areas.

The oral hygiene pattern of behavior is more fluid and complex than can be conveyed by only reporting the types of instruments and oral hygiene products commonly used. For example, a distinction needs to be made between "brushing the teeth" and "washing the mouth". "Brushing the teeth" is defined as behavior done to cleanse teeth and
other surrounding oral structures such as the gums and tongue. "Washing the mouth" is basically rinsing and spitting two or three times to cleanse the mouth from undesirable saliva and loose food debris. This universal habit among Nanga Commune residents is practiced by taking a sip of water, swishing it around in the mouth, which may include quickly rubbing the teeth with the index finger, before spitting out the water. In practice the behavior of "brushing the teeth" includes everything that "washing the mouth" seeks to accomplish in addition to cleaning the teeth.

Generally, the residents of Nanga Commune do not differentiate between these two types of oral hygiene behavior and use the terms "wash your teeth" and "wash your mouth" interchangeably, although "wash your mouth" is the more common expression. In fact, the concept of "washing the mouth" has everything to do with ridding the mouth of bad odors and debris which can affect the health of the rest of the body and comparatively little to do with keeping the teeth healthy.

Virtually all adults "wash their mouths" in the morning when they get up before they eat or drink anything. This morning ritual may or may not include actual brushing or rubbing the teeth. Almost half of the residents interviewed claim to clean their mouths in the evening before they go to bed. Some say they "wash their mouths" after they eat the main meal of the day which is often during the afternoon. It is also a very common habit for the Nanga residents to "rinse and spit" after a meal. Some respondents say that they clean their mouths before they eat a meal, when they bathe and before they go out.
During the morning hygiene ritual, individuals who have toothbrushes use them and do brush their teeth. Those persons who do not have toothbrushes most frequently use their finger to rub over their teeth. Later, on the way to the garden after drinking coffee or tea, some of these individuals who use their fingers for rinsing their mouths in the morning tear a chew-stick off the kury or sere plant, clean their teeth, then throw it away.

Rarely are children taught to clean their own teeth and most parents do not clean their children's mouths. When the children are old enough to do it themselves, they take on the habit of washing their mouths when they get up in the morning. N'kouet's study of four to six-year-old children in Bangui found that although parents reported that they brushed their children's teeth, this was in fact, not the case. Clinical examination of ninety-five percent of these same children during the early morning hours at school showed large particles of food lodged around the teeth.10

The oral hygiene behavior of Arab Muslims is quite different from that of most residents in Nanga Commune. Religious prescriptions require that Muslims wash their mouths, face, arms and feet before they pray which is about five times a day for those who practice Islam. Also, because of the higher income level of the Arabs, a higher percentage of them use toothpaste and toothbrushes, although the Chadian chew-stick is favored by many of the older individuals.

As alluded to above, the most frequent reason given for cleaning the mouth is to rid the mouth of bad odors and debris. "I brush my teeth at night to clean out food particles. If I don't, a very bad
smell will come from my mouth." Residents explain that during the night while asleep there is no way of knowing what may have entered the mouth, so it needs to be cleaned. Little bugs may have crawled in. Also, dirty saliva comes up from the stomach during the night and needs to be washed away. The bad taste that people wake up with in the morning is proof of the foul character of the saliva. Most Suma believe that one does not swallow while asleep and this is substantiated by the fact that people drool while they sleep, therefore they are not able to swallow. Thus, it is widely held that if the mouth is not washed in the morning before eating or drinking, the inevitable consequence will be digestive problems evidenced by nausea and a stomach-ache. This is the predominant rationale given for doing oral hygiene in the morning.

I clean my mouth so I won't get sick. The saliva is odorous and it's bad so I don't want to swallow it. Also during the night I'm dead (unaware of what is going on) and I don't know what might have entered my mouth, so it needs to be cleaned before I eat or I might get sick.

Another respondent explained it this way:

As a child I knew that it wasn't right to eat without cleaning the mouth. Then as a young person I had stomach-aches. I saw everyone washing their mouths in the morning so I did and the stomach-aches stopped. Debris and odorous saliva cause the stomach-aches. All night saliva and food from eating the night before come up from the stomach and if you swallow this it makes you sick, it's "old food."

One fourth of the respondents say that they practice oral hygiene in order to keep their teeth healthy. A few individuals remark that they clean their teeth to get rid of "little bugs" (microbes). Infrequently esthetic reasons for cleaning the teeth are mentioned. Whether or not this has anything to do with the fact that many individuals do
not have mirrors is not known. Even when they do have mirrors, they do not stand in front of a mirror to "wash their mouths". The morning ritual of washing the face and mouth is done outside with a basin of water and a free hand to scoop water to the face. If a person owns a mirror or has a neighbor from whom to borrow one it is used primarily as a general check on appearance. The following comment illustrates the behavior of those residents who do clean their teeth and understand that oral hygiene prevents oral health problems.

I clean my teeth with charcoal, my finger and a twig. When I go to the garden I find a stick because it makes my teeth pretty and white. I also clean my teeth to get rid of little bugs (microbes) otherwise my teeth will fall out.

Others state that they clean the mouth to enhance their appetite and the flavor of food as well as to wash away saliva and a bad taste. Although esthetic considerations for cleaning the teeth are rarely mentioned, respondents verbalize that it is socially unacceptable to have food particles showing on the front teeth or to have offensive oral odors.

I brush my teeth to clean the saliva so that food tastes good. I also clean food from my teeth so that when I talk and laugh people won't see food in my mouth...brushing the teeth doesn't prevent holes in the teeth because you can still get the disease (dental caries).

Another respondent commented:

I don't know why I clean my teeth; my mother showed me how. Before going to market I wash my mouth to get rid of bad odors from food...Friends will criticize me if my breath smells bad, for example, if it smells like I've been drinking.

In summary, the oral hygiene behaviors of Nanga Commune residents are found to be ineffective in the prevention of common oral health problems. A thorough and regular self-cleaning of tooth structure and
supporting gum is not a part of daily life for the vast majority of the population. This fact is especially disturbing when one discovers that it would be possible to maintain an acceptable level of oral hygiene in this situation with the indigenous resources readily available to all residents. The expressed preference for the most expensive cleansing instrument, the toothbrush, and the most costly cleaning product, toothpaste, need not be a barrier to achieving a healthy oral condition. The typical Nanga Commune resident does not understand that proper oral hygiene contributes to healthy dentition nor does he or she realize that, when financial constraints exist, natural local products can be substituted for Western modes of oral hygiene with similar, acceptable results.

Habits

During the course of the interviews I asked Nanga Commune residents if they smoked or chewed tobacco or any other kind of substance. In this rural setting, smoking is uncommon among women, but about half of the men claim to smoke. Cigarettes are sold along with other commodities like soap, sugar, thread, coffee and tea in vendors' stands in front of homes in all sectors of the community. Some individuals cannot afford to buy cigarettes or prefer to make their own. They plant and dry their own tobacco and use the leaves for chewing or grind them up for snuff. Certain spices are sometimes added to the concoction such as the Chadian salt, natron. Homegrown tobacco is particularly popular among older men. Pipe smoking is not as customary now as it used to be.
A common habit among the Arabs is chewing the betel nut. Both men and women enjoy its bitter, astringent qualities and its effects as a stimulant. I did not conduct a detailed investigation of the extent and effects of betel use among the Arabs.

Tobacco and betel nut use affect oral health in proportion to the frequency of smoking and chewing. These substances cause irritation to oral tissues. Studies previously cited point to betel nut mastication as a habit that contributes to cancers of the mouth. Although these habits are practiced, they are not pervasive and they probably have a moderate to minimal effect on the oral health of Nanga Commune as a whole. Nonetheless, these habits are harmful oral health behaviors.

Customs

Two customs are practiced in Nanga Commune which directly involve dentition; filing teeth and pulling teeth. These tribal customs are outlawed by the government, but were still being practiced in this area as recently as seven years ago and the practice may continue presently on a limited basis.

The most common filing pattern seen in Nanga Commune is an inverted "v" where the upper central incisors meet. As shown in figure 7, the anterior mesial (toward the midline) corner of each central incisor is filed off. Some individuals have four to six anterior upper and lower teeth individually filed to a point. This custom of filing teeth to a point is seen mainly among older adults and is not widely practiced in Nanga Commune. Filing the teeth is usually done at
Figure 7. Tooth Filing Patterns of Nanga Commune Residents
puberty and as mentioned in chapter 5, it is done for esthetic and health reasons. The dentition pattern is considered attractive. Also, when illness strikes and the person cannot open the mouth, fluids and soft foods are passed through the spaces. Another explanation given for filing teeth is that the pattern serves the purpose of tribal identification. In the days of frequent intertribal feuds one could identify friend or foe as soon as the person opened his or her mouth. Filing teeth is practiced among both men and women, but it is seen most frequently among women, which would support the idea that it is done chiefly for beautification.

Among the Suma the custom of pulling healthy teeth is practiced only by women. The same reasons are given for this behavior as stated for filing teeth. Evidence of this tradition is seen less frequently than filed teeth. Two to four lower central incisors are pulled around the age of puberty. In former times this may have been part of a rite-of-passage ceremony, but the individuals interviewed in Nanga Commune explained that their teeth were extracted by a local person or someone passing through who knew how to pull the teeth with a pliers. There was no ceremony. The popularity of this custom is diminishing and its practice for esthetic reasons is changing. For example, one woman explained during the interview that as soon as she had the money she planned to go to the dental clinic to request replacement teeth for her two lower incisors which were pulled at puberty.

Dentition alteration customs indicate that the appearance of teeth is an important facet of cultural life. However, government legislation and changing values are modifying traditional customs. For
those who have the means, replacing a missing tooth with a silver, gold, or artificial one is an enviable status symbol. Metal clasps that might show with a partial plate are thought of as additional ornamentation. When I visited Boguila in 1979 I was surprised by the numerous compliments I received for the orthodontic braces I was wearing. Individuals requested similar strands of metal for their own teeth.

The custom of pulling teeth obviously harms the dentition by decreasing the ability to tear food. It also decreases clarity of speech and weakens the unity of the dental arch, increasing the incidence of periodontal disease. The amount of filing done on the inner aspect of the central incisors does not usually destroy all the protective enamel of the tooth, and no substantial increase in decay is noted. Occasionally devitalized teeth are seen where too much tooth structure was destroyed when filing the teeth to a point. It is fortunate that usually a relatively conservative amount of tooth structure is filed. It is uncertain to what degree filing teeth as it is done in Nanga Commune affects oral health by contributing to decay and loss of teeth. It does result in increased tooth sensitivity on a temporary or sometimes permanent basis, and occasionally causes pulp death.

Table 27 summarizes Nanga Commune oral health behaviors by listing them according to Namboze's categories of beneficial, harmless, uncertain, and harmful. The purpose of using this type of classification is that it delineates the behaviors according to their relationship to oral health; whether they have a positive, negative or unknown effect.
Table 27. Classification of Oral Health Behaviors of Respondents and the Predicted Effect on Oral Health

<table>
<thead>
<tr>
<th>Oral Behaviors</th>
<th>Beneficial</th>
<th>Harmless</th>
<th>Uncertain</th>
<th>Harmful</th>
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<tbody>
<tr>
<td>Diet:</td>
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<tr>
<td>Protein</td>
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<td>X</td>
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<tr>
<td>Minerals</td>
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<td>X</td>
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<td></td>
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<tr>
<td>Vitamins</td>
<td></td>
<td>X</td>
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<td></td>
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<tr>
<td>Sugar</td>
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<td>X</td>
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<tr>
<td>Alcohol</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Washing the Mouth</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brushing the Teeth</td>
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<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chew-stick</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bar soap</td>
<td></td>
<td>X</td>
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<td></td>
</tr>
<tr>
<td>Toothpaste</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charcoal and ashes</td>
<td></td>
<td>X</td>
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<td></td>
</tr>
<tr>
<td>Salt</td>
<td></td>
<td>X</td>
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<tr>
<td>Smoking</td>
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<td>X</td>
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<tr>
<td>Betel nut</td>
<td></td>
<td></td>
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<td>X</td>
</tr>
<tr>
<td>Filing teeth</td>
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<td>X</td>
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<tr>
<td>Pulling teeth</td>
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</tbody>
</table>
on oral health. It is understood that there is a degree of arbitrariness in determining which category to place some of the behaviors. For example, charcoal is particularly beneficial for absorbing unwanted odors in the mouth, however, in its ground-up state it can also be abrasive to teeth and gums, so it is classified in the uncertain category.

Oral Health Beliefs

As Nanga Commune residents talked about their oral health conditions, I asked them what they thought caused the problems that they experienced. Over a third of the interviewees said that they did not know what caused toothaches or sore gums. The following remark is typical, "I don't know the cause; something starts to attack the teeth but I don't know what." The remaining individuals related reasons for their plight that included comments like "my parents had bad teeth," "it's a bug," "the wind spreads the disease," "the good God does what He will." In this section Nanga Commune beliefs about the cause of oral health problems are classified. The three categories which emerge are infection, supernatural or magical, and heredity. It is common for an individual to hold to a theory of causation that synthesizes various aspects from two or even all three categories. For clarity, however, each category will be discussed separately.

Infection The most frequently mentioned causes for dental problems are those which fall under the category of infection. These include those which are spread from person to person, by living objects or some other entity such as air. Nanga Commune residents cite a
little worm-like bug as the chief offender. Interviewees claim to have seen this "bug" and explain that it is found "in the gum, tooth or between the gum and the tooth." The following is a series of descriptions.

The bug is little but it causes a lot of pain.

It looks like a worm.

It is white, small, has a flat head and pointed tail, black eyes and a mouth. I know, because it fell out dead when I washed my mouth. I don't know where it comes from, but I felt pain in my jaw, head and then in my tooth.

I know a bug causes the hole (in my tooth).

I've never seen the little bug but when I have a lot of pain I know the bug is working because the pain throbs.

I think it is just one bug.

A middle-aged man explained:

The bug makes the holes and the saliva of the bug provokes the swelling. The bug is between the gum and the tooth. When it works the pain starts and saliva runs in the mouth.

Some individuals think that the destruction of their teeth is caused by "many little bugs."

I think there are many little bugs that cause the pain and swelling. They come from the teeth. I saw them when I rinsed my mouth with the liquid made from the bark of de-deeng and termite excrement. The de-deeng killed them and the pain stopped, but now the pain has started again.

Various ideas are expressed about the origin of these "little bugs":

Little bugs in the veins cause the problem in the teeth.

They come from the teeth.

...from between the gums and the teeth.

...from the gums.
...from the depth of the roots.
It comes down from the head, that's where the pain started.
There's a bug, but I don't know how it got there.

A few individuals hold to the germ theory and explain that "little bugs that you can't see" (microbes) account for oral health problems. However, others claim dental disease is caught from the air. "Everyone gets dental decay from the wind."

One knowledgeable interviewee refuted the commonly-held "little bug" theory in recounting what he perceived as the cause.

Africans say it is a little bug that eats the teeth, but according to medicine, food particles and sugar eat at the teeth, especially the molars. So I think the lack of hygiene and lack of vitamin C is the cause.

Most individuals believe that caries are contagious.

Dental caries are contagious through saliva.

If you suck a bone that someone else with caries has eaten you can get it too.

I avoid kissing some people because of cavities. I tell them that I have cavities so I won't kiss them.

Just greeting someone won't spread cavities, but if you kiss with the tongue you can spread the disease because of the saliva.

I do kiss my wife who has cavities, but I haven't gotten the disease even though it's contagious.

As long as I don't have pain, I can kiss without giving the disease; it's only contagious when there's pain.

Several individuals pointed to meat as the source of their problem as exemplified by the following:

Eating meat started the problem. Meat got caught between the tooth and the gum. When I took out the meat then the pain and swelling started.
I got the disease because I ate too much meat. I'm a hunter and eat a lot of meat. I don't know why meat causes the problem.

It is interesting to note that the cause of the problem is often attributed to the stimulus that is associated with the onset of pain as in the case of the meat. Other items named as causing trouble were honey, sugar and food in general. Clear illustration of this reasoning is seen in the following example.

The problem began in the morning. I drank cold water and it started (the pain). I'm not sure if there was something in the cold water. I had two weeks of pain. I don't know what caused it.

**Supernatural/Magical** Supernatural and magical explanations for oral health problems appear to be of two types. The first to be examined are those explanations stemming from a prevalent fatalistic orientation; God does what He wills and there is not much that an individual can do to make a difference. The second type of explanation originates from the animistic orientation to life where good and evil events are the results of curses or blessings that invoke the power of the spirits to act.

Often interviewees give a fatalistic-type explanation when they do not know the cause of the disease. As one woman observed,

I don't know why I don't have problems with my teeth; that must be what God wants.

Other interviewees said,

I don't know. God only knows.

I don't know the cause of my problem. Maybe the good God sent this, but I don't know why.

There are two levels of causation in operation as would be expected in a culture that is very spirit oriented. One is the
physical and the other spiritual. This holds true for oral health problems as well as for more life-threatening illnesses. When I conducted the interviews I did not specify what type of explanation I was looking for; I let the respondents initiate the direction of their answers before introducing probes for clarification or further information. Analysis of the oral health problem accounts shows frequent intermingling of the physical and spiritual perspectives. The following response is to the question, "What is the cause of your problem (caries with swelling and pain)?"

I don't know the reason for this problem, it's just the disease. I only know that God sent it, but I don't know why, it's His work. The good God sends it, He does what He will.

When asked, "Is there a bug?" he went on to say,

Yes, but I didn't see it in my mouth. But when I rinsed with the "bark brew" it fell out, dead. It was white, small, with a flat head, eyes and mouth. I don't know where it comes from—outside or in the body.

In essence, whenever a physical rational for acquiring a disease is expressed there frequently appears to be linked with it a dominant underlying spiritual causation. This dual perspective of viewing life events is apparently embraced by most individuals. In fact, spiritual explanations at times are more readily understood and accepted. "I don't know the cause. God sends the disease if He wants."

The second type of belief within the supernatural/magical category is founded on an animistic orientation. While I conducted interviews in Boguila a respondent explained that in the small village of Bondodi, five kilometers out, "people have cavities even when they are five years old--this comes from the ancestors." Numerous individuals
confirmed his statement and it became apparent that Bondodi is noted for its high incidence of dental caries. When I asked him, "why?" he responded, "because God wants it." Further inquiry with this individual elicited this rather confusing response which incorporates both the concept of "buying" the disease and the "curse."

Ancestors bought this disease. The people did something that displeased the spirits of the ancestors so they got this disease. They bought the disease because they liked to hold their hands on their faces when they had pain. For them holes in their teeth are normal and it is pretty to have holes and missing teeth.

The people there think the disease comes from the spirits. A father curses a son so he gets sick and the disease is passed on. It's usually the parents or grandparents that curse. And it is provoked by anger and the disobedience of children. For example, a small child can be cursed. It is done with words like, "You'll die this year or a serpent will bite you." If a father has a toothache and a child mocks him, the father may say, "You're going to have a toothache."

Other Nanga Commune residents provided varying interpretations. Here is an example of how one man outlined the process of "buying" the disease.

I've heard that certain ethnic groups bought the disease. Like my grandparents; they bought it with meat. It happens like this. A long time ago a group of people visit a village and say, "If you buy this you'll always have meat." So they buy the "kouringang" (dental caries) by bartering something the others want. Back then they didn't have money or writing. The people didn't realize that "kouringang" was a disease. I think the spirits are involved because the people say the family bought the disease, but they don't say who. There's no way to prevent this disease because it was bought, it is done by the spirits.

Even a simple curse can be the catalyst for disease. "If a child is chewing bones and a parent says, 'You'll have dental caries.' From then on the disease will pass to the child."
Another person told of his experience.

My mother had dental caries and my older brother laughed at my mother because she didn't have any teeth and she cursed him. So now my brother has dental caries and that is why he has lost all of his teeth. I don't know of anything to prevent it unless an older brother would give a blessing—like asking pardon—so the disease could stop.

A Bondodi resident recounts her version of why she has caries.

I have caries because my ancestors bought them. Our village had millet and we ate large quantities. We needed dental caries so that we would not eat so much. If you have a toothache you can't eat a lot and you leave food. That way there is more food and it isn't all used up.

This interviewee provides an explanation that indicates that traditional views are changing even though the supernatural/magical orientations to disease causation still prevail.

My family doesn't have dental caries. They come from the ancestors and my family didn't have any problems. Before people believed that curses caused disease by buying evil for the generations that followed. But now with the Word of God, we no longer believe in the spirits. Every tribe used to buy their own disease or problem, like dental caries, or flies.

**Heredity** Heredity is the third cause of dental disease listed by interviewees. It is mentioned less often than infection and supernatural/magical beliefs and when cited it is quite often in conjunction with these other reasons. Most individuals simply state that they inherited bad teeth from their parents. Usually they indicate that their mother or father had bad teeth. It is understood as something that is transmitted, like appearance. One person recounted that a child looks like one of the parents, likewise, a person can take on the kind of teeth of the mother or father. Nanga Commune residents believe hereditary influences can also extend into the second generation.
I've had dental caries in many teeth since I was young. I think the bug makes holes in the teeth; walking from tooth to tooth causing them to fall out. I got the disease from my family. My grandfather had bad teeth.

One final example is that of this respondent who gives a more detailed account of the hereditary factor as he understands it.

Parents can give caries to their children without cursing them, because of sexual relations. If the father has bad teeth, the sperm of the male carry dental problems by the veins and blood to the wife and child conceived. The father gives this and the wife can too.

Nanga Commune inhabitants construct their belief system by selecting from the three categories of oral health beliefs described in this section. Table 28 summarizes and delineates the salient beliefs about oral health problems according to the categories of infection, supernatural/magical and heredity.

In sum, perhaps the most important feature of the excerpts about oral health beliefs is the pervasive attitude of passivity. The Nanga Commune resident is being acted upon, whether it is by a "little bug," the "good God," a "curse," or a parent's "physical traits." There is not much that the individual can do to change the situation. This is important to keep in mind as we look at the pattern of illness behavior associated with oral health problems.

Illness Behavior

Kasl and Cobb define illness behavior as, "any activity, undertaken by a person who feels ill, to define the state of his health and to discover a suitable remedy. The principal activities here are complaining and seeking consultation from relatives, friends, and from
Table 28. Classification of Oral Health Beliefs of Respondents According to Causative Agent

<table>
<thead>
<tr>
<th>Oral Beliefs</th>
<th>Infection</th>
<th>Supernatural/Magical</th>
<th>Heredity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little worm</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Little bugs</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tiny bugs (microbes)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good God</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Verbal Curse</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Purchased Curse</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Parents</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Meat</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Honey</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sugar</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Those trained in matters of health. As Nanga Commune residents narrated their oral health experiences, they described the types of problems they had undergone and depicted what they did when they faced an oral health problem. These accounts along with observations of
illness behavior furnish the material for this discussion. Among those individuals interviewed, approximately three-fourths recount dental problems. Of interest is the process of problem identification including the type of treatment sought and the results.

**Onset** Pain is the primary signal that something is wrong. Uncommon is the person who defines the onset of an oral health problem as a small hole in the tooth. This became clear to me one day about three-fourths way through the collection of interview data. I was sitting under a mango tree interviewing a young woman. In response to the directive to tell me about her experiences with her mouth she explained that, "Three days ago pain started for the first time. I've never had a problem with my mouth before this." When I looked at her teeth there was a very large hole in her first molar; a cavity that had been in the making for a number of years. This incident underlined and brought to life what I had been hearing for several months about the Nanga Commune resident's process of problem identification. As is typical in other cultures, but maybe more pointed in this one, pain is the stimulus that suggests an oral abnormality. This sequence of remarks epitomizes this thinking.

My problem started with severe pain, then there was a hole.

The problem started in 1982 with pain.

It started a long time ago with pain, then the holes came.

The problem started with a little pain which became an infection with swelling.

My problem started when my gums started to hurt a lot.

I have no pain, so I don't have any problems.
For a Nanga Commune resident the foremost sign that something is wrong is pain. However, occasionally a respondent explains that the problem started with a symptom other than pain as in this example. "The problem started as little holes, I thought it was nothing then it started to hurt." Some individuals claim that they have never had any oral health problems, yet a look in the mouth reveals decay and broken down or missing teeth. Other symptoms like a hole in the tooth or bleeding gums may be noticed, but are not deemed problematic. It is not so much a change in the state of oral health as it is the onset of pain that prods the individual to consider treatment.

**Treatment** Once a problem is identified, what does the typical Nanga Commune inhabitant do? Essentially, mouth discomfort is tolerated and lived with in the same way that someone in a Western culture deals with a headache or the common cold. Family and friends recommend numerous traditional remedies including; plant leaves, bark, roots, salt, termite excrement, glue and the cow horn used as a suction device. See appendix H for a list of plant and non-plant remedies and their reported effectiveness. Most Nanga Commune residents treat themselves for oral health problems. Plant products are boiled in water and either the steam is inhaled through the mouth or the liquid is used to rinse the mouth. Following are a few examples related during the interviews.

Holes in the teeth made by a little bug are the only problem I've had during the last three years. I had continual pain day and night. So I made a liquid by boiling the bona plant root which calmed the pain. The water was hot when I rinsed my mouth. Three hours after rinsing with a cup of the sweet, clear liquid, the pain went away. I lost the tooth later, but the root remains. I have no pain.
The example below is that of a young man who found relief.

I've had caries since 1975. It started with pain and swelling and was treated with kelou bark and water. I rinsed my mouth with it and the swelling decreased and it calmed the pain completely. Since then the teeth are breaking off, but there is just a little pain.

This woman uses the suction horn for pain.

I don't have holes in the teeth, but my teeth hurt between the gum and the tooth. I use the suction horn on the outside of my jaw under the jawbone. It's been four days since I used it but you can still see the mark from the blister. I place the horn on my skin then have someone suck. The horn gets warm and I put wax in the hole on the end. When the horn cools I take it off by making a hole through the wax in the end.

Some products are stuffed into the offending tooth; for example, aspirin, glue, mentholatum, and on occasion parts of certain plants. Aspirin and mentholatum are bought at the market and used by some individuals, although they are largely considered remedies for headaches and colds, respectively. As mentioned in chapter 4 of this report, medicines are available locally for sale over the counter. However, no one reported treating a tooth abscess by buying antibiotics at the market.

Attitudes vary toward the value of "village" medicine as it is called. This woman's comments typify those who question its efficacy and choose to use commercial products.

I don't have swelling, but chronic pain whenever it's chilly; night and day, alike. This started in 1976. I took aspirin and put it in the hole and swallowed some. The pain went away. I didn't take village medicine because I tried it one time and it didn't help.

Sick role behavior as defined by Kasl and Cobb "is the activity undertaken by those who consider themselves ill, for the purpose of getting well. It includes receiving treatment from appropriate
therapists, generally involves a whole range of dependent behaviors, and leads to some degree of neglect of one's usual duties. In Nanga Commune the average inhabitant does not seek care until the pain and other symptoms are debilitating. Only a couple respondents said they had gone to a traditional healer for a toothache. Medical or dental care is sought for the most part by only a minority of Nanga Commune residents, and then only when the disease manifests itself with symptoms of swelling, excruciating pain and the inability to eat. Some individuals in dire need of care described going to the hospital dispensary for antibiotic therapy, and a few recounted seeking care 18 years ago at the dental clinic before it had been closed.

What is the impetus to get care? Basically, it is pain and the extent to which the individual is incapacitated. Another factor which is crucial is whether the individual has the money to pay for treatment. If the situation is defined as serious, money can be borrowed from relatives. Dental problems which are not defined as critical do not warrant the effort to seek care. The following comments are representative of this view toward dental care.

One year ago a dental carie started but I haven't had it treated because there hasn't been much pain. Sometimes the tooth hurts at night or when I'm talking to my brothers, but it's not severe. Since the pain is not strong, I'll try to find money to go to the dentist when it's worse.

I would get my tooth fixed for 500 francs ($1.60) but 800 francs ($2.60) is too much. It's a lot of money.

I have a lot of pain, I'd like to be treated if I had the money.

The only problem I've had is dental caries. Thirteen or fourteen years ago I had my first cavity. I didn't get any treatment. I used glue to stuff in the hole. Afterwards the glue came out, but it stopped the pain. Now I have a little problem, but it's not
like before. I can't have dental treatment because I don't have the money. It's too expensive, probably 10-15,000 francs ($33-50.00) to repair it.

This last individual overestimated the cost of treatment which illustrates the common problem of a lack of understanding about dental service costs and oral health disease.

Given the economic status of most Nanga Commune residents and the idea that nothing can be done to prevent oral health problems it is not surprising that the prevailing behavior is to wait and see what happens.

I just started having holes in my teeth this year during the past six months. My teeth hurt with hot and cold, but otherwise I have no pain. If I had the money I would go to the dentist, but I don't so I'll wait. I would treat my tooth now with a root or bark, but I'm pregnant and the medicine could cause a miscarriage, so I'll wait 'til I've had the baby.

Financial constraints and the ability to live with moderate discomfort impedes attempts to get necessary dental care. For example, one day I interviewed a man whose only oral health problem was an upper right lateral incisor loosely hanging down over his lower lip. It was the result of a blow received ten years previously. He said that the tooth was an annoyance and hurt when bumped, so he ate on the left side of his mouth. He stated that he wanted to have the tooth pulled because it bothered him. At the end of the interview I explained that the dentist was working across the road and that he could have the tooth pulled for 800 francs ($2.60). He did not have the tooth pulled. I realized that if he was not able to forge the obstacles facing him that day to have the desired treatment done, it would be highly
unlikely that he would walk ten kilometers to the dental center to have the tooth pulled.

In sum, several factors influence the decision to not seek care. First, the inability to pay for dental services, whether it is provided by the traditional healer or a local dispensary. Second, a lack of understanding about dental service costs and oral health disease, in general. Third, the long tradition of accepting oral health problems as an inevitable consequence of life about which nothing can be done. This attitude of resignation is pervasive and is compatible with the underlying belief that God does what He will. This woman's experience is common.

I've had caries for a long time. I don't have holes, but it's the bug that causes the problem—pain. For 35 years I've had the problem and it continues. I make tea, but when I rinse the pain doesn't go away. Now I have pain on both sides in the back. I don't know why I have the problem. I've never seen the little bug. But when I have a lot of pain I know the bug is working because the pain throbs.

Outcome As illustrated in many of the cases above and the following example, the outcome of treatment for Nanga Commune residents spans the spectrum from satisfaction to dissatisfaction.

The swelling decreased...it calmed the pain...the pain decreased temporarily...it soothes sores in the mouth...it stopped the pain and swelling...it popped the abcess...the bug fell out, dead...it decreases bleeding...it did not help the pain.

The evaluation of treatment is based primarily on whether or not the pain abated. Loss of tooth structure and teeth are not the main concern and in fact, the process of decay often continues unchecked even though the remedy is evaluated as being successful. Appendix H provides a compilation of outcomes for specific treatments as
verbalized by interviewees. In essence, the treatments palliate the pain of a chronic or acute condition.

Summary Portrait

The Nanga Commune resident, in a way that I as a Westerner may find difficult to understand, holds to the proverb "death and life are in the power of the tongue." The mouth is that instrument that curses and blesses. Words that come out of the mouth bring forth life, death or illness. The mouth's ability to function also signals life or eminent death. The mouth is also a source of beauty and is adorned by filing teeth into attractive shapes and extracting certain teeth.

Satisfaction with the state of the mouth is primarily related to the absence of pain. The oral health behaviors practiced by Nanga Commune residents, for the most part, do not contribute to healthy mouths. The diet's adequacy for the development of healthy oral tissue is uncertain. Fluoride in the water is insufficient. High levels of sugar consumption at all socio-economic levels of the community are harmful. Widespread drinking of alcoholic beverages, smoking among the male population, and the Arabs' habit of chewing the betel nut all contribute to poor oral health. The oral hygiene activities of the majority of the population are not adequate to effectively clean tooth structure and supporting gums. A lack of knowledge about basic oral hygiene principles is evident.

Oral health beliefs about the cause of oral disease encompass three broad categories; 1) infection, 2) supernatural/magical and
3) heredity. Most individuals hold to some type of infection theory which usually includes a "bu:*" of some sort. This bug may be worm-like or more like tiny bugs such as "microbes" which cannot be seen with the naked eye. Certain foods are sometimes mentioned as contributing to tooth decay. Regardless of the type of infecting agent, supernatural/magical forces are generally believed to be at work. These governing powers may be the good God, a verbal curse or purchased curse which invokes the spirits. Some residents explain that parents, by means of genetic influence, determine whether a person has healthy or unhealthy teeth.

Illness behavior is initiated by the identification of a problem which is usually pain. This is followed by self-treatment based on recommendations of friends and family and includes mainly plant and some non-plant products. The outcome of the treatment varies from satisfactory to unsatisfactory. Nanga Commune residents consider themselves sick if they have severe pain and swelling and especially an inability to eat. For these symptoms they may seek help from a traditional healer, medical or dental clinic. Barriers that hinder individuals from getting dental care early in the disease process are; 1) cost, 2) poor understanding of dental care and oral health, and 3) an acceptance of oral health problems as a part of life that is endured because there is not a way to prevent them.

This 53-year-old man recounts his story. It highlights features that are common to many Nanga Commune residents and I would add, many other Central Africans.
I've suffered from dental caries since youth. As a young man in Bangui I went to the hospital and they pulled the crown but not the root of the tooth. I had no more problems from that tooth, but another bothered me. Before I was married it started with severe pain, then a hole where food would lodge. Finally the tooth fell out. I didn't know what medicine to use, so I never used any root or bark. Even now I have problems when I eat food. I have pain until the food is taken out of the hole. I buy Aspro once in a while when I have money, but I don't have any money now. It costs 25 francs ($0.08) per pill. I have three teeth affected with caries.

At the beginning I didn't know the cause, but when I felt the pain I thought it must be caused by tiny bugs (microbes). Then I saw the little bug. It is white with a flat head and pointed tail. I was eating when the crown broke off the tooth and I saw the bug. It was dead. It came from the tooth, otherwise, I would have had pain in another part of my body. I still don't know what to do to prevent these problems with my teeth.
NOTES TO CHAPTER 6


2. The style of greeting most often used in the Central African Republic is an adaptation of the French custom of kissing both cheeks in addition to a frequently seen third kiss on the mouth.


4. Women keep dietary taboos for various reasons. Although I did not attempt an in-depth inquiry into this aspect of their belief system, reasons were given which included the following. 1) It is the custom that has been passed down from the ancestors. 2) Certain foods are not eaten in order to maintain fertility. 3) If a woman eats pig while she is pregnant, her child will look like a pig when it is born. 4) Women do not eat pig and chicken because these animals are dirty because they eat bugs and garbage off the ground. 5) Eating pork can make you sick. The symptoms include swelling and weakness. Compliance to these taboos is decreasing to some extent, especially among more educated women, but in a community like Nanga Commune most women do not eat prohibited foods.


6. Ibid., 452.


11. In order to show the extent to which these customs are practiced: out of 100 individuals interviewed, thirteen women and six men had filed teeth. Approximately half of the women were in their twenties and thirties and half in their forties. Only six women were missing their lower central incisors due to alteration of normal dentition. They were all in their thirties and forties.

12. My husband, David S. Daugherty, D.D.S. recently made an investigative trip to Bambio, which is in the southern forest area of the Central African Republic. Among the Pygmies in this region he found an example of filing teeth which noticeably contributes to decay. The upper incisors are filed to a point with a ledge at each side of the base of the point. This extensive filing devitalizes the teeth and destroys the protective enamel which leads to decay and loss of teeth. The decay can be attributed to the filing of these teeth because the Pygmies do not appear to have a decay problem in other teeth. This is probably due to a lack of refined sugar in the diet. Heavy use of the anterior incisors for tearing meat probably adds to the stress on these teeth since the diet contains considerable amounts of hunted game.


14. Ibid.
CHAPTER 7
DESIGNING ORAL HEALTH CARE

Providing effective oral health care in a country such as the Central African Republic is not a simple task. Some of the obstacles on the path to this goal are: endemic oral disease, limited and expensive oral health care services, few dental health education opportunities or programs of prevention, and detrimental cultural beliefs and practices. These problems combine to strengthen the argument for careful planning of oral health care based on the oral health behavior model.

Chapter seven explains how this model can be used to develop an effective oral health care program. First, the importance of using this model is presented. Then, four aspects of the model that are applicable to designing oral health care in a developing country are discussed. The four aspects are: deciphering the culture, delineating the oral behaviors and beliefs, determining the treatment, and developing the preventive care.

The Oral Health Behavior Model Revisited

The oral health behavior model underscores the need for oral health professionals to consider more than just clinical disease when treating oral health problems. This need becomes increasingly
important in countries such as the Central African Republic where many oral health professionals may be unfamiliar with the cultural and social background of patients. Most developing countries in Africa do not have dental schools, but depend to a great extent on non-national oral health professionals. This means that these practitioners are treating patients who live in a markedly different and therefore unfamiliar linguistic, cultural, and social setting. Even nationals who graduate from an African dental school and work in their own country are often from the middle or upper class and may know little about the oral habits and beliefs of the lower class. Tribal differences also become apparent when national oral health professionals work in different regions within their own country.

Most personnel in the oral health care sector are the product of traditional education based on the disease and treatment model. Such training naturally produces oral health professionals who are preoccupied with clinical diagnosis and treatment modalities and who disregard the importance of behavioral and social factors when treating disease. However, encouraging signs are seen on the horizon. An effort is now being made by African professionals in this country's medical school to consider traditional medical customs and beliefs when practicing medicine in rural settings. In the field of oral health, the challenge is to design effective care that takes into account the social and cultural setting, oral behaviors and beliefs, and the oral health status of the population.
Deciphering the Culture

Oral health workers must realize that an understanding of the culture is essential to delivering optimum oral health care. As Gift explains, successful oral health care is "...enhanced if the dentist is sensitive to the environment or culture which affects the patient, and if the dentist devises techniques that will be compatible with those values and norms that the patient already has." This statement assumes that the professional is familiar with the culture.

Gaining that familiarity requires that the dentist or other oral health professional takes on the role of a learner and firmly believes that it is important to understand the culture of the population which will receive oral health care. The care giver needs to acknowledge personal ethnocentrism and cultivate an interest in the local culture. A negative attitude toward the social and cultural characteristics of the client population will preclude gaining an appreciation for positive aspects of the culture. An American dentist working in West Africa describes her experience as follows: "...integrating this concept (modern dental care) into the community and working with the native people require some understanding of the culture. Gaining insight into customs and traditional beliefs by attending native dance celebrations and visiting local witch doctors is a fascinating cultural experience."3

Gift, in her article on "The Dental Patient's Cultural Response to the Need for Dental Care,"4 suggests actions to aid the dentist's awareness of social and cultural influences. She writes about
dentistry in the United States, but her recommendations with some modifications are applicable to dentistry in a Third World country.

1. The dentist needs to be aware of his or her past and present cultural orientation, particularly, the ways in which it differs from that of the target population. This can be done by identifying personal values and comparing them with those of the client population.

2. Identify the predominant social and cultural groups of the community. What are the predominant values of these groups? Are they different from the dentist's values?

3. Read articles and books that describe and discuss these or similar groups.

4. Listen to the people. Spend time with them, observe and ask questions. Visit the marketplace. Gift assumes that the dentist has a working knowledge of the language. Develop a relationship with someone who can serve as a translator when communication with the people is not possible. The translator can also serve as a confidant to explain customs and beliefs.

5. Discuss ideas about health and dentistry with office staff. They can provide insights about the client population's background.

6. At the clinic listen to the clients' remarks and make note of their reactions. Never assume that the patient population is homogeneous. If there is not obvious ethnic variation among the clients, there will be subcultural differences due to age, sex, education, family size, and urban-rural childhoods.5

In addition to gathering general information about the culture, it is essential that the oral health professional gain an understanding of
the local economy. Questions such as "Who spends money for what?" and "What is the average income?" are helpful in determining appropriate fees for service. Information about seasonal shifts in spendable income may influence decisions about the best time for staff vacations. In Nanga Commune, for example, January through March are the peak months when people have cash following the sale of cotton.

Insights into deciphering the culture may be gained by examining the proceedings of the first International Interdisciplinary Symposium "Health and Development in Africa." Economists, sociologists, lawyers, doctors, anthropologists, and specialists in African studies from industrialized and non-industrialized countries came together for this conference in June 1982. Oberender and Diesfeld, who organized the conference state that, "The cultural identity of the people concerned is an aspect of development that has so far been inexcusably neglected." They suggest that "...an interdisciplinary approach to a solution" is necessary due to the complexity of the health situation and the way in which it is integrated into all aspects of life.

This of course requires a consideration of the African concept of unity between man and nature, a concept which does not exist in Western culture. And thus it will be necessary to overcome the exclusively science and technology based orientation of modern medicine and to take into account, amongst other factors, psychological and mystical influences on supposedly purely physical events.

Oberender and Diesfeld's recommendations for health and development are pertinent to the field of oral health, but are difficult to implement in most African countries. Problems are inherent in an interdisciplinary approach. There may be differences in perspectives and in the use of technical language among staff members.
In addition, the financial support of members of a team that represent several disciplines is costly. Finally, the logistics of organizing and maintaining an interdisciplinary team and burdensome living conditions usually prohibit its execution. I propose, however, that principles based on an inter-disciplinary approach can and should be put into effect by personnel who work to improve oral health. An appreciation for social, cultural, and economic factors needs to be cultivated among dental professionals. This can be done on a large or small scale.

The final question that I asked Nanga Commune residents when I interviewed them was, "What suggestions do you have for the new dentist who has just arrived in your country?" One thoughtful respondent stated, "He should spend time with the people, sit with them, talk with them, receive them warmly and know their customs: what they like to eat, their ideas, what they want and what they do not want." This behavior assures the national of the professional's genuine interest and care.

As the oral health professional deciphers the culture, a never-ending process that leads to a deeper level of understanding, the information gathered provides the context from which oral health behaviors and beliefs are delineated.

**Delineating the Behaviors and Beliefs**

After the oral health professional has begun to grasp the general philosophy of life and the basic social structure of the community, an effort can be made to start outlining the oral health behaviors and
beliefs. Knutson supports this order of acquiring information in his book, *The Individual, Society, and Health Behavior*. "It is wasteful, often futile, to begin (investigating an individual's health behavior) without first knowing how he perceives the world about him as it is related to the health action under consideration."^10 Practically, there will always be a weaving back and forth between gaining information about the general cultural context and acquiring an understanding about the specific health behaviors and beliefs. Information from one area will shed light on the other, clear up misconceptions and broaden perception. However, it is worthwhile in the long run to take time to gather facts about the popular worldview prior to studying specific health behaviors. In fact, that process of collecting information requires that time be spent with a variety of people who may or may not have oral health problems. Contact with a broad spectrum of individuals at this stage may open doors for specific inquiry later and may also demonstrate the oral health worker's interest in the community.

In addition to gathering information which is pertinent to oral health—diet, habits, customs, and oral hygiene—the oral health worker needs to learn how individuals in the target population define their oral health problems. This can be done by asking questions at individuals' homes or in small groups. For this research project I asked respondents to describe health experiences that they had had with their mouths. This open-ended question allowed further inquiries about routine treatment, beliefs, and the cause of oral health problems. Thus the individuals defined what they perceived to be their oral
health problems. An informal survey of this sort does not require a large number of respondents. An adequate sample is achieved when the responses become repetitive and relatively little new information emerges. Care should be taken to include individuals in the survey from various economic and social groups.

Although some dentists may consider the task of deciphering the culture and delineating the behaviors and beliefs as beyond the scope of their training and too involved to be practical, an oral health professional who desires to effect change can make an adequate assessment of the population. It may be a temptation to simply ask questions about behaviors and beliefs of those who come to the clinic. However, a word of caution is warranted. Certainly, conducting a survey of clients that come to the dental office is better than doing nothing at all, but a danger inherent in doing this is expressed by Illsley.

To the extent, however, that it (the conceptual synthesis) is based upon patients in contact with services and thus abstracted from their daily environment, it deals with the behavioral consequences rather than the origins of ideas and behaviour. ¹²

The expatriate dentist who is designing a program of oral health care and does not appropriately assess the social structures, culture, oral health behaviors and beliefs of the population may at a future date miss opportunities to improve oral health.

**Determining the Treatment**

The task of determining the treatment program requires an adequate grasp of the culture and oral health behaviors and beliefs as
Previously discussed. It also demands information on the oral health status of the population. These factors along with the type of facility, electrical supply, equipment, supplies, and level of dental skills will influence the care offered. It is also necessary to evaluate the treatment program in terms of its availability, accessibility, appropriateness, and acceptability to the people being served.13

First, an assessment of the oral health status of the local population is essential if there is no baseline data on hand. This provides information from which the dentist can plan treatment, prevention and teaching programs. The World Health Organization deems basic oral health surveys important to the extent that they assist dentists in the planning, analysis and summarization of data collected in country surveys.14 The process of conducting an oral health survey, which requires government approval, produces opportunities for the dentist to meet community leaders and forces him or her to research the geographic and jurisdictional boundaries of the community.

The findings of the survey offer a clear picture of prevalent disease and the type of treatment recommended. This information permits the oral health professional to determine the kind of program which will most effectively serve the needs of the people. Survey results are particularly useful in planning prevention programs. For example, in Nanga Commune prior to the oral health survey, I expected a high level of gum disease based on my casual observations. However, the level of 4.1 diseased, missing or filled teeth per 12-year-old was
a surprise finding and underscored the need for a carie prevention program among school children.

It is assumed that the oral health professional will gain an understanding of traditional oral health treatments in the community as part of the assessment of the oral behaviors and beliefs. However, the extent to which traditional remedies are used needs to be underscored. Oberender and Diesfeld point out "It is not yet sufficiently recognized that this kind of medicine (traditional medicine) still represents the only basic medical service available in many areas." The dentist or dental auxiliary should take an interest in learning about local herbs used for oral treatments. Scientific identification of plants and their active ingredients can lead to determining whether or not they have medicinal properties for oral health problems. Encouraging the use of beneficial herbs and discouraging the use of those whose properties may be detrimental or not helpful can be a great service to the community.

Gift states that "...the most sensitive predictor of dental care utilization is perceived illness." Research among Nanga Commune residents clearly shows that the identification of an oral health problem is directly linked to pain: no pain means no problem. In addition, the level of knowledge about the cause and prevention of oral health disease is minimal. Given these factors and the absence of a dental clinic in the area for 18 years, one would expect a low level of dental care utilization. The majority of individuals who suffer from a toothache seek home remedies as clearly portrayed in the chapter on behaviors and beliefs. Consequently, an integral part of an oral
health treatment program should be oral health education which is discussed in the next section. The goal is to effect change in understanding and behavior.

A different and necessary approach to increase dental care utilization focuses on structural changes rather than individual behavioral changes. Jenny, in her article on social values and oral health emphasizes the importance that structural changes can have in promoting oral health. Studies have shown that "health education efforts to change dental behaviors and attitudes have not been, so far, successful on any large scale." A classic example in the United States is the decrease in caries among children. This change has come about primarily because of water fluoridation. It is not the result of a major change in the brushing or eating habits of children.

The oral health professional who develops a treatment program with the goal of decreasing organizational barriers increases the probability that dental services will be used. Common complaints among health workers in Third World countries run along these lines: people do not care about health; people would rather spend money for things other than for medicine; and people wait to get medical assistance until it's too late to do any good. These complaints are applicable to oral health patients and also, there is a veritable basis for them. It is common in rural Africa for health workers to expect people to walk 15 or more kilometers for routine dental or medical care and are critical when individuals do not make this kind of effort to seek care.

Structural obstacles can be lessened and even removed in order to improve dental care utilization. One practical way to do this is to
"increase the mobility of dental practice." This can be done with the use of a mobile unit or by coordinating visits to various types of dispensaries where dental services are not routinely provided. Other creative initiatives can be taken to tap captive populations in institutional settings such as schools. The oral health professional can adapt incentives for getting oral health care into the cultural setting. The following factors also need to be considered when developing an oral health care programs.

1. Availability, or "Is there someone I can go to?" Are there oral health facilities, personnel, equipment, supplies and other resources available to the population?

2. Accessibility, or "Can I afford to go, to spend the time and the money?" Are the clients able to take advantage of the care, given the distance they must travel, the hours that the service is available, and the costs? Are there organizational barriers that can be reduced or eliminated? These may be physical, economic, or cultural.

3. Appropriateness, or "Will the care I get give the result I want?" What is the effectiveness and technical quality of the care received? Does the care in fact improve oral health? Do the oral health personnel communicate clearly with clients so that they understand the clients' expectations?

4. Acceptability, or "Do I really want to go through all that?" Does the care satisfy the clients? Is the care convenient and courteous? Are the charges reasonable? Is the quality of care acceptable?
The type of procedures that the dentist decides to provide depends on the location of the dental clinic. For most settings in Africa and particularly for those that are rural, the goal of treatment needs to be the alleviation of pain. This includes extractions, medicated fillings, simple permanent fillings, cleanings, and treatment for trauma such as dislocated jaws.

In general, private clinics are unable to provide free care. The fees for treatment need to be low enough to be affordable to the average person and yet high enough to maintain the costs of running the facility. A sliding fee scale is one way to allow lower class individuals to obtain palliative care. Clients who have a regular income and can afford more sophisticated treatment can thus contribute a larger percentage of the clinic operating revenue. Creative modes of payment in grain or commodities other than currency might be feasible in certain situations; however, without subsidy free care is usually not possible. Emergency care for the relief of pain is beyond the means of some individuals, even when fees are set at a level that just covers costs.

Facing the task of providing available, accessible, appropriate, and acceptable oral health care in a Third World setting accentuates the fact that solutions are not facile and that vocation education and preventive care are fundamental.

An integral part of an oral health treatment program in a developing country should be a program for vocation education. This may be a simple apprenticeship or a formal program to train dental auxiliaries or village oral health agents. An apprenticeship program
might have only one or two students who assist the dentist and gradually take on added responsibilities. A more formal program would include classroom work as well as clinic experience where the students learn by observation and hands-on practice.

Education that is relevant to the health care system in Africa needs to equip the students to be life-long learners who can do independent study, who have a desire to act, and who are ready to communicate to others on the health team. Students require encouragement and teaching in the skills of communication and in identifying problems. The focus of their education should be continued learning and inquiry, not "dogma-dominated" or "teacher-centered" education.

In developing countries where dental manpower resources are almost non-existent it is most unfortunate for a dentist to focus on delivering oral health care to the exclusion of dental vocation education. A great amount of tension results when the effort is made to meet oral health needs and spend time setting up an education program. However, the priority of establishing a vocation education program needs to be guarded. The main challenges are: 1) recruiting personnel who are qualified in terms of capability and integrity, and 2) maintaining a financial base to cover salaries and operating costs. The dentist needs to remember that in a period of just a few years, more oral health needs will be met by those taught by the dentist than he or she would have been able to care for alone.

A number of organizations and individuals have been involved in the production of dental education materials that are particularly
relevant to Third World countries. Some address the organization, development, and content of education programs to train dental personnel, while others focus on priorities and recommendations for oral health in the community. See the notes for a list of these references.22

Developing the Preventive Care

Since the mid-seventies, attempts to introduce primary health care in Third World settings has received considerable attention in the literature.23 In 1982 my husband and I attended a workshop entitled "Community-Based Health Care: Making It Happen."24 The resounding theme communicated by the presenters, several of whom had worked in developing countries, was that in order to effect a change in the health of a community, teaching about the cause and cure of disease must take place where the people reside; in the villages. Medical crisis intervention at the hospital, for all the good it does, will not affect the thousands of infants and adults who continue to die unaided out in the villages.

Primary health care is initiated when the program directors choose participating villages based on need and on an indication of village support. Health workers for village health posts are chosen by the villagers, who then attend a course where they learn, "...drama, songs, riddles and parables to illustrate preventive measures and effective health care related to local diseases."25 The village workers treat common diseases with a limited pharmacy and simple, standing orders.
Hill and Henning in a recent article highlight the fact that the aims of the program are often the very problems that hamper the program's development—working in isolated villages, community involvement, preventive emphasis, and an appropriate level of health care that can eventually be integrated into the State Health scheme. However, for all their words of caution, they acknowledge that village health schemes have value: "The teaching methods are both sound and appropriate, the aims are worth pursuing and the need for such services great." 

There is no doubt that the development of oral health prevention programs in developing countries is essential. Caries rates are rising and there is no sign that gum disease is abating. It is clear that oral health needs cannot be met by curative means alone. The financial cost of treatment is prohibitive and neither governments nor individuals can afford to pay for the care necessary. Results from the WHO survey indicate that the average Nanga Commune adult, 35-44 years old, needs extractions, fillings, and a cleaning. The cost of having this treatment at the Boguila dental center is 8,880 Central African francs ($29.60). This amount of money is beyond the income of most residents, and the majority would not borrow that amount of money for a problem that is not life-threatening. The manpower necessary to treat dental disease in Nanga Commune alone, if everyone could afford it, would require more dental auxiliaries than are available.

As Barmes states, "...the best way of applying prevention is to use a comprehensive established care structure." The prevention program comes out of the curative service. It appears that the most
appropriate model of care to serve rural villages is that of primary health care. Cooperative efforts on the part of medical and dental health workers could cut costs. Adaptations can be made to make oral health care more suitable for particular settings. A goal of getting basic care and information to people isolated from large health care centers is needed in Africa's vast, rural-populated areas. Teaching the cause and prevention of oral disease with culturally appropriate drama, songs, riddles and parables is one teaching method that can be used. Chambers emphasizes the importance of teaching skill-habits rather than trying to modify knowledge and values. Children at school can be instructed in the effectiveness and use of the chew-stick. The habit of cleaning their teeth every morning at school with the well-proven three strokes per tooth-surface method could be encouraged by the teacher, dental auxiliary or village health worker. For example, most individuals in Nanga Commune consider the tooth-stick a disposable item that is used on the way to the garden and then thrown away. At school, children could be taught 1) the advantages of a chew-stick over a toothbrush, 2) how to soften the chew-stick by soaking it in water so that it can be used more than once, and 3) the technique of cleaning the teeth with it. Incentive programs for decreasing sugar intake can also be developed at school and at other settings such as church groups, clinics, and village meetings.

Blaikie, in his article, "Cultural Barriers to Preventive Dentistry," describes frequently encountered cultural barriers found among lower socio-economic groups in developed nations. He states that often "desirable dental attitudes and habits are inconsistent with
their cultural values." Some of the attitudes he addresses have implications for rural Africa. He claims that the dentist needs to have knowledge about the population's socio-psychological and cultural background that affects attitudes and behaviors. Blaikie emphasizes, "Without such knowledge dentists are likely to regard cultural differences as oddities, as intolerable, or as irrelevant." He then delineates the following common perspectives among lower class individuals.

1. Definition of health. They define health in terms of incapacitation and consider themselves healthy as long as they are able to keep working.

2. Lack of information. They tend to be more ignorant about health matters.

3. Fatalism. They often regard illness as unavoidable. Consequently, there is little concern for preventive care.

4. Orientation to the present. They think in terms of the present rather than the future and for that reason, immediate positive results are important.

5. Preference for personal relationships. An unfamiliar setting may be intimidating, so efforts are made to seek help from a person who is known rather than a medical or dental practitioner.

Blaikie's suggestions for designing a prevention program have implications for rural settings such as Nanga Commune. He states that the dental health education must counter fatalism and lack of information by specifically showing patients positive results of preventive oral behaviors. Concrete examples must be used. Plaque
disclosing tablets and bleeding scores can clearly illustrate the oral health professional's teaching. In order for preventive programs to fit with the clients' orientation to the present, immediate benefits of proper oral hygiene such as the absence of pain, improved appearance, pleasant breath and reduced treatment costs need to be identified. Methods of teaching should stress visual and physical results. Guidelines for proper oral hygiene need to be expressed in clear and precise rules to eliminate opportunities for confusion.  

Although the problems that stimulate the need for oral health prevention programs may be similar in all countries, Bulman states that "the solutions can and must vary enormously with local conditions." Even within a small area like Nanga Commune, there needs to be variation in the approach to prevention depending on whether one is working with the Suma, the Arabs or the nomadic Mbororo who occasionally pass through. The oral health professional needs to monitor all aspects of the prevention program and make necessary modifications when indicated. Bulman sums up the situation, "the ways in which they (dental caries and periodontal disease) manifest themselves in different regions and social groups can be bewilderingly diverse. Therefore the methods used to combat them must be equally diverse, and geared not to the teaching of a distant dental school but to a realistic appraisal of the balance of prevention, treatment, and education appropriate to a specific locality or population group."
Summary

The importance of designing oral health care is not emphasized in developing countries. Other needs take precedent. Oral health care is not a service that a significant number of people demand. In fact, population groups have adapted to the pain and disfigurement of oral disease. It is accepted in their setting in the same way that someone in Western culture would accept a headache or acid indigestion.

For those who enjoy a challenge and want to work toward the goal of oral health for all by the year 2000, four aspects of designing oral health care require consideration; deciphering the culture, delineating the oral behaviors and beliefs, determining the treatment, and developing the preventive care. Two advantages face most oral health professionals who work in developing countries over those who choose to stay in the developed world. First, there is rarely a long-established and entrenched oral health care system in operation that is resistant to change. Secondly, these countries are in the enviable position of being able to learn from mistakes in the industrial countries. The Third World needs oral health care professionals who design oral health care with sensitivity to human suffering and with an awareness of great economic, cultural, behavioral and social diversity.
NOTES TO CHAPTER 7


5. Ibid., 603.


7. Ibid.

8. Ibid.

9. Ibid.


11. Ibid.


18. Ibid., 281.


27. Ibid., 45.

28. This figure is calculated using the lowest fee scale. The recommended treatment is; 1.6 extractions at 800 Central African francs (CAF) per extraction, 2 one-surface fillings at 1500 CAF per filling, 1.7 two-surface fillings at 2000 CAF per filling and a cleaning at 1200 CAF. The U.S. dollar figure is calculated at 300 CAF per $1.00. The average per capita income for a Nanga Commune resident is estimated at about $100.00 per year, or slightly more.


33. Ibid., 401.

34. Ibid., 399-400.

35. Ibid., 400-401.


37. Ibid., 71.

38. Ibid., 70.
The final chapter of this report is divided into two main parts. The first section, a summary of findings, gives a review of the work that was accomplished during the research phase of this project. The second section highlights and discusses the implications of this socio-dental study. Included in this section are thoughts on the relevance of the results and questions raised by the research.

Summary of Findings

The formulation of this study came out of an apparent need for community-based research in the developing world. Specifically, it attempted to fill a gap in the area of socio-dental research in developing countries where oral health resources and research are limited. The underlying assumption of the study is that oral health professionals who work in developing countries, and especially those who are foreigners, need to use an oral health behavior model for treatment as opposed to the traditional medical model. The oral health behavior model considers the cultural and social background and the oral health behaviors and beliefs of the individual receiving treatment. These factors influence the way the oral health professional views the patient. To the extent that the model increases
the dentist's understanding of the patient, it assists him or her in
determining appropriate treatment.

The focus of the study was to learn about the oral health
behaviors and beliefs of the people of Nanga Commune in the
northwestern part of the Central African Republic. When I realized
that no current oral health data existed, an additional inquiry was
undertaken to determine the oral health status of the Nanga Commune
residents. However, the study took on an even broader scope as I tried
to gain a general understanding of the cultural and social context and
to assess the delivery of oral health care.

Situated in the heart of the African continent, the Central
African Republic is a vast, undeveloped, sparsely populated country.
Large numbers of children living here die from malaria, measles, and
whooping cough while others are paralyzed by polio. Government public
health and prevention programs are being started in various regions of
the country, yet resources for meeting the oral health needs are
insufficient.

In Nanga Commune, the Suma are the predominant tribe and Arabs
comprise an influential minority as the business sector of the
community. Households are comprised of family units which include
mother, father, and children, although the clan is the important social
unit in day-to-day living. Except for the commercial sale of cotton,
lifework follows a pattern of subsistence farming, hunting, and
gathering. The cultural orientation of the people is based on an
animistic belief system which encompasses all aspects of their lives.
The religious universe in which they live is subject to a distant and
powerful God. Spiritual intermediaries, such as the spirits of dead ancestors, provide the communication link to this God who is not clearly understood. This worldview influences thinking at all levels including health beliefs.

An assessment of the delivery of oral health care in this country indicates that services are provided in three different settings. In the public sector Central Africans may visit one of the two government-operated dental clinics in the capital or see a dental nurse who works in a government hospital in an outlying town. The larger of the two main clinics is at the general hospital and the other has recently been opened at a small community hospital. Private services include two dentists who in their private practices in the capital, provide care for a predominantly foreign or upper class African clientele. Three private mission-run clinics exist in remote areas beyond Bangui. The third type of care, which is accessible to all, is that of the traditional healer whose treatment consists mainly of medicinal plants and some non-organic products. The traditional healer's treatments frequently, although not always, reduce the pain and in some cases provide a bactericidal effect. Most frequently, however, the Central African who has a toothache uses a home remedy recommended by a family member or a friend. This may be in the form of a herbal tea which is used to rinse the mouth or some aspirin bought at the local Arab shop.

The oral health care system is limited by a lack of oral health professionals. Most of the dentists working in the Central African Republic are non-nationals. There is no government-operated dental auxiliary program or dental school in the country. Physicians and
government nurses in hospitals throughout the country provide emergency dental care when necessary. Future government plans include sending more nurses to Senegal for dental nurse training. Since the Central African Republic population is 70-80 percent rural and dental services are mainly in urban centers, oral health care is inaccessible to the majority of the population.

To assess the oral health status of the Nanga Commune population, a clinical survey of 114 six-year-olds, 104 twelve-year-olds, and 104 adults 35-44 years old was conducted using the WHO survey form designed to determine oral health diseases and necessary treatment. The findings indicated that the level of oral disease is above the WHO goal of not more than 3 diseased, missing, or filled (DMF) teeth per 12-year-old. The DMF for Nanga Commune 12-year-olds is 4.1 with a precision level of ±1.0. Eighty-eight percent of the adults have caries with a mean DMF of 6.8 ±1.0 teeth. Taking into consideration the fact that this survey was done in a rural setting, I expect that the national DMF lies in the range of 3.1 to 5.1 teeth.

Periodontal disease is very prevalent as indicated by the finding that 94 percent of six-year-olds and 99 percent of 12-year-olds and adults have either bleeding, calculus or gingival pockets. Among the adults, 84 percent have either shallow or deep pockets. Given these results for Nanga Commune subjects, I am willing to say, allowing for a reasonable margin of error, that the Nanga Commune population has a moderately high level of caries and a very high level of periodontal disease. Some of the more serious periodontal diseases such as cancrum
oris are not evident in Nanga Commune, yet are commonly seen in other parts of the country.

The need for treatment findings indicated a need for fillings by 55 percent of six-year-olds, 89 percent of 12-year-olds, and 87 percent of adults. Extractions are recommended for 78.5 percent of the adult subjects. For periodontal problems, oral hygiene instruction is needed for 94 percent of six-year-olds and 99 percent of 12-year-olds and adults. Ninety-three percent of 12-year-olds and 98 percent of the adults need a cleaning to remove calculus, a procedure they cannot perform for themselves. Thirty-two percent of the adult subjects require complex care for gingival problems.

Data from 100 in-depth interviews was analyzed in order to develop a descriptive portrait of the oral health behaviors and beliefs of Nanga Commune residents. The findings are presented in four broad categories: general values and views about the mouth; frequently practiced oral behaviors; commonly-held beliefs; and typical illness behavior.

For the Nanga Commune resident the mouth is important. It is that part of the body that curses or blesses and it is a commonly held belief that the words formed by the mouth can result in life, death, or illness. The mouth's ability to function also signals life or eminent death. The mouth is considered a source of beauty and is adorned by filing teeth into attractive patterns or by extracting certain teeth. Satisfaction with the mouth is primarily related to the absence of pain.
Daily oral habits practiced by Nanga Commune residents, for the most part, do not contribute to healthy mouths. The oral health behaviors were categorized as being either beneficial, harmless, uncertain or harmful. The diet's adequacy for the development of healthy oral tissue is uncertain. Fluoride in the water is insufficient. High levels of sugar consumption at all socio-economic levels of the community are harmful. Widespread drinking of alcoholic beverages, smoking among the male population, and the Arabs' habit of chewing the betel nut all contribute to poor oral health. The oral hygiene activities of the majority of the population are not adequate to effectively clean tooth structure and supporting gums. A lack of knowledge about basic oral hygiene principles is evident.

Oral health beliefs about the cause of oral disease encompass three broad categories: infection, supernatural/magical, and heredity. Most individuals hold to some type of infection theory which usually includes a "bug" of some sort. This bug may be worm-like or more like tiny bugs such as "microbes" which cannot be seen with the naked eye. Certain foods are sometimes mentioned as contributing to tooth decay. Regardless of the type of infecting agent, supernatural/magical forces are generally believed to be at work. These governing powers may be the good God, a verbal curse, or a purchased curse which invokes the spirits. Some residents explain that parents, by means of genetic influence, determine whether a person has healthy or unhealthy teeth.

Illness behavior is initiated by the identification of a problem which is usually pain. This is followed by self-treatment based on recommendations of friends and family and includes mainly plants and
some non-plant products. The outcome of the treatment varies from satisfaction to dissatisfaction. Nanga Commune residents consider themselves sick if they have severe pain or swelling. Inability to eat is a certain sign of illness. For these symptoms they may seek help from a traditional healer, medical or dental clinic. Barriers that hinder individuals from getting dental care early in the disease process are: cost and inconvenience, poor understanding of dental care and oral health, and an acceptance of oral health problems as a part of life to be endured, since there is no known way to prevent them.

Finally, the oral health behavior model was reexamined in light of the need to design oral health care in developing countries such as the Central African Republic. The model's value as an aid to the oral health professional who is from a culture or subculture different from that of the client population was underscored. The dental health professionals are encouraged to consider the social and cultural setting, oral health behaviors and beliefs, and the oral health status of the population when designing oral health care. The information accumulated and the understanding gained about the population is extremely valuable for designing treatment and developing preventive care that is relevant to the clients' needs.

The importance of starting and maintaining dental vocational education was stressed because of the tremendous dental manpower needs in Third World countries. Oral health professionals were encouraged to learn about traditional oral health medicines which are often the only source of medicine that the population uses on a regular basis. Any research that can be done to identify the plants so that their chemical
composition and efficacy can be determined will be a great service for the people.

**Implications**

This case study, which took place in Nanga Commune with a population that was predominantly Suma, is discussed in terms of its relevance to the author, Nanga Commune, and the Central African Republic. Then the discussion focuses on the implications of the study for the delivery of oral health care. Relevant findings are drawn from data about the cultural setting, the oral health care system, the oral health state of the people of Nanga Commune, and the oral health behaviors and beliefs. In conclusion, the oral health behavior model is reevaluated in relation to its relevancy and some questions raised by the research are presented. Final comments by the author end this report.

The goal of this case study was to gain an understanding of oral health in the Central African Republic from three levels of data: clinically identified dental disease, individual behaviors and beliefs, and the existing oral health care system. However, it in fact served another purpose. It put me in contact with individuals I would otherwise never have met. This included African professors at the University of Bangui, government officials in our community, and local people in ten villages in Nanga Commune. During the course of interviewing 100 people I gained an appreciation for the landscape, the kinds of things that are important to a Nanga Commune resident, and the seasonal and daily rhythm of life. These are rewards that only the
researcher enjoys because they are the result of spending time in the field with the people.

For all the challenges that doing research in Africa presents, it can be done with the full cooperation of the authority structure. In the Spring of 1987 when the annual Nanga Commune budget meeting was held, I was invited to attend the meeting to report the results of the research to the village chiefs and local government officials. They accepted with enthusiasm the statistics from the oral health survey that indicated the extent of oral health problems in Nanga Commune. The door is open to teach oral health principles in the villages, schools, churches, and community organizations. In essence, the research project in Nanga Commune served as a form of publicity for oral health. My translator continues to get questions from individuals in outlying villages as to when we will return.

This project was a case study of one small commune among many in the Central African Republic. To suppose that the results of 100 interviews can be generalized to the nation as a whole is presumptuous and in fact, violates one of the principles of the oral health behavior model—that populations cannot be assumed to be homogeneous. However, the results can be applicable to parts of the Central African Republic if care is taken to assess similarities and differences among communes. An acceptable generalization could probably be made to the populations surrounding Nanga Commune since other Sumas and the Gbayas, who have a similar culture, live in these areas. The diet, customs, and oral health behaviors and beliefs are probably quite similar. However, other regions may report different dietary and daily oral habits. As
mentioned earlier in this report, some other parts of the Central African Republic, for example the Kaga Bandoro area, report frequent cases of cancrum oris. Different diet and oral hygiene habits may be contributing factors. Nevertheless, the understanding attained from studying Nanga Commune will facilitate the process of learning about other groups in the Central African Republic and in other African countries.

The results of the oral health survey indicated a moderately high level of caries (4.1 DMF per 12-year-old) and a very high level of periodontal disease for Nanga Commune. I conservatively estimated that the DMF for the nation is probably between 3.1 and 5.1 teeth and that periodontal disease is highly prevalent. This estimate was made in consideration of the fact that Nanga Commune is a rural setting. Typically, that indicates a lower average income than urban areas and thus less access to sugar. On the other hand individuals with higher incomes may practice better oral hygiene habits. Keeping those factors in mind and realizing that some areas have more serious oral health problems, I think it was a fair estimate.

This assessment of oral health places the Central African Republic with the 36 other developing countries that have more than 3 DMF teeth among 12-year-olds. WHO statistics compiled in May 1986 show that the Central African Republic has one of the highest DMF rates among African countries where statistics were available. Mali and Réunion are two other countries in Africa with a DMF above 3.0. A recent compilation of data about periodontal conditions in adolescents shows that the periodontal status of 12-year-old Nanga Commune residents is slightly
less severe than that of 15-19 year-olds in Tanzania. Among the seven African countries listed, Tanzanian statistics showed the highest levels of periodontal disease.

These statistics indicate that the Central African Republic is among the countries that have high levels of oral disease. Unless work is done to improve oral health, the incidence and severity of oral disease will probably increase. In light of the cost of dental services I do not expect any major changes in the delivery of oral health care in the near future. Until a comprehensive oral health care program can be initiated, I suggest that the physicians and nurses who work in outlying areas be given more instruction on oral health prevention and emergency care.

An essential aspect of the social and cultural context of the Central African Republic that needs to be understood is that it is a country comprised of small villages. Seventy-four percent of the population lives in rural areas. The average village population is less than 190 persons. This fact carries tremendous implications for oral health care. The professionals who plan the structure of the oral health care delivery system must consider this fact.

The provision of oral health services in urban centers without a system of care in villages is not going to meet the needs of the village populations. An oral health plan which includes a combination of oral health centers, satellite clinics, mobile units, and village oral health posts with personnel of varying levels of training is a start towards a system that provides adequate care. For example, there are 100 villages in Nanga Commune. The dental center is at Boguila.
Certain larger villages could be chosen as sites of satellite clinics and other smaller ones for village oral health posts. On a monthly or bi-monthly basis a mobile unit could be scheduled to visit satellite clinics and village oral health posts to provide care not usually available. In any case, a national system of oral health care must consider the fact that the population of the Central African Republic is basically rural, and that this presents challenges for the provision of oral health care.

Knowledge about the Central African's perception of health and illness means that the oral health professional can expect illness to be experienced in the African community as a collective phenomenon. An understanding of how the African perceives this crisis should make the professional more sensitive to the family and friends that accompany the patient. The first time that my husband had a soft tissue surgical case, he was surprised by the large group of family and friends who accompanied the patient. The surgical procedure was to remove a large, unsightly tumor that had grown to the size of a small grapefruit on the inner aspect of the lip of a woman. In retrospect, post-research, he understands why the "whole village" appeared to be in the waiting room. The outcome of the surgery, which was perceived as a life-threatening event, and the health of the patient were of concern to everyone. Also, the quiet presence of those who accompanied the patient was a sign of support.

The results of the oral health survey described the oral disease and treatment needs in Nanga Commune. This information provided details about the extent of caries and periodontal disease and specific
needs for treatment. These statistics can serve as a guide for planning treatment. However, in my mind, the crucial finding of the oral health survey is that the treatment needs are so great that it is not feasible to meet them all. The cost is prohibitive and the manpower resources unavailable. In addition, the population is not aware of the extent of its oral disease or of its need for treatment. This does not preclude setting up curative care, but the fact remains that all the oral health needs cannot and will not be met. Consequently, the oral health professional needs to evaluate the priority that he or she has placed on prevention, which is the key to oral health.

Findings about the oral behaviors and beliefs provided pertinent information for designing a prevention program. An understanding of the prevalent behaviors and beliefs in the community allow the oral health professional to speak knowledgeably. Thus the teacher can describe current habits and beliefs and explain why they are beneficial or harmful to the teeth. The philosophy of teaching should be one that uses meaningful illustrations and stories to communicate concepts of health. For example, the teacher might explain why all Central Africans wash their mouths in the morning and describe the event; then continue to explain how to clean the teeth to prevent caries and gum disease.

When possible the people should be taught to use indigenous products. As mentioned earlier, the chew-stick needs to be presented in terms of its beneficial properties: its cost, its effectiveness to clean, and its use even in other countries. Since the introduction of
the toothbrush, the current generation of Africans do not value the chew-stick as being effective. Common beliefs about the cause of tooth decay can be discussed, then the teacher can explain actual causes and describe how the chew-stick promotes healthy teeth. Each audience and setting will dictate to a degree the approach and content of the prevention program. An important and necessary aspect of any prevention program is that the oral health professionals be examples of good oral health habits.

The portrait of the Nanga Commune resident has implications for the way the oral health professional perceives the typical client that comes into the office. A greater understanding of the individual's values, health behaviors, beliefs, and illness behavior will also affect the relationship between the professional and the client. For example, the client who waits until he or she is gravely ill to get dental treatment is usually thought of as not having been willing to make the effort to seek care earlier. True, the person did not make the effort to seek care at the onset of the health problem, but what factors contributed to that decision? The results of this paper indicate that the social and cultural environment, including the person's worldview, the availability, accessibility, and acceptability of oral health care, the inexpense and ease of using home remedy, the fact that the problem is quite likely one that has been experienced before and is not deemed serious, the belief that the problem is inevitable and, a lack of information about the outcome of treatment if it were sought all have a part in determining the behavior of the client. I do not intend to negate the importance of personal
responsibility, but rather illustrate the fact that a series of factors no doubt influences the decision that seems unwise to the expatriate oral health professional. Understanding is the first step to accepting the client.

A major question raised by this research is whether or not the oral health behavior model is relevant to the delivery of oral health care. Some oral health professionals might think that it has some merit for the planning of oral health care in an unfamiliar setting, but would then raise the question: Is it practical or worth the effort? Oral health professionals must decide the answer to that question for themselves. The best way to do that is by trying it out in various places. Based on the experience of the past two years, I would consider it unfortunate for an expatriate dentist to develop an oral health program and vocation education without gaining some understanding of the culture, social context, oral health state, and oral behaviors and beliefs of the people being served.

This study suggests that more research needs to be done on the use of traditional plants for oral health problems. The extent to which plants are used for medicinal purposes in Africa is poorly understood by Westerners. In Nanga Commune everywhere I went I saw trees stripped of patches of bark that had been cut off for medicinal use. The information gathered during the course of this research is only a beginning. All the plants used in Nanga Commune for dental problems have not yet been identified according to scientific name. Questions that need to be answered are: What are the chemical compositions of
the plants? What are the medicinal properties? Which plants are beneficial and for what types of problems?

More research needs to be done on traditional healers. For this study the contact with traditional healers was limited. Questions need to be asked about their use of plants and other products. What is the rationale for using certain plants for certain problems? The process of interaction that they have with the clients warrants study. What is it that people like about the care of the traditional healer? I suspect that Westerners working in developing countries could gain valuable insights from traditional healers about how to relate to clients in a way that might make the care more acceptable. When the Westerner moves to a Third World country, businesslike, professional mannerisms are carried along. How the Nanga Commune resident interprets the learned responses of the professional is an unanswered question. A concept that is highly valued in the Nanga Commune society is that people come before projects. At the end of an interview a resident explained, "If you want to do what is right when a person stops by your house, offer a chair and sit down with the person, don't just wave and say 'hello'." The kinds of messages that are unwittingly communicated to clients would be a fascinating topic for study.

A final, yet crucial question is whether or not nonsubsidized, private oral health care operated by African dental personnel can be self-supporting in a Third World country. The challenges are great. For example, the Central African Republic is sparsely populated, the average income is about $300 (but much less in rural areas), the oral health knowledge of the people is limited, and illness behavior
patterns are in operation that do not demand routine care. The goal for such a project is that the revenue from patient services pay for staff salaries and supplies, equipment being previously donated. A balance needs to be found between teaching prevention so that future generations will avoid dental disease and providing curative care that meets urgent needs, but does not "lead to the population being trapped in a care/repair cycle..." This problem remains to be resolved. However, if the project is started on a small scale and information is gathered with the oral health behavior model and utilized, I think survival is a possibility.

Finally, I would like to remind the reader, that although many sources were consulted, the portrait of the Nanga Commune resident communicated in this report is the result of choices made by the author. It is a composite. Personal biases are inherently a part of any research. In light of my belief that learning is a continuous process, my ideas may change. Therefore, I caution the reader against stereotyping all Nanga Commune residents into the image conveyed by this paper.

In essence, I have in this report attempted to illustrate the importance of the oral health behavior model for the oral health professional. The point has been repetitively made that the oral health professional who wants to give optimum care needs to understand the clientele in terms of their social and cultural background, their oral health status, and their oral health behaviors and beliefs. Merton in his paper, "On the Oral Transmission of Knowledge," rephrased a common statement that L. J. Henderson used during his seminar on
Pareto's general sociology. I think that Merton expressed succinctly what I have tried to communicate when he wrote, "In general, it's a good thing to know what you are doing."
NOTES TO CHAPTER 8


2. Tanzanian 15-19 year-olds had the following levels of periodontal disease recorded by the mean number of sextants: 4.5 with bleeding, 3.8 with calculus, and 1.6 with shallow pockets as compared to 4.9, 3.6 and 1.2, respectively, for Nanga Commune 12-year-olds.

3. The seven African countries are: Ethiopia, Kenya, Malawi, Niger, Nigeria, Tanzania, and Zimbabwe.

4. Personal communication via letter with J. Sardo Infirri, Oral Health Unit, WHO. She also mentioned the importance of using locally available materials and at the first referral level, nondestructive care methods such as sealants and glass ionomers or composite resin filling materials.

APPENDIX A

FIELD GUIDE FOR IN-DEPTH INTERVIEWING
INTRODUCTION: The interview is conducted in an unstructured manner so as to allow the participant to describe behaviors practiced and beliefs held that relate to oral health. Ideally the interview is started following a period of participant-observation where the researcher has taken on the role of learner. Asking questions for information, i.e., what is this? how do you cook it? what do you eat with it? etc. provides an introduction that sets the participant at ease. In this context the researcher steers the conversation to the topic of oral habits by introducing an open-ended question. The researcher is to allow the participant to describe as freely as possible his or her ideas and behaviors with a minimum of interruption. The researcher should maintain an active listening stance by using silent probes and non-verbal cues.

OPEN-ENDED QUESTIONS: The researcher is introduced to the participant as a new-comer to the country who is interested in learning about foods and anything that has to do with the mouth. Her husband is a dentist and this information will help him in his work. The initial question is:

1. What kinds of experiences have you had with your teeth or other parts of your mouth?

2. Have you had any problems?

3. If so, what did you do?

4. What was the cause?

OTHER QUESTIONS: The following questions are asked if they are not answered in the participant's initial narrative:


4. What do you do with your mouth? Do you use it in your work? Can you catch dental caries?

5. As you get older will your mouth change? How? Why?

6. Are you satisfied with your mouth the way it is or would you like to change something? If so, what? Why?

7. What does a dentist do? Why?
8. Please answer honestly. The dentist has just arrived in your country. What suggestions do you have for him as he works with Africans here?

OTHER INFORMATION: On a separate card the researcher notes the participant's:

1. Village
2. Tribe
3. Approximate age
4. Sex
5. Occupation
6. Education
7. Religion
8. Family members in household
9. Name
10. Number of upper and lower teeth/general condition of teeth and gums.
INTRODUCTION: L'interview doit être conduit d'une manière ouverte pour amener les gens à exprimer leurs idées et expliquer leurs habitudes concernant la santé orale. C'est bien si l'interview suit une période d'observation où le chercheur prend le rôle d'étudiant pour poser des questions telles que: Qu'est-ce que c'est? Comment vous préparez cela. Quelle chose mangez-vous avec cela? etc. Ces moments vont donner l'occasion aux gens d'être à l'aise avec le chercheur. Dans ce contexte, la conversation commence avec une question ouverte. Le chercheur doit laisser le participant répondre aux questions librement sans intéraction. Le chercheur doit bien écouter sans commenter et encourager les gens à parler avec silence et les gestes.

QUESTIONS OUVERTES: Le chercheur va être introduit au participant comme quelqu'un qui est nouveau en Afrique et qui voudrait connaître la nourriture du pays et toutes choses qui concernent la santé de la bouche. Son mari est dentiste et ces informations peuvent l'aider à mieux faire son travail. La première question:

1. Quelles sont les expériences que vous avez eu avec la santé de votre bouche?
2. Avez-vous eu des problèmes?
3. Si oui, qu'est-ce que vous avez fait?
4. Quelle était la cause?

AUTRES QUESTIONS: Les questions suivantes seront posées aux participants si les réponses n'étaient pas données dans la conversation antérieur.

1. Qu'est-ce que vous mangez? Quand? Comment? Pourquoi?
2. Qu'est-ce que vous buvez? Quand? Mangez-vous des bonbons? Fumez-vous?
4. Que faites-vous avec votre bouche? Est-ce que vous l'employez dans votre travail?
5. Quand vous avances en âge est-ce que votre bouche va changer? Comment? Pourquoi?
6. Etes-vous satisfait de votre bouche ou est-ce que vous voulez changer quelque chose? Si oui, quoi? Pourquoi?
7. Que fait le dentiste? Pourquoi? Que pensez-vous de son travail?

8. S'il vous plaît, répondez honnêtement. Le dentiste vient d'arriver dans votre pays. Quels conseils pourriez-vous lui donner pour l'aider dans son travail avec les Africains?

AUTRES INFORMATIONS: Le chercheur prend note de ces informations concernant le participant:

1. Village
2. Tribu
3. Age approximatif
4. Sexe
5. Occupation
6. Education
7. Religion
8. État-Civil
9. Noms
10. Nombre de dents et conditions des dents et gencives.
So ayéké atènè ndé ndé ti fa na jo ni kodjo si lo hinga yé so ayé ti hounda lo da:

Fa na lo so ayéké mbéni guéné so aga na Afrique na ayé ti hinga akobé ndé ndé ti kodro ni, na nga ayé so aba tènè ti yanga ti jo. Koli ti lo ayéké dentiste (jo ti lèkè pèmbè) na fadé atènè so amou légué na lo ti sala koussala ti lo ndjoní koué. So ayé ti tènè fadé assala koussala tâ na nda ni so ahounda atènè so da pèpé.

QUESTIONS TI OBSERVATION: Mbi lingbi ti ba mo séngué? So ayéké gné? Mo to kobé so tonga na gné? Mo tè ni na gné?

QUESTIONS TI INTERVIEW: Ambéni yé gné assi na mo na tènè ti yanga ti mo? Yé ti ngangou gné assi na mo? Si tonga na yé so assi, yé gné laa si mo sala tènè ni? Ayé gné si aga na yé so na mo?

AUTRES QUESTIONS: Ablingi hounda question so tonga na jo ni akiri tènè ni kogjoní pèpé oula na légué ni pèpé.


4. Koussala ti gné laa mo sala na yanga ti mo?

5. Tonga na mo ga mbakoro, fadé yanga ti mo aga tonga na gné? Mbanga ti gné? (mots et structure de la bouche)


7. Koussala ti dentiste ayéké gné? Mbanga ti gné? Yé gné mo pensé na ndo koua ti lo?

8. Ayéké nzoni mo sala mbito pèpé ti kiri tènè mbilimbili so na mbi. Dentiste assi na kodro ti ala fadé so. Ouango ti gné mo yé ti mou na lo tènè ti koussala na popo ti a vouko jo?
QUESTIONS TI HANGA NDJONI

1. Kodro
2. Mara
3. Ngou ti lo
4. Ajo na séwa ti lo ayèké okè
5. Koussala
6. Mo sala école ouala pèpé
7. Eglise ti mo
8. Ajo na ya séwa, ala oké
9. Iri ti lo
10. Ambéni tèné, diko pèmbé
APPENDIX B

WORLD HEALTH ORGANIZATION (WHO) COMBINED ORAL HEALTH AND TREATMENT NEED ASSESSMENT
WHO COMBINED ORAL HEALTH TREATMENT NEED ASSESSMENT (with CPITN) 1983 E

<table>
<thead>
<tr>
<th>Study Number</th>
<th>Name</th>
<th>Family</th>
<th>Other</th>
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</thead>
<tbody>
<tr>
<td>(1)</td>
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<td></td>
<td></td>
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</tbody>
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PERSONAL AND DEMOGRAPHIC INFORMATION

- **Sex:**
  - M = 1
  - F = 2
- **Age in years:**
- **Ethnic group:**
- **Occupation:**

<table>
<thead>
<tr>
<th>OTHER CONDITIONS</th>
<th>DENTURE STATUS</th>
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</thead>
<tbody>
<tr>
<td>(to be specified by investigator)</td>
<td>Wearing</td>
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<tr>
<td></td>
<td>0 = None</td>
</tr>
<tr>
<td></td>
<td>1 = Upper</td>
</tr>
<tr>
<td></td>
<td>2 = Lower</td>
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<td>3 = Both</td>
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<thead>
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<th>FLUOROSIS</th>
<th>COMMUNITY PERIODONTAL INDEX OF TREATMENT NEEDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codes: 0 = Normal</td>
<td>Codes 0 = Healthy 17/16 11 26/27</td>
</tr>
<tr>
<td>1 = Questionable</td>
<td>1 = bleeding 17/16 11 26/27</td>
</tr>
<tr>
<td>2 = Very Mild</td>
<td>2 = calculus 17/16 11 26/27</td>
</tr>
<tr>
<td>3 = Mild</td>
<td>3 = pocket 4 or 5 mm 17/16 11 26/27</td>
</tr>
<tr>
<td>4 = Moderate</td>
<td>black band not visible 17/16 11 26/27</td>
</tr>
<tr>
<td>5 = Severe</td>
<td>black band partially visible 17/16 11 26/27</td>
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<th>DENTOFacial ANOMALY</th>
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<td>(Specify)</td>
<td>0 = Absent 1 = Present 2 = Treatment Need</td>
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<td>Other</td>
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<table>
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<td>FILLED &amp; CARIES FREE</td>
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<td>FILLED WITH PRIMARY DECAY</td>
<td>2 surface</td>
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<td>FILLED WITH SECONDARY DECAY</td>
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<td>5 EXTRACTION FOR</td>
</tr>
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<td>OTHER (specify)</td>
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<td>EXCLUDED TOOTH</td>
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FORMULAIRE OMS POUR EVALUER LA SANTÉ BUCCO DENTAIRE ET LES BESOINS EN TRAITEMENT (avec CPITH) 1983 F

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RENSEIGNEMENTS D'ORDRE PERSONNEL ET DÉMOGRAPHIQUE

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<th>(20)</th>
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| Profession | (17) | |
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AUTRES OBSERVATIONS
(À préciser par l'examinateur)

| (17) | (22) | (23) | |
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PROTHÈSE

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INDEX DES TRAITEMENTS PARODONTIQUES

| (24) | (25) | (26) | |
|------|------|------| |

FLUOROSE

| 0 = dent normale | 1 = douceuse |
| 2 = fluolose très légère | 3 = légère |
| 4 = modérée | 5 = sévère |

MUQUEUSE ORALE

| (24) | (25) | (26) | |
|------|------|------| |

AUTRE

| (27) | |
|------| |

ANOMALIE DENTOFACIALE

| (27) | |
|------| |

D = absent | 1 = présente | 2 = traitement nécessaire

CARIES DENTAIRES ET TRAITEMENT DES DENTS

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ÉTAT DES DENTS

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<th>DENT PERSISTANTE</th>
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<tr>
<td>SAIN</td>
<td>A</td>
<td>0</td>
</tr>
<tr>
<td>CARIES</td>
<td>B</td>
<td>1</td>
</tr>
<tr>
<td>OBTURÉE ET NON CARIEE</td>
<td>C</td>
<td>2</td>
</tr>
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<td>OBTURÉE AVEC CARIE PRIMAIRE</td>
<td>D</td>
<td>3</td>
</tr>
<tr>
<td>OBTURÉE AVEC CARIE SECONDAIRE</td>
<td>E</td>
<td>4</td>
</tr>
<tr>
<td>TEMPORAIRES MANQUANTES DE CARIE 9 ans &lt;</td>
<td>M</td>
<td>5</td>
</tr>
<tr>
<td>PERMANENTES MANQUANTES DE CARIE DE CARIE (moins de 30 ans seulement)</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>PERMANENTES MANQUANTES POUR TOUTE AUTRE CAUSE QUE LA CARIE (moins de 30 ans seulement)</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>PERMANENTES MANQUANTES QUELLE QU'EN SOIT LA RAISON (30 ans et plus)</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>LA DENT INCLUSE</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>LA RAISON (30 ans et plus)</td>
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<td>7</td>
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<tr>
<td>DENT INCLUSE</td>
<td>9</td>
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CARTE NUMÉRO (80) | 4 |
APPENDIX C

SURVEY SUMMARY—WHO ORAL HEALTH ASSESSMENT
SURVEY SUMMARY - WHO ORAL HEALTH ASSESSMENT

COUNTRY: CENTRAL AFRICAN REPUBLIC  DATE: 18 APRIL 1986

CO-INVESTIGATORS: David S. Daugherty and Karen Ortlip Daugherty

ADDRESS: B.P. 240
BANGUI
CENTRAL AFRICAN REPUBLIC
AFRICA

REGISTRATION NUMBERS USED: 001 - 114  6 year olds
201 - 304  12 year olds
401 - 504  35 - 44 year olds

AGE RANGES EXAMINED: 6, 12, and 35 - 44 year olds. Ages had to be estimated in many cases and even adults with birth certification usually had approximate year of birth.

ETHNIC GROUP: (16) 1 = Sama or other tribe that is living in this area. Sama is the predominate tribe but there is some intermarriage with other tribes.
2 = Arab - those of Islamic faith. There were not enough Arabs in this sample to study them as a sub-group, but we did identify them as a separate group so that they could be studied at a future date when exams in some of the more highly populated cities might be possible.

PROFESSION: (17) 1 = cultivateur/farmer
2 = ménagère/housewife
3 = instituteur/teacher
4 = élève/student
5 = non-élève/non-student
6 = commerçant/business
7 = berger/shepherd
8 = main d'oeuvre/laborer

LOCALITY: (18) 01 = Commune of NANGA in the sous-préfecture of MARKOUNDA in the Préfecture of OUHAM

EXAMINER: (19) 1 = David S. Daugherty, D.D.S.

OTHER OBSERVATIONS: (22) Defects of teeth
0 = normal
1 = intrinsic staining of teeth possibly due to childhood or prenatal medications

(23) Esthetic alteration of Dentition
0 = normal
1 = cosmetic extraction of lower incisors at puberty

ORAL MUCOSA: (25) 1 = acute necrotizing ulcerative gingivitis
2 = acute necrotizing ulcerative stomatitis
3 = suspected oral cancer
4 = oral lichen planus
5 = leukoplakia of oral mucosa
ORAL MUCOSA: (25) continued

6 = odontogenic fibroma
7 = candidosis
8 = lesion of unknown origin

(26) Site of lesion
1 = lips
2 = lower labial mucosa and sulcus
3 = upper labial mucosa and sulcus
4 = commissures, buccal mucosa, buccal sulcus
5 = alveolar ridges
6 = tongue
7 = floor of mouth
8 = hard and soft palate
APPENDIX D

CHECK LIST OF DATA FOR SURVEY PLANNING AND SAMPLING DESIGN
CHECK LIST OF DATA FOR SURVEY PLANNING AND SAMPLING DESIGN

COUNTRY:  CENTRAL AFRICAN REPUBLIC

CO-INVESTIGATORS:  David S. Daugherty and Karen Ortley Daugherty

ADDRESS:  B.P. 240, BANGUI, CENTRAL AFRICAN REPUBLIC, AFRICA

AREA TO BE SURVEYED:  Commune of NANGA IN THE sous-préfecture of MARKOUNDA in the Préfecture of OUHAM
Sample taken from a village of 3072 and nine surrounding villages of 70 - 657 population.

<table>
<thead>
<tr>
<th>POPULATION OF AREA</th>
<th>SCHOOL-AGE POPULATION</th>
<th>SCHOOL-ATTENDING POPULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>14507</td>
<td>Don’t know school age population. Non-adult population is 7875</td>
<td></td>
</tr>
<tr>
<td>6632=adults</td>
<td></td>
<td>Don’t have figures. In larger villages most children may they go to school although they may not be regular attenders. General % for area - 35-45% 6-14 yr olds attend school.</td>
</tr>
<tr>
<td>adult = 15 years +</td>
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</table>

ESTIMATE OF DISEASE LEVEL:  ??

IMPORTANT SUBGROUPS OR DIVISIONS IN POPULATION:

Urban/Rural:  In 1975 67.6% of the population lived in rural areas and 77% of the villages had a population of less than 200.

Ethnic:  Sama is the major tribal group in this area and the Arabs the second largest.

Religious:  Protestant, Catholic and Islamic

Dietary regime:  Manioc base with guinea corn and vegetable sauces, ie. various types of greens. Meat is eaten 1-3 x/week or less depending on economic level. During the rainy season meat is even more scarce in the diet. Protein sources in the diet include peanuts, beans, sesame seeds, and squash seeds.

Habits:  Men smoke, Arabs chew betel nut, women may have lower incisors pulled at puberty for beauty and men or women may have central upper incisors filled for beauty.

Education levels:  Majority of adults are non-schooled. Very very few can write their name.

Socioeconomic levels:  Main source of income is the sale of cotton and peanuts. Specific income levels for the people in this commune have not yet been obtained.

ORAL HEALTH SERVICES IN OPERATION OR BEING PLANNED:

Emergency:  Mission Dental clinic, re-opened since our arrival
Preventive programme:  None presently. Hope to start this at the village level during the next year.
School services:  None. Dental nurses have started teaching classes in the local school two times per week.
Private practice:  Care given as a teaching opportunity for dental nurses.
Personnel and finance available for study:  Student dental nurses helped with recording for the survey. Personal finances used.
Size of survey population:  114 6-year-olds  Duplicates? NO
104 12-year-olds
104 35-44-year-olds
APPENDIX E

LIST OF PLANTS USED IN NANGA COMMUNE FOR ORAL HEALTH CARE
AND THEIR SCIENTIFIC IDENTIFICATION
This list of plants was compiled while conducting 100 interviews with Nanga Commune subjects and is not exhaustive. The list includes Family and species names. This information is based on the work of Bradshaw and Fay, "Local Plant Names from Various Gbaya Ethnic Family Dialects and Their Scientific Identification," Manuscript, n.d.

Plants are listed alphabetically according to the name by which they are known in this area which is usually a Suma dialect name. Spellings used are those of Bradshaw and Fay. When the spelling which was given to me is considerably different, it is in parenthesis. The Family name is followed by the Species name when it is available. Plants included in the Bradshaw and Fay list which have not yet been identified are followed by a (?). Plants mentioned during the interviews, but not found on the Bradshaw and Fay list are followed by (??).

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<tr>
<th>Local name</th>
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<th>Species</th>
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<td>bona</td>
<td>EUPHOR</td>
<td>Khaya senegalensis</td>
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<td>LILIAC</td>
<td>Asparagus flugellaria</td>
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<td>dee (dinh)</td>
<td>MELIAC</td>
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<td>Cassia occidentalis</td>
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<tr>
<td>kera</td>
<td>CESALP</td>
<td>Daniella oliveri Hutch &amp; Dalz.</td>
</tr>
<tr>
<td>kon</td>
<td>COMBRE</td>
<td>Butryospermum paradoxim</td>
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<td></td>
<td></td>
<td>Namelia latiflora</td>
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kutu | PAPILA
---|---
kpenggere | CAESAL | Burkea africana
kury | ROSACE | Parinari curatellifolia
logbo | ??
lungmgbe | COMBRE | Combretum sp.
maro | POLYGA | Securidaca longipedunculata
ndende | SCROPH | Striga osiatra
nggara | LORANT | Entada africana

ngombo (Bozoum dialect) | MIMOSA | Acasia campylacanthus

Hochst.

ngore | MALVAC | Rothmannia whitfuldii
nor-kora | EUPHOR | Bridelia scleroneura
sere | MIMOSA | Prosopsis africana

sory (sonri) | RUBIAC | Sterculia setigeran
talala | ?
tara | COMBRE | Anogeissus leocarpus
ziya | MIMOSA | Parkia clappertaniana
APPENDIX F

FEATURES OF THE ORAL HEALTH DELIVERY SYSTEM
OF THE CENTRAL AFRICAN REPUBLIC
Table 4. Features of the Oral Health Delivery System of the Central African Republic

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<tr>
<th>Country</th>
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<th>Type of Service</th>
<th>Targeting</th>
<th>Manpower Employment</th>
<th>Manpower Type</th>
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<td>Demand</td>
<td>Public-</td>
<td>Professional-</td>
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<tr>
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<td>Direct</td>
<td></td>
<td></td>
<td>Private-</td>
<td>Auxiliary</td>
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</table>


- **Payment** - Predominantly Indirect with a considerable amount of direct payment.
- **Type of Service** - Predominantly Curative with a potential for prevention.
- **Targeting** - Predominantly Demand. No organized plan of targeting service to need, for example schools or other organizational sectors of the community.
- **Manpower Employment** - Predominantly Public with a potential for Private.
- **Manpower Type** - Predominantly professional with potential for an increase in auxiliary staff.
APPENDIX G

LIST OF FOODS COMMON TO NANGA COMMUNE
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<th>Sango</th>
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**Animal protein**

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<td>-------</td>
<td>--------</td>
</tr>
<tr>
<td><strong>Non-alcoholic drinks continued</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>millet bran</td>
<td>samsam</td>
<td></td>
<td></td>
</tr>
<tr>
<td>millet flour</td>
<td>kounou</td>
<td></td>
<td></td>
</tr>
<tr>
<td>honey drink</td>
<td>dongo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>porridges (rice, manioc, millet etc.)</td>
<td>potopoto</td>
<td></td>
<td></td>
</tr>
<tr>
<td>leaf teas:</td>
<td>nol</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>tena</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>koube</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>soda</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Alcoholic drinks</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>honey beer</td>
<td>doumo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>millet bran beer</td>
<td>bilibili</td>
<td></td>
<td></td>
</tr>
<tr>
<td>millet beer</td>
<td>loboto</td>
<td></td>
<td></td>
</tr>
<tr>
<td>manioc alcohol</td>
<td>mbako harge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>beer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>wine</td>
<td></td>
<td>vin</td>
<td></td>
</tr>
<tr>
<td>whiskey</td>
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</table>
APPENDIX H

LIST OF PLANT AND NON-PLANT ITEMS USED FOR DENTAL PROBLEMS
WITH THE REPORTED EFFECTS
<table>
<thead>
<tr>
<th>Local name</th>
<th>Part used</th>
<th>Medicinal effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>akasia</td>
<td>leaves, flower</td>
<td>swelling decreased</td>
</tr>
<tr>
<td></td>
<td></td>
<td>did not kill bug</td>
</tr>
<tr>
<td>bona</td>
<td>root</td>
<td>calmed pain</td>
</tr>
<tr>
<td>de-deeng (dindin)</td>
<td>bark</td>
<td>decreased pain temporarily</td>
</tr>
<tr>
<td>dee (dinh)</td>
<td>bark</td>
<td>decreases pain</td>
</tr>
<tr>
<td>doma</td>
<td>bark</td>
<td>soothes sores in mouth</td>
</tr>
<tr>
<td>gengke'deng</td>
<td>root</td>
<td>calms pain</td>
</tr>
<tr>
<td>gba-kuwa</td>
<td>root</td>
<td>calms pain with gums and teeth, did not stop bleeding gums</td>
</tr>
<tr>
<td>gbokola</td>
<td>bark</td>
<td>decreases swelling</td>
</tr>
<tr>
<td></td>
<td></td>
<td>decreases pain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>popped abcess</td>
</tr>
<tr>
<td>gola</td>
<td>bark</td>
<td>decreases pain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>decreases swelling</td>
</tr>
<tr>
<td>guitikanran</td>
<td>root</td>
<td>decreases swelling</td>
</tr>
<tr>
<td></td>
<td></td>
<td>decreases pain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>popped abcess</td>
</tr>
<tr>
<td>kelu</td>
<td>bark</td>
<td>decreases pain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>abcess popped</td>
</tr>
<tr>
<td>kengeleba</td>
<td>leaves</td>
<td>decreases pain</td>
</tr>
<tr>
<td>kera</td>
<td>bark</td>
<td>decreases swelling</td>
</tr>
<tr>
<td></td>
<td></td>
<td>decreases pain</td>
</tr>
<tr>
<td>kon</td>
<td>bark</td>
<td>decreases swelling</td>
</tr>
<tr>
<td></td>
<td></td>
<td>decreases pain</td>
</tr>
<tr>
<td>kutu</td>
<td>bark</td>
<td>bug sucked it and it fell out</td>
</tr>
<tr>
<td>Local name</td>
<td>Part used</td>
<td>Medicinal effect</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>kpenggere</td>
<td>bark, roots, leaves</td>
<td>decreases pain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>decreases swelling</td>
</tr>
<tr>
<td></td>
<td></td>
<td>pain continues, worm falls out</td>
</tr>
<tr>
<td>kury</td>
<td>branch</td>
<td>toothstick, cleans teeth</td>
</tr>
<tr>
<td>logbo</td>
<td>bark and roots</td>
<td>did not help pain</td>
</tr>
<tr>
<td>lungmgbe</td>
<td>leaves</td>
<td>did not help pain</td>
</tr>
<tr>
<td>maro</td>
<td>root</td>
<td>stopped pain and swelling</td>
</tr>
<tr>
<td>ndende</td>
<td></td>
<td>decreases pain</td>
</tr>
<tr>
<td>nggara</td>
<td>bark</td>
<td>decreases bleeding</td>
</tr>
<tr>
<td></td>
<td></td>
<td>decreases pain but it returns</td>
</tr>
<tr>
<td>ngombo (Bozooum dialect)</td>
<td>root</td>
<td>decreases pain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>decreases swelling</td>
</tr>
<tr>
<td>ngore</td>
<td>root</td>
<td>did not help pain</td>
</tr>
<tr>
<td>nor-kora</td>
<td>root</td>
<td>infections, decreases pus</td>
</tr>
<tr>
<td>papaye</td>
<td>root</td>
<td>decreases pain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>decreases swelling</td>
</tr>
<tr>
<td>aining, decreases pus</td>
<td></td>
<td>infections, decreases pus</td>
</tr>
<tr>
<td></td>
<td></td>
<td>toothstick, cleans teeth</td>
</tr>
<tr>
<td></td>
<td></td>
<td>partly stopped pain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>decreased swelling</td>
</tr>
<tr>
<td></td>
<td></td>
<td>stopped pain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>neutralizes poison</td>
</tr>
<tr>
<td></td>
<td></td>
<td>did not help much</td>
</tr>
<tr>
<td>Name</td>
<td>Medicinal effect</td>
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<tr>
<td>---------------------------</td>
<td>----------------------------------------</td>
<td></td>
</tr>
<tr>
<td>aspirin</td>
<td>relieves pain</td>
<td></td>
</tr>
<tr>
<td>elephant dung</td>
<td>kills bug forever</td>
<td></td>
</tr>
<tr>
<td>glue</td>
<td>stopped pain</td>
<td></td>
</tr>
<tr>
<td>mentholatum</td>
<td>decreases pain</td>
<td></td>
</tr>
<tr>
<td>natron (salt)</td>
<td>decreases pain</td>
<td></td>
</tr>
<tr>
<td>cow suction horn</td>
<td>decreases pain</td>
<td></td>
</tr>
<tr>
<td>termite excrement</td>
<td>decreases swelling popped abcess</td>
<td></td>
</tr>
</tbody>
</table>
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