PREDICTING THE VOLUME OF SERVICES USED BY WORKING CAREGIVERS
OF PERSONS WITH ALZHEIMER’S DISEASE

by

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Predicting the Volume of Services Used by Working Caregivers of Persons with Alzheimer’s Disease

Abstract

by

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Although many formal services are available to caregivers of persons with Alzheimer’s disease, they are greatly underutilized. While little information exists regarding the service use of caregivers as a whole, even less information exists regarding the service use of a growing subset of caregivers: working caregivers. The present study sought to predict the volume (hours) of service utilization by working caregivers who were using services ($N = 32$), based upon an expanded version of the Andersen and Newman model of service use. It was found that need and enabling variables were predictive of hours of service use at the trend level. It was also found that caregivers working full time found services to be more helpful than those working part time.
Introduction

As the baby boom generation continues to age, the number of people living with Alzheimer’s Disease (AD) will increase dramatically. It is projected that by the year 2040, nine million people will be living with the disease (Mitrani & Czaja, 2000). As attention is drawn to this situation by policy makers, patients, and family caregivers, questions center around how it will be possible to keep patients in the community longer and how services may be provided for patients and their caregivers (Toseland, McCallion, Gerber, & Banks, 2002). These services may include adult day care, home health care, and support groups, among others. Despite the existence of many services for caregivers of persons with Alzheimer’s disease, there seems to be a disconnect between service availability and rates of service use. Furthermore, it is widely believed that available services are underutilized by caregivers (Brodaty, Thomson, Thomson, & Fine, 2005) with virtually no available information about the rates or predictors of service use for working caregivers. This study seeks to determine the predictors of the volume of services used by working caregivers according to the expanded Andersen and Newman model of service use. Below is a review of services that are available to caregivers.

Following this review, the Andersen and Newman model of service use and the expanded Andersen and Newman model of service use are discussed.

**Formal support for caregivers**

*Psychosocial support.* In response to the number of well documented negative aspects of caregiving, many formal support services exist for caregivers of persons with Alzheimer’s disease. Services include individual therapy for caregivers, respite programs, support groups, and adult daycare, among others. In terms of the effectiveness
of these services, individual therapy and respite programs are considered to be moderately effective while group interventions, such as support groups, have shown little if any effectiveness in the research literature (Knight, Lutzky, Makofsky-Urban, 1993; NIH, 2003). Additionally, interventions aimed at individual caregivers and families are more effective than interventions that target groups of caregivers. Family interventions are most effective when comprised of multiple components, for example, family therapy in combination with information about Alzheimer’s disease (Eisdorfer, Czaja, Loewenstein, Rupert, Arguelles, Mitrani, & Szapocznik, 2003). These types of programs are being designed and piloted with greater frequency.

Recently, online caregiver support in the form of mailing lists, message boards, and newsgroups have become popular among caregivers (White & Dorman, 2000). Online alternatives to traditional services such as support groups are convenient because they may be accessed 24 hours a day, no respite or transportation needs to be arranged, and caregivers may be more comfortable with the anonymity of the internet than the face to face interaction of traditional services. There is increasing evidence to support the effectiveness of online caregiver support (Bass, McClendon, Brennan, & McCarthy, 1998; Beauchamp, Irvine, Seeley, & Johnson, 2005; White & Dorman, 2000).

Medical support. Patients and caregivers are now able to turn to drugs that have been developed to slow the cognitive decline that is characteristic of the Alzheimer’s disease process. In addition to helping the care recipient maintain cognitive functioning, it is hypothesized that caregivers will also feel the positive effects of these drugs in the form of lower levels of burden and less time spent providing care. A meta-analysis
conducted by Lingler, Martire, and Schulz (2005) examining the effects of cholinesterase inhibitors found a small but significant effect in the reduction of time spent by caregivers in providing care.

Formal support for the primary caregiver is one important way in which the negative aspects of caregiving can be addressed and partially ameliorated. Increasing service use and improving access to services may aid in doing this. A first step in the process will be to determine predictors of service use. In the present study, predictors of volume of services used by caregivers of persons with Alzheimer’s disease will be determined using the expanded Andersen and Newman model of service use.

Models of service use

*Andersen and Newman model*

Historically, the model that has served to explain the predictors of service use has been the Andersen and Newman model (Andersen & Newman, 1973). In an effort to explain medical service use by a population who considered themselves to be in a healthcare crisis, Andersen and Newman proposed a model that contained three factors composed of subvariables believed to explain service use. The components of the model were predisposing factors (composed of demographic, social structure, and belief variables), enabling factors (composed of family and community variables), and illness level factors (composed of perceived and evaluated illness variables). However, the Andersen and Newman model received criticism in part due to its narrow focus. Consequently, it was expanded to suit different and more specialized fields (Andersen, 1995; Bradley, McGraw, Curry, Buckser, King, Kasl, & Andersen, 2002).

*Expanded Andersen and Newman model*
From a gerontological perspective, one of the biggest criticisms aimed at the model is that it disregards the informal care that dependent elders often receive. Bass and Noelker (1987) noted that because caregivers for the elderly often provide informal support, caregivers would most likely influence both patient and caregiver service use. Accordingly, Bass and Noelker (1987) incorporated caregivers into an expanded Andersen and Newman model of service use, making the model a four factor model which at present is widely used to consider dependent elder and caregiver service use (Houde, 1998). The expanded model, which is also the primary framework that is used to consider caregiver service use within the realm of Alzheimer’s disease, is composed of the original (1) enabling and (2) predisposing factors of the Andersen and Newman model; however, the expanded model also includes a (3) caregiver need factor and an (4) elder need factor. These need factors, new to the Andersen and Newman framework, include subvariables such as caregiver burden and the number of chronic conditions of the care recipient. In summary, the predisposing factors of the expanded Andersen and Newman model reflect that some caregivers and care recipients may be inherently more predisposed to use services than others based on variables such as age; enabling factors reflect that although some individuals may be predisposed to use services, they must encounter the right set of conditions to use those services such as having adequate transportation and money to pay for services; and caregiver and care recipient need factors reflect the possibility of the caregiver recognizing a need for services based on caregiver and care recipient health, among other variables (Kosloski, Montgomery, & Karner, 1999).
Biegel, Bass, Schulz, and Morycz (1993) emphasize that the expanded Andersen and Newman model of service use is particularly appropriate in the context of Alzheimer’s disease because as cognitive functioning declines in persons with Alzheimer’s disease, caregivers become increasingly more instrumental in making decisions about service use for the patient. Additionally, the caregiver may choose to engage in the use of services that are geared primarily towards caregivers, such as support groups and informational talks about the Alzheimer’s disease process.

**Defining the service use variable**

Studies that have sought to predict caregiver service use using Andersen and Newman model as well as the expanded model have continually encountered the problem of defining service contact (use versus non-use) in terms of one or multiple variables. Andersen and Newman, in thinking about their original model of service use, argued that it would be important in future analyses to avoid the utilization of only one service contact variable because of the differences between available services (Andersen & Newman, 1973). The primary methodological danger of including a single service contact variable as an outcome variable in analyses lies in the assumption that all service contact is elicited by the same set of predictors. As an example, Biegel and colleagues (1993) point out that formal services, such as adult day care, often place restrictions on the levels of functioning of the patients they accept, whereas in-home service providers are less likely to set these types of restrictions. In this case, assuming that the same sets of factors predict the use of formal as opposed to in-home services would be incorrect by virtue of the fact that there may be different qualifications that an Alzheimer’s patient must meet in order to be able to use a particular service.
On the other end of the spectrum, there is also the danger of treating each service as a single outcome variable, thus limiting the power of analyses that seek to predict factors leading to service contact. Biegel and colleagues (1993) suggest that a compromise be reached between the extremes of treating service use as a single outcome variable and treating each service as an outcome variable. This problem has generally been solved by collapsing services into relevant and salient categories such as in-home versus out of home services (Biegel et al., 1993) and health services versus human or social services (Bass, Looman, & Ehrlich, 1992; McCallion, Toseland, Gerber, & Banks, 2004).

A less complicated method of defining the construct of services use may be to examine the volume of services used, or how many hours of services are used. Bass, Looman, and Ehrlich (1992) found that a combination of salient service contact variables in addition to measures of service volume were extremely useful in predicting caregiver service use for health and social service users. Additionally, because service contact and service volume have different predictors that do not overlap, conducting research in this way might have the greatest chance of capturing all aspects of the multi-determined construct of service use. However, more data should be generated by this method before it is relied on as the primary method for predicting service use. At present, the method of using service volume as an outcome variable in analyses may be the most accurate.

Factors predicting service use

It is important to emphasize that factors predicting service contact and service volume are different (Gill, Hinrichsen, & DiGiuseppe, 1998). Previous research examining the validity of the Andersen and Newman framework as well as the Bass and
Noelker (1987) expanded Andersen and Newman framework with caregivers of persons with Alzheimer’s disease has indicated that some factors are more predictive of service use than others. Within the expanded Andersen and Newman model of service use, caregiver and elder need variables are most predictive of service contact whereas enabling factors are most predictive of the volume of service use (Bass & Noelker, 1987; Caserta, Lund, Wright, & Redburn, 1987; Toseland et al., 2002). Because enabling variables are most predictive of the volume of services used by caregivers of persons with Alzheimer’s disease, they will be a focus of research for this study. However, predisposing and need variables will also be considered.

**Predisposing variables**

Predisposing variables such as age and ethnicity have been found to be predictive of service contact, especially. Although the present study considers service volume as the outcome variable and not service contact, predisposing variables will still be considered in the analysis. Predisposing variables may still have some predictive value in this area and should not be ruled out at this point because few analyses have focused specifically on working caregivers.

**Need variables**

*Psychological health.* Need variables, such as caregiver health and care recipient health, have been found to be highly predictive of service contact and should be included in an analysis of predictors of service volume because they are included in the expanded Andersen and Newman model. Health is an especially salient variable, and often precious commodity, for both caregivers and care recipients. Being a caregiver for a person with Alzheimer’s disease poses many challenges to physical and emotional health.
One of the psychological side effects of caregiving that is reported most frequently is caregiver depression. Caregivers of persons with Alzheimer’s disease who live in the community often report high levels of burden, anxiety, and depression (Messinger-Rapport, McCallum, & Hujer, 2006). Self reports show that 30%-84% of these caregivers are depressed (Cohen & Eisdorfer, 1988; Drinka, Smith, & Drinka, 1987).

Physical health. Caregivers of Alzheimer’s patients have long reported burden, stress, and depression subjectively (Clyburn, Stones, Hadjistavropoulos, & Tuokko, 2000; Covinsky et al., 2003; Drinka et al., 1987; Schulz & Williamson, 1991) but current technology has allowed for the physiological measurement of these symptoms, such as hyperglycemia, hyperinsulinemia, high blood pressure, poor immune functioning, high cholesterol, and other indicators of risk for coronary heart disease (Vitaliano, Young, & Zhang, 2004). Assisting care recipients with activities of daily living, such as dressing and toileting, can have a direct impact on the health of the caregiver in these domains and on decisions to use services. Additionally, greater need for assistance with activities of daily living on the part of the care recipient may also indicate to the caregiver that the time has come to initiate service contact.

Enabling variables

Based on the available literature as well as their own data, Toseland and colleagues (2002) suggest that enabling factors might be the most important predictors of service use regardless of service contact or volume of service use. Toseland and colleagues (2002) find that enabling variables predict more variance in service use (service contact) than need variables across health and human services. Since enabling factors include variables such as information about services and transportation, variables
that directly influence whether or not a caregiver will be able to use services, Toseland and colleagues suggest that service providers and policymakers should address these issues.

Household income and social support, both enabling factors, are particularly salient in the prediction of the volume of services used by caregivers. Penning (1995) found social support to vary in its predictive strength based on in-home care versus out of home care and health needs of the dementia patient and caregiver. Social support provided by the use of in-home services reduced the likelihood of service contact in addition to those services, whereas social support was not significantly related to length of hospital stays on the part of the care recipient. Social support is a particularly useful way of representing enabling variables because there is a body of social support research that represents caregivers of different ethnicities, making the results more generalizable to a broad population of caregivers.

Social support and ethnicity. It has been found that the social support networks of European Americans and African Americans in particular are quite different, with the social support networks of African Americans often consisting of large extended families, friends, and neighbors (Williams & Dilworth-Anderson, 2002). Williams and Dilworth-Anderson (2002) suggest that the conceptualization of the African American social support network has historically been thought of in this way but that these types of large, supportive networks are currently becoming more of an exception than a rule. However, social support networks still play an important role in the service use of African American caregivers. In a recent study conducted by Williams and Dilworth-Anderson (2002) examining the social support systems of African Americans caring for dependent
older adults, the authors find that greater perceptions of informal support are related to higher levels of formal support service usage. Additionally, family members in the informal social support network appear to be helpful in linking caregivers with formal services. This finding has been replicated elsewhere (Luckey, 1994).

Informal support from the church may be extremely salient for African American caregivers. In this population, religion has been found to mediate perceived positive aspects of caregiving (Burgio, Gitlin, Nichols, Chaplin, & Hardin 2004). Williams and Dilworth-Anderson (2002) also found that the church may play an important role in linking African American caregivers with formal support services. Therefore, it might be important when trying to increase levels of service utilization among African American caregivers, who display considerably lower levels of service use than European Americans, to create more direct channels between predominantly African American churches and formal support service providers.

Patterns of service use

**Service non-use**

Formal service use does not seem to reach or even approach the point of substituting for the informal, in-home care that is provided by caregivers (Brodaty, Thomson, Thomson, & Fine, 2005). Estimates of caregivers of persons with Alzheimer’s disease who take advantage of formal services range only from ten to twenty-five percent (Markle-Reid & Brown, 2001). Frequently, caregivers do not even begin to use formal services until later in the Alzheimer’s disease process, which could be years after a person has taken on the caregiving role (Markle-Reid & Brown, 2001). Although much data has been collected regarding patterns of service use, these data continue to paint a
vague picture of the types of services that are used by caregivers of persons with Alzheimer’s disease, how often services are used, and the characteristics of service users. One of the reasons this picture may be so unclear is that many methodological problems regarding how service use is measured still exist. Another reason may be that so few caregivers use formal services that not enough data exist to pull together an accurate picture. And although there is a great need for services, especially if caregivers tend to delay service use until burden incurred through the caregiving process reaches high levels (Cox, 1999), services are greatly underutilized. In addition to being able to predict the volume of services used by caregivers of persons with Alzheimer’s disease from the expanded Andersen and Newman model, it will be important to understand the barriers that lead to service non-use.

One major caveat of studies targeting service non-use has generally been that service users are included in study samples. In these studies, rates of service use can be computed but rates of non-use cannot be computed accurately by virtue of sampling techniques. Often, authors report that the average number of services used by caregivers is quite low, or that some caregivers may use one service but no additional services. Authors then frame this information in the context of service non-use. The misconception then becomes that these reported numbers are equal to rates of non-use.

Because caregivers do not access and use all services equally, service non-use may vary by each individual service. For example, reasons for the non-use of adult day care may include cost, while reasons for the non-use of a support group may include distance (Hamilton, Braun, Kerber, Thurlow, & Schwieterman, 1996). However, when considering service non-use more broadly, many of the reasons for non-use overlap.
Therefore, it may be appropriate to condense the reasons for non-use into one list. In a review of the service non-use literature, Brodaty and colleagues (2005) aggregate the most commonly occurring reasons for service non-use. These reasons include an indicated lack of need for services (caregivers do not feel that they need assistance), reluctance to use services (often related to beliefs about services), service characteristics (services may be too far away or too costly), and a lack of knowledge about existing services. Another reason for service non-use occurring less frequently in the literature exemplifies the gap between the formal medical system and the formal support services system for caregivers. Through interviews and qualitative analysis, Bruce and Paterson (2001) found that caregivers had trouble discussing caregiving difficulties with their primary care physicians and when problems were discussed, the severity of problems was deemphasized. These results suggest that those at the frontlines of diagnosing Alzheimer’s disease should be more perseverant in helping to inform caregivers of persons with Alzheimer’s disease of available support services.

Service use

While services are generally thought to be underutilized by caregivers, even when there is a perceived need for services, a base rate of service use for caregivers caring for persons with Alzheimer’s disease is difficult to determine. A large part of the uncertainty surrounding patterns of service use may be attributed to sampling and study design. While several studies have determined patterns of service use for caregivers of dependent elders, fewer studies have examined patterns of service use for caregivers of persons with Alzheimer’s disease. Those studies that have examined patterns of service contact for caregivers of persons with Alzheimer’s disease find that they tend to use fewer services
than those caring for dependent elders (Birkel & Jones, 1989). Of the studies that have examined patterns of service use among caregivers caring for persons with Alzheimer’s disease, these patterns still remain unclear. Using a sample of caregivers of persons with Alzheimer’s disease, Hamilton and colleagues (1996) report that caregivers use an average of 1.45 services. Toseland and colleagues (1999) find that caregivers of persons with Alzheimer’s disease use an average of 3.2 health services and 3.7 human services. Although average service contact in both of these studies remains low, it should be noted that the results of studies that seek to determine patterns of service use are strongly influenced by research design. For example, Toseland and colleagues (1999) include a list of ten possible health services and twenty-four human services for caregivers to endorse while Hamilton and colleagues (1996) include a list of six possible services for caregivers to endorse. It is clear that the way services are defined across studies is far from uniform, which does not help to identify patterns of service use for caregivers of persons with Alzheimer’s disease.

*Ethnic minority service use*

A sizable subset of caregivers of persons with Alzheimer’s disease is composed of ethnic minority caregivers. Kosloski, Montgomery, and Karner (1999) emphasize that rates of service use are especially low for minority caregivers. Kosloski and colleagues (1999) also suggest that ethnic minority caregivers, specifically African American caregivers, may have a greater need for services yet unequal access to services as compared to European American caregivers. Although the level of need for services across ethnic groups remains uncertain, unmet need for services may vary widely across caregivers of different ethnic groups. In a study comparing Latino caregivers, Chinese
caregivers, and African American caregivers to a reference group of European American
caregivers, Ho, Weitzman, Cui, & Levkoff (2000) found that Chinese and Latino
caregivers had high levels of unmet need for services. The authors hypothesize that
language barriers are a major factor in this unmet need.

Working caregiver service use

Another large subset of caregivers of persons with Alzheimer’s disease is
composed of working caregivers. Caregiving for persons with Alzheimer’s disease can
last for many years and incur high levels of stress and burden. When caregivers
simultaneously hold jobs, the caregiving situation is made especially difficult. As a result
of taking on the caregiver role, working caregivers often need to adjust work schedules,
take unpaid leave, or leave their jobs. In fact, Aneshensel, Pearlin, Mullan, and Zarit
(1995) report that twenty percent of caregivers reduce the amount of time spent working
or stop working altogether. Additionally, Mutschler (1994) found that despite the
resources that some companies have to address the needs of working caregivers, working
caregivers in jobs at all salary levels provide more hours of care to an older adult than
they spend working. As an extension of thinking about how the working caregiver is able
to balance work, caregiving, and other roles, a logical next step in this thinking is to
consider the service use of this group. The major limitation of the existing information
regarding working caregivers is that much of it pertains only to working caregivers who
are caring for dependent elders or younger family members who require constant care
due to disability.

Given the numbers of caregivers who find themselves in the position of having to
juggle employment and caregiving, one would expect a large amount of information in
this area. However, very little is known about the characteristics of working caregivers of persons with Alzheimer’s disease. Less is known about the way these caregivers use services and the factors that predict the volume of services they use. Identifying these predictors may be the first step identifying the ways in which working caregivers of persons with Alzheimer’s disease can be connected with services and function in their jobs without having to compromise the number of days that are worked.

Hypotheses

While little is known about the patterns and predictors of service use for caregivers of persons with Alzheimer’s disease, even less is known about caregivers who take on caregiving responsibilities while simultaneously holding a job. The purpose of this study will be to identify characteristics of working caregivers of persons with Alzheimer’s disease, the types of services working caregivers use, and the amount of time they use services on a monthly basis with the implication that further studies may be able to disseminate information to working caregivers and connect them with services in a more effective manner. Specifically, it is hypothesized that:

1) The expanded Andersen and Newman model of service use (Andersen & Newman, 1973) will predict the volume of services used on a monthly basis for working caregivers of persons with Alzheimer’s disease.

2) Based on the expanded Andersen and Newman model of service use, social support, an enabling variable, will explain more of the total variance in hours of services used per month than other model factors.
Method

Participants

Participants were 32 employed caregivers of persons with Alzheimer’s disease who had occupied the caregiver role for at least three months. Twenty-four participants were White, 7 were African American, and 1 was Hispanic. Participants were recruited in one of three ways: through a caregiver conference held at the Fairhill Center, through talks given to local caregiver support groups, and through online caregiver support message boards.

Procedure

Participants recruited at the Fairhill Center conference approached the table at which the researcher was seated and were given a brief verbal description of the study. If participants indicated interest in study participation, they were given the consent form and asked if they would like more time to consider study participation. If participants indicated that they were ready to sign the consent form, they did so in person at the conference. Participants had the option of completing five study questionnaires at the conference, by phone, or by mail. The majority of participants who were recruited at the conference completed study questionnaires in person, although one participant completed study questionnaires by phone and one participant completed study questionnaires by mail. Eleven participants were recruited via this method.

Talks were given to caregiver support groups, during which the researcher described the study. No participants were recruited in this way.

Finally, 21 participants were recruited through online message boards for caregivers of Alzheimer’s patients. Data were collected via an online survey program.
called SNAP. Each data record was sent to an e-mail account that was created for the present study. Data were then transferred to the SPSS statistical analysis program.

**Measures**

*Demographics.* A demographic questionnaire was adapted for this study from a previous study conducted with caregivers of persons with Alzheimer’s disease (McCallum, Sorocco, & Fritsch, 2006). The questionnaire included information about age, ethnicity, education, length of time caregiving, employment status, income, and the activities of daily living with which the caregiver aided the care recipient. This questionnaire provided information on important predisposing variables as defined by the Andersen and Newman expanded framework.

*Service use questionnaire.* A service use questionnaire was developed for this study that collected information on the types of services used by the caregiver, the number of services used, the helpfulness of the services used, and services that the caregiver would like to use but is currently not using.

*Social Relationship Index-Alternate Form.* The Social Relationship Index-Alternate Form (SRI; Uchino, Holt-Lunstad, Uno, Betancourt, & Garvey, 1999) was used to assess the structure of the caregiver’s social network as well as the caregiver’s perceptions of how helpful people in the social network were. This measure provided information on an important enabling variable as defined by the expanded Newman and Andersen framework.

*PROMIS.* The PROMIS (Bruce & Fries, 2005) is a widely used, ten item health assessment scale. The scale asks those completing it to rate their health in several areas
during the past seven days. This measure provided information on an important caregiver need variable as defined by the expanded Newman and Andersen framework.

*Stress in General Scale.* The Stress in General Scale (Ironson, Smith, Brannick, Gibson, & Paul, 1989) is a scale that evaluates job stress. The scale is composed of 18 descriptors that require a person to answer “yes”, “no”, or “don’t know”. These descriptors refer to a person’s experience of their job. The Stress in General Scale was used to evaluate job stress as it related to services used by caregivers.

Results

**Demographics**

The average participant in the present study was 50 years old, with a college education, and an annual income of between $40,001 and $50,000 a year. The majority of participants were White (75%) while 20% of participants were African American. One participant was self-described as Hispanic and one participant was self-described as bi-racial. Fifty-three percent of caregivers were caring for their mothers. Sixty-six percent of caregivers were employed full time and thirty-four percent of caregivers were employed part time. Means of demographic variables are presented in Table 1.

**Service Use Descriptive Statistics**

Results of a frequency analysis indicated that the majority of study participants (62%) used over 10 hours of services on a monthly basis. When examined in terms of ethnicity, it appeared that African American participants used more hours of services per month than White participants, although, significant differences were not found. This result contradicts general findings regarding service use as a function of ethnicity (Kosloski et al., 1999), however; it must be interpreted with caution because of the small
number of African American \((n = 6)\) versus White participants \((n = 24)\) in the sample. Additionally, the large percentage of caregivers reporting over 10 hours of monthly service use may indicate a ceiling effect of the measure used to capture this information. Hours of services used on a monthly basis are reported in Table 2.

A separate frequency analysis also indicated that the Alzheimer’s Association \((50\%)\) and support groups \((53\%)\) were the most widely used services. Use of a senior center and use of transportation were not used at all by participants. Percentages of individual services used are presented in Table 3.

Additionally, caregivers were asked to determine the degree to which services were helpful and if there were any services they felt they needed in addition to the services they were already using. The majority of caregivers in the present study reported that the services they were using were very helpful \((31\%)\) or extremely helpful \((40\%)\). Results of a Mann-Whitney \(U\) test revealed a significant difference in the degree to which caregivers working part time \((Md = 3, n = 11)\) versus full time \((Md = 4, n = 21)\), \(U = 68, z = -1.989, p = .05, r = .03\), found services to be helpful. Caregivers who were working full time found services to be more helpful than caregivers who were working part time.

When asked about additional services that might be helpful, only 12 participants responded. Responses clustered into two groups. Caregivers reported wanting existing and available services \((n = 7)\), or answered the question by stating that they were either using all existing services or were not sure of the other services they might want to utilize \((n = 5)\).

*Predicting Service Use*
A multiple regression based on a previous analysis conducted by Bass and Noelker (1987) examined age, social support, incontinence, and caregiver health as predictors of monthly hours of caregiver service use. These predictor variables correspond to the predisposing variables, enabling variables, care recipient need variables, and caregiver need variables, respectively, in the expanded Andersen and Newman model. A correlational analysis was conducted to determine if additional variables should be added to the regression analysis. Significant correlations included correlations between age and ethnicity, marital status and income, and income and health. However, correlations between model variables and demographic variables were not significant. Results of this analysis are presented in Table 5. All predictor variables, excluding caregiver age, were significant at the trend level ($p < .1$). This set of predictors explained 22% of the total variance in monthly hours of service use.

Additionally, a hierarchical regression was conducted to determine which predictor variables contributed most to the overall variance. The predictor variables were entered in the order consistent with the analysis conducted by Bass and Noelker (1987). The caregiver need variable of caregiver health explained the largest part of the overall variance (10%). It was hypothesized that the enabling variable of social support would contribute most to the overall variance in this analysis, however; social support explained only 6% of the total variance. Hierarchical regression results are presented in Table 4. Correlation coefficients between the four predictor variables and monthly hours of service use indicated small effect sizes (Cohen, 1992). Effect sizes are presented in Table 4.
Social support. The social support variable used in the regression analysis was created by using the Uchino et al. (2004) method for analysis of the Social Relationship Inventory. Supportive social network members were counted for each participant and coded as those people who were rated as most helpful and least upsetting on the measure. However, much of this social support data was missing as participants commonly failed to report data for the last half of the measure. Therefore, it is difficult to know whether the number of supportive social network members for this sample was accurate. In terms of the multiple regression data, the negative $\beta$ value indicated at the trend level that increased levels of social support predicted decreased monthly hours of service use.

Discussion

The purpose of the current study was to examine the predictors of service use among working caregivers using the expanded Andersen and Newman model of service use. Service use was defined as hours of services used per month. Additionally, the study explored the distribution of services that were used by working caregivers and how helpful those services were perceived to be.

Expanded Andersen and Newman model

Thus far, the predictors of service use according to the expanded Andersen and Newman model have not been examined in a population of working caregivers of Alzheimer’s patients. The expanded model has most commonly been used to predict the service use of broader groups such as disabled elders (Bass & Noelker, 1987) and more recently, of caregivers of Alzheimer’s patients (Kosloski et al., 1999). However, an increasing population of employed Alzheimer’s caregivers warranted the examination of service use predictors in this group. The current study hypothesized that the expanded
Andersen and Newman model would predict hours of service use among employed Alzheimer’s caregivers. This hypothesis was partially confirmed; however, it must be emphasized that this partial confirmation rested on statistical trend and not on significance at the $p < .05$ level. On the other hand, this partial confirmation may indicate that a similar analysis of the expanded Andersen and Newman model with a larger sample would lead to statistical significance at the $p < .05$ level. More specifically, results of the hierarchical regression indicated that ill caregiver health, higher levels of care recipient need, and lower levels of caregiver social support predicted monthly hours of service use. While these results seem intuitively possible, they are not necessarily substantiated in the present analysis. It will be important to confirm the utility of the expanded Andersen and Newman model with a larger sample as an initial step towards developing ways to connect working Alzheimer’s caregivers with services.

Another hypothesis was made regarding the influence of social support in explaining the total variance in hours of service use per month. It was expected that social support would explain the largest amount of the total variance in hours of service use per month. However, the caregiver need variable, represented by caregiver health, explained the majority of the total variance. Previous literature has linked enabling variables, such as social support, to hours of service use while caregiver need variables have been found to be most predictive of types of services used (Bass & Noelker, 1987; Caserta, Lund, Wright, & Redburn, 1987; Toseland et al., 2002). Because hours of service use was the outcome variable in this analysis, it was expected that the enabling variable would explain the most variance. It is difficult to know whether the present analysis failed to resemble previous analyses because of slight differences in population,
because of the low power in the present study, or because of the way in which the social support variable was created. It is likely that the latter two possibilities present an equal confound in being able to interpret these results.

Because of the way the social support variable was created, it may be an unreliable predictor of hours of service use per month. The measure used to create this variable, the SRI, asks participants to answer four multiple choice questions regarding three family members, three other relatives, three friends, three social acquaintances, and three coworkers, for a total of fifteen social network members. Most participants in the present study responded regarding family and other relatives (notably the first two pages of the measure) while some also responded regarding friends. However, the majority of participants left over half of the measure unanswered. Therefore, the computed number of supportive social network members for each participant may have been inaccurate. This resulted in an incomplete number of supportive social network members and also a bias towards friends and family members. It is possible that these friends and family members were more supportive in general than social acquaintances and coworkers, but it seems more likely that given the order in which questions were asked, this was a result of fatigue on the part of participants in answering questions.

Service use

The majority of participants reported using over ten hours of services per month, which was not anticipated based on previously reported low levels of service use. However, these reports are often made in terms of service contact and not hours (Bass, Looman, & Ehrlich, 1992; McCallion, Toseland, Gerber, & Banks, 2004) so it is difficult to estimate the hours of services that participants might use monthly. Also, it is possible
that due to an overrepresentation of computer users in the study sample, the majority of participants relied primarily on computer-based services. Those who are active on Alzheimer’s message boards and online support groups may spend over ten hours a month, checking messages and replying to them, more easily than those who use only traditional formal services. There are no restrictions on what time of day a person can access online services and a person who uses online services may not have to travel to a specific service provider. Additionally, some online service users may be able to use services while at work, increasing their hours of service use per month. Related to the overrepresentation of online services users, the present study also found that services used by participants were considered to be quite helpful. It is possible that this perception is related to the ease with which online services can be used. This finding may warrant future comparisons between online services users and traditional formal service users.

The present study also indicated that there was a difference between caregivers who were employed part time versus caregivers who were employed full time. Caregivers who were employed full time found that services were more helpful than caregivers who were employed part time. This finding may be due in part to the increased need for and use of formal services on the part of caregivers who were employed full time. It is possible that caregivers who spend more hours using formal services find them to be more helpful than caregivers who use less hours of formal services. This finding was not born out in follow-up analyses but it is possible that this would be the case given a larger sample and more even groups of caregivers who were employed part time versus full time.
Service access. In terms of the individual services that were used by participants, it was reported that highly visible services such as the Alzheimer’s Association and support groups (often run by the Alzheimer’s Association) were used with greatest frequency. These services are generally the most visible social services available to caregivers. Not surprisingly, home health aides were the most frequently used services following the Alzheimer’s Association and support groups. It is possible that health related services may be accessed with greater ease than social services because it becomes necessary to access the healthcare system as the course of Alzheimer’s disease progresses. While a caregiver may ignore personal feelings of burden and depression, eventually the declining physical state of a person with Alzheimer’s disease must be addressed.

Furthermore, it is possible that Alzheimer’s caregivers who access services through common access points, such as the Alzheimer’s Association and the healthcare system, may still remain unclear as to the availability of different services. All but three participants in the present study reported using a service provided by the Alzheimer’s Association. However, the present study replicated some of Brodaty and colleagues’ (2005) findings regarding the reasons for service non-use including lack of knowledge about services. This may point to a need for educational interventions about available services provided at common service access points.

Study limitations

The present study suffered from several limitations including low power, study recruitment methods, and design flaws in two study measures. Arguably the most problematic limitation in terms of being able to interpret study results and gain significant
outcomes was the lack of power due to small sample size. Additionally, subsequent follow-up analyses were prevented by low power.

Study recruitment proved to be a limitation for multiple reasons. The primary difficulty was that the study sample was biased towards caregivers who were already using services. This is a common problem in the service use literature. It is difficult to recruit samples of caregivers without tapping into them via the formal services they use. Additionally, it may be true that because caregivers are so overburdened by the demands of caregiving and other responsibilities, recruiting from non-service providing locations such as community centers might not draw caregivers into studies. While having control groups of non service using caregivers would greatly improve the quality of the service use literature, the realities of participant recruitment will continue to pose problems. Secondly, those who were recruited from online message boards were predominantly White. In general, it is possible that those who are recruited from online message boards own personal computers and have a higher socioeconomic status than those who are not. In the expanded Andersen and Newman model of services use, income is an important enabling variable, meaning that it is central in helping to create the conditions for initiation of service contact. The present study found no differences between White and African American participants in terms of income levels or between those that were recruited from online message boards as opposed to support group meetings or the caregiver conference. However, it must be emphasized again that in the present study’s sample, there were very few African American participants and very few participants who were not recruited through online message boards, making a comparison difficult.
In terms of the measures that were used, in addition to the non-response observed on the SRI, a ceiling effect was observed when asking about how many hours per month services were used. Again, this may be due to the fact that online support group or message board users could use well over 10 hours of this service per month and that this group made up the majority of the sample of working caregivers. Future researchers may want to consider balancing the number of participants in service use studies that are recruited online with those that are recruited through formal service providers such as the Alzheimer’s Association.

**Directions for future research**

It has been well documented that caregivers who occupy multiple roles such as caregiver, employee, spouse, and parent can experience role overload (Edwards, Zarit, Stephens, & Townsend, 2002). Role overload is defined as the stress or burden caused by performing the duties of multiple roles. Given the current and expected demographics of Alzheimer’s caregivers, it is right to expect that working caregivers will remain a population of interest. In fact, researchers are beginning to refer to the “sandwich generation” in which women especially are employed, caring for a parent with Alzheimer’s disease, and caring for their own children (Riley & Bowen, 2005). Because of the increasing burden that these caregivers are feeling, it will be important to find ways of connecting them with services. A first step in this process will be to continue to investigate characteristics of service users and non-users, if possible, in these populations. One way of doing this might be to replicate the current study with a large enough sample. Additionally, it would be helpful to be able to include multiple subvariables under each
of the four expanded Andersen and Newman model factors. The current study only included one subvariable per factor due to power limitations.

Furthermore, given more information about where and how caregivers initiate service contact, simple informational interventions might be designed to help begin meeting service needs. The present study indicates that targeting these interventions to common service contact locations might be most helpful in informing caregivers of a range of services that are available in a particular geographical area. Additionally, the present study suggests that both enabling and need variables under the expanded Andersen and Newman model are predictive of hours of service use. Although this needs further confirmation with a larger sample, it may specifically provide support for implementing informational interventions in the healthcare system about available services for caregivers.
### Table 1

*Demographic Variable Means and Standard Deviations by Ethnicity*

<table>
<thead>
<tr>
<th>Variable</th>
<th>White</th>
<th>African American</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>St. Dev.</td>
<td>Mean</td>
</tr>
<tr>
<td>Caregiver age</td>
<td>49.7</td>
<td>6.1</td>
<td>59.3</td>
</tr>
<tr>
<td>Education</td>
<td>3.2</td>
<td>3.2</td>
<td>3.0</td>
</tr>
<tr>
<td>Annual income</td>
<td>8.1</td>
<td>8.0</td>
<td>6.4</td>
</tr>
</tbody>
</table>

*Note.* For education 3 = college graduate

*Note.* For annual income 6 = $25,001-$30,000 and 8 = $40,001-$50,000
Table 2

*Hours of service use per month*

<table>
<thead>
<tr>
<th>Hours</th>
<th>White</th>
<th>African American</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>29%</td>
<td>16%</td>
<td>25%</td>
</tr>
<tr>
<td>3-4</td>
<td>8%</td>
<td>0%</td>
<td>6%</td>
</tr>
<tr>
<td>5-6</td>
<td>4%</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>7-8</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>9-10</td>
<td>4%</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>More than 10</td>
<td>52%</td>
<td>83%</td>
<td>62%</td>
</tr>
</tbody>
</table>
Table 3

*Percentages of service use by ethnicity*

<table>
<thead>
<tr>
<th>Services</th>
<th>White $(n = 24)$</th>
<th>African American $(n = 6)$</th>
<th>Total $(N = 32)$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n = 24$</td>
<td>$N = 32$</td>
<td>$n = 6$</td>
</tr>
<tr>
<td>Home health aide</td>
<td>33%</td>
<td>25%</td>
<td>33%</td>
</tr>
<tr>
<td>Visiting nurse</td>
<td>8%</td>
<td>6%</td>
<td>0%</td>
</tr>
<tr>
<td>Outpatient mental health</td>
<td>0%</td>
<td>0%</td>
<td>17%</td>
</tr>
<tr>
<td>Alzheimer’s Association</td>
<td>50%</td>
<td>38%</td>
<td>50%</td>
</tr>
<tr>
<td>Support group</td>
<td>67%</td>
<td>50%</td>
<td>17%</td>
</tr>
<tr>
<td>Transportation</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>In-home respite care</td>
<td>13%</td>
<td>9%</td>
<td>0%</td>
</tr>
<tr>
<td>Adult day program</td>
<td>8%</td>
<td>6%</td>
<td>33%</td>
</tr>
<tr>
<td>Meals on wheels</td>
<td>4%</td>
<td>31%</td>
<td>0%</td>
</tr>
<tr>
<td>Area Agency on Aging</td>
<td>8%</td>
<td>6%</td>
<td>33%</td>
</tr>
<tr>
<td>Senior center</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Table 4

*Hierarchical Regression Coefficients for Predictors of Monthly Hours of Caregiver Service Use (N = 32)*

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>R²</th>
<th>ΔR²</th>
<th>Effect Size</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Caregiver Age</td>
<td>.04</td>
<td>.06</td>
<td>.13</td>
<td>.13*</td>
<td>.02*</td>
</tr>
<tr>
<td>2</td>
<td>Caregiver Age</td>
<td>.02</td>
<td>.06</td>
<td>.07</td>
<td>.06</td>
<td>.04</td>
</tr>
<tr>
<td></td>
<td>Social Support</td>
<td>-.16</td>
<td>.14</td>
<td>-.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Caregiver Age</td>
<td>.04</td>
<td>.06</td>
<td>.13+</td>
<td>.12</td>
<td>.07</td>
</tr>
<tr>
<td></td>
<td>Social Support</td>
<td>-.17</td>
<td>.14</td>
<td>-.23</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Incontinence</td>
<td>.74</td>
<td>.52</td>
<td>.27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Caregiver Age</td>
<td>.01</td>
<td>.06</td>
<td>.05</td>
<td>.22+</td>
<td>.10+</td>
</tr>
<tr>
<td></td>
<td>Social Support</td>
<td>-.24</td>
<td>.14</td>
<td>-.32+</td>
<td></td>
<td>-.21</td>
</tr>
<tr>
<td></td>
<td>Incontinence</td>
<td>.91</td>
<td>.50</td>
<td>.33+</td>
<td></td>
<td>.20</td>
</tr>
<tr>
<td></td>
<td>Caregiver Health</td>
<td>-.79</td>
<td>.43</td>
<td>-.34+</td>
<td></td>
<td>-.28</td>
</tr>
</tbody>
</table>

*Note.* *p* < .05.

*Note.* *p* < .1. Coefficients significant at the trend level.

*Note.* Step 1 = (Constant), caregiver age

Step 2 = (Constant), caregiver age, social support

Step 3 = (Constant), caregiver age, social support, incontinence

Step 4 = (Constant), caregiver age, social support, incontinence, caregiver health

*Note.* R = .10 is considered a small effect, r = .30 is considered a medium effect, r = .50 is considered a large effect. From “A Power Primer,” by J. Cohen, 1992, *Psychological Bulletin, 112*, p. 157.
Table 5

*Intercorrelations between demographic and model variables*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age</td>
<td>--</td>
<td>-.37*</td>
<td>-.17</td>
<td>.26</td>
<td>-.32</td>
<td>-.22</td>
<td>-.17</td>
<td>-.10</td>
<td>-.20</td>
<td>.05</td>
</tr>
<tr>
<td>2. Ethnicity</td>
<td>--</td>
<td>.05</td>
<td>.32</td>
<td>-.18</td>
<td>-.24</td>
<td>-.31</td>
<td>-.22</td>
<td>-.14</td>
<td>.28</td>
<td></td>
</tr>
<tr>
<td>3. Martial status</td>
<td>--</td>
<td>-.32</td>
<td>-.09</td>
<td>-.38*</td>
<td>-.08</td>
<td>.08</td>
<td>.19</td>
<td>.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Employment</td>
<td>--</td>
<td>-.16</td>
<td>-.01</td>
<td>-.07</td>
<td>-.17</td>
<td>-.17</td>
<td>-.01</td>
<td></td>
<td></td>
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<tr>
<td>5. Education</td>
<td>--</td>
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<td>.14</td>
<td>.07</td>
<td>.01</td>
<td>.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Income</td>
<td>--</td>
<td>.19</td>
<td>-.39*</td>
<td>.05</td>
<td>.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Incontinence</td>
<td>--</td>
<td>.20</td>
<td>.19</td>
<td>.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Health</td>
<td>--</td>
<td>-.09</td>
<td>-.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Support</td>
<td>--</td>
<td>-.21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* *p < .05*
References


