Framing Misoprostol Programs in Pakistan Within a Postcolonial Context

Thesis

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Abstract

In 2011, the World Health Organization added the drug misoprostol to its Essential Medicines List in order to treat postpartum hemorrhage, which is the leading cause of maternal mortality in the world. While global health agencies and planners have cited this as a revolution for maternal health, studies in Pakistan are beginning to highlight inconsistent use of the drug, paradoxically exacerbating issues of maternal health within the nation. In this thesis, I contextualize the misoprostol programs in Pakistan within the larger colonial context of global health to elucidate why it continues to be promoted despite these risks. Ultimately, we are shown how the power ascribed to Western-based global health agencies has allowed them to reshape local maternal health landscapes to reproduce their authority and expand the use of misoprostol, at the expense of the wellbeing and safety of women.

Dedication

First, I dedicate this thesis to the women in my family - my Nano Jahn, my Ammi, and my sister Simra. I am forever indebted to their love and support. Second, I also dedicate this to my Dad who has also shown me the utmost love, care and support my entire life. Lastly, I also dedicate this to my dog Coco, who I lost while writing this. While I miss her, I'm sure she's thriving in doggy heaven somewhere.

Vita

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Fields of Study

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List of Acronyms

AKHS …….…… Aga Khan Health Services

AMTSL……. Active management of the third stage of labor

EML ……...…… Model List of Essential Medicines

KPK ……..…….…… Khyber Pakhtunkhwa

LHW …….……..…… Lady Health Workers

PMNCH ……...… Partnership for Maternal, Newborn, and Child Health

PPH …….…… Postpartum Hemorrhage

SAPs …….…….. Structural Adjustment Programs

SMI …….…… Safe Motherhood Initiative

TBA …… Traditional Birth Attendant

UN MDG ……...……..…… United Nations Millenium Development Goals

USAID ……..….. United States Agency for International Development

WHO ……..……...…… World Health Organization

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I. Introduction

In 2007 the World Health Organization (WHO) endorsed using the drug misoprostol to treat and prevent postpartum hemorrhage (PPH) in order to reduce maternal mortality across the global South (Mobeen et al. 2011). This disorder remains the leading cause of maternal death in the world, where rates are argued to be more concentrated in the global South because access to clinics in this region of the world is limited (Mobeen et al. 2011; Prata et al. 2006). An important clinical recourse for the disorder is the use of uterotonics, a class of drugs that induce the uterus to contract, thus allowing for the blood to clot and reduce blood loss (WHO 2012). While the first-line uterotonic option is usually oxytocin, its liquid form and need for refrigeration have made it difficult to access far distances from the clinic (Prata et al. 2015). As a mere tablet, misoprostol induces similar uterotonic effects as oxytocin, thus global health agencies argued the drug could function as an accessible treatment for this disorder, subsequently revolutionizing maternal health in the process (Prata and Weidert 2016; Suh 2021).

While global health agencies continue characterizing the drug as a revolution, scholars have argued the scientific evidence to justify its use for PPH is weak, as the clinical trials for this use have not been conclusive (Weeks et al. 2015; Chu et al. 2012). This has led scholars to highlight the ethical considerations of these programs (Towghi 2014). Moreover, recent work in Pakistan has discussed inconsistent use of the drug by community health workers in the nation, leading to iatrogenic injury in women (Towghi 2014; Shah et al. 2016). These findings indicate the idealized vision promoted by global health agencies is not an accurate account of the actual experience with misoprostol for PPH. Previous investigations into misoprostol programs have argued issues of inconsistent use are the result of the continued inability of global health policies to account for issues of local bureaucracy and access to supplies (Hobday et al. 2020; Samnani et

al 2017). Moreover, this work has argued the promotion of misoprostol in the face of flimsy scientific evidence follows a larger history of Western-pharmaceutical market expansion and unethical clinical human experimentation within the global South (Towghi 2014).

In my paper, I investigate the promotion of misoprostol programs using a postcolonial lens. Global health has long been discussed as a colonial enterprise (Daffé et al. 2021). Postcolonial work with global health has studied the power implicit in the way Western-based global health agencies are often positioned as the authority over policymaking and programming for health interventions within the global South (Anderson 2014; Pearson 2018). Misoprostol programs in Pakistan are mostly promoted by Western-based global health agencies (Zuberi et al 2008; Mobeen et al 2011; Abbas et al. 2019). As part of the colonial landscape of global health, I argue that a postcolonial framing of misoprostol programs provides a critical framework for understanding how these programs converge with local landscapes of maternal health to create the conditions for Western dominance and subsequently the promotion of misoprostol, despite their questionable ethics.

My work begins by reviewing postcolonial theory as an analytic framework and the important critiques it presents to the field of global health. Thereafter, I review the landscape of global maternal health and highlight the coloniality implicit in the policies that have shaped this, more specifically the presence of power ascribed to Western nations over decision-making regarding the health of women in the global South (Allen 2004). Central to this section is the development of the traditional birth attendants (TBA) for global maternal health and their importance for misoprostol programs targeting PPH. Next, I review the implementation of misoprostol within this landscape and track its eventual journey into Pakistan. I draw on anthropological work with pharmaceuticals, critical global health studies, and postcolonial

critiques of global health to contextualize the history explored in this paper (Biehl and Petryna 2013; Petryna et al. 2006). This work has both highlighted the often antagonistic relationships between people, medical technology, and pharmaceuticals, while also arguing that studying the dialectical tensions between Western-based global health organizations, State healthcare systems, and local healthcare providers across the global South that deal with the implementation of their policies can help make sense of their political-economic impact (Anderson 2014; Biehl and Petryna 2013; Pearson 2018; Petryna et al. 2006).

I also draw on feminist postcolonial theory and feminist anthropological work on the biomedicalization of childbirth (Mohanty et al. 1991; Davis-Floyd and Sargent 1997; Jordan 1980; Allen 2004; Lock and Kaufert 2006). The former serves to explicate the gendered aspects of colonization which are critical to explore within the context of global maternal health and misoprostol programs that target women in the global South. Moreover, as global health policies center on biomedical interventions, scholarship on biomedicine and childbirth has highlighted how biomedicine, as the dominant system of healing in the West, attains the capitalist, gendered, and racialized components inherent to it (Martin 2001; Washington 2006). Scholars have often documented the relationship between biomedical science and colonialism, where the adoption of policies that implemented biomedicine was predicated on the making of modern and civilized communities (Monnais and Tousignant 2006). Therefore, I use the works of feminist anthropologists to offer important critiques of the biomedical framework inherent to misoprostol programs to highlight the necessity of understanding them as part of the larger colonial project of global health.

II. Global Health As a Colonial Landscape

Postcolonial theory

Foundational texts in postcolonial theory seek to understand the legacy of colonialism, arguing that colonizing forces at play in the past continue to be active in our present-day world (Said 1978; Spivak 1988). In *Orientalism*, Said (1978) describes the use of a colonial binary, derived from Western distortion of history, to construct "European superiority over Oriental backwardness" (Said 1987, p. 15). Feminist perspectives within postcolonial studies have further highlighted the gender dimensions of these binaries, where Western feminism has utilized them to reduce non-Western women into a homogenized other; categorizing them as a unanimous victimized group in need of saving by the West (Ahmed 1992; Mohanty et al. 1991). The power ascribed to Western nations also worked to produce knowledge about cultures within the Orient and control knowledge production, a concept often referred to as epistemic violence (Spivak 1988).

The colonial history of global health

This work provides important context for the history of global health. Global health interventions originally developed within colonial settings, where colonizing Western nations subverted the existent "incompetent" public health systems within colonies to protect the health of their personnel (Daffé et al. 2021, p. 557). These personnel were understood to be colonial conscripts or foreign officers operating within these regions and were cited as essential to upholding the colonial economy (Davidovitch and Greenberg 2007). This eventually led to the emergence of fields like tropical medicine that operated on the production of knowledge within colonial settings to generate a new lexicon for the health issues facing the global South (Daffé et al. 2021). This history indicates the presence of epistemic violence, or hegemonic control over ways of knowing, in which the West dictated how health issues were to be understood and defined within the global South to further reproduce Western authority (Daffé et al. 2021).

An important aspect of this colonial history of global health interventions is the use of biomedicine, which is the dominant system of healing in the West (Monnais and Tousignant 2006; Davis-Floyd 1994). Historically, the spread of biomedical knowledge and technology has followed Western colonial expansion into the global South (Monnais and Tousignant 2006; Fanon et al. 1967). As the use of colonial binaries painted the global South as barbaric and in need of Western influence to bring civility and modernity, biomedicine blended into local systems of care because of the way Western colonizers framed it as emblematic of this modernity (Monnais and Tousignant 2006; Fanon et al. 1967).

Biomedicine is reductive in the sense it centers on the proximate biological etiology of disease (Holst 2020). This negates the fact that health is also tied to cultural, social, and political factors (Farmer 2003; Gravlee 2009). For instance, the health of communities across the global South is tethered to larger colonial histories (Holst 2020; Packard 2007; Turshen 1977). Packard (2007) describes how the disease malaria, which disproportionately burdens African countries, was exacerbated as colonizers cut trees and vegetation to allow flooding and the creation of standing water that attracted mosquitoes. Moreover, this colonial process also led to the continuous leeching of resources from communities and the promotion of Western cultural, economic, and scientific technology that curated a dependency which further contributed to poor conditions for health and consequently more power for the West over the health of colonized people (Turshen 1977). In his essay, Brown (2009) argues reducing health to biology was a political endeavor. He explained the emphasis on biological factors depoliticized health issues and averted the need to deal with the macro issues contributing to health to further promulgate the expansion of biomedicine (Brown 2009).

As the dominant health framework in the West, the expansion of biomedicine has also functioned antagonistically towards many communities because it is culturally constructed to represent the capitalist and gendered ideals of the West (Lock and Kaufert 2006; Martin 2001). For example, the biomedical model of childbirth followed the long tradition of biomedicine viewing the body as a machine which Martin (1987) argues extends from capitalist frameworks inherent to Western culture and essentially operates to disempower and objectify the person giving birth. The biomedical model of childbirth also framed pregnancy as a risky endeavor which was argued to stem from the phallogocentrism inherent to Western science that centered on the male body as the ideal machine and framed feminine processes as inherently defunct because they deviated from this ideal model. (Davis-Floyd 1994; Martin 1987).

Biomedicine also reflects the racialized history of the West that proliferated a system of white supremacy through the exploitation of communities of color. In their essay, Towghi and Vora (2013) explain experimentation is integral to the production of biomedical knowledge. Historically, this experimentation has been highly exploitative, where its subjects have been the systemically oppressed and marginalized in society (Washington 2006; Roberts 1997). For instance, biomedical innovations in obstetrics and gynecology in the 19th century were the result of the dehumanizing experimentation and torture of enslaved women within the US antebellum south (Washington 2006). Ultimately, this history illustrates how the use of biomedicine has affirmed Western interests at the expense of further subjugating colonized communities.

The present-day global health landscape

This context presents important implications for the present-day landscape of global health. Postcolonial critiques continue to highlight the power imbalance between Western nations and nations in the global South that are often made the target of global health initiatives, allowing the

former to dominate decision-making and control of resources regarding healthcare (Daffé et al. 2012; Anderson 2014; Pearson 2018). Moreover, scholars have illustrated how the use of biomedicine to depoliticize health issues within the global South has led to the increased promotion of so-called magic bullet biomedical interventions like drugs, which, in turn, has validated the expansion of Western pharmaceutical markets into the global South (Biehl 2007; Petryna et al. 2016). With the power ascribed to them, Western-based agencies have also promulgated the expansion of clinical testing across the global South to generate biomedical knowledge necessary to prove the efficacy of these drugs to regulatory bodies (Petryna et al. 2017). This clinical experimentation further expanded into the global South after the 1970s when the US banned using prisoners for clinical trials, and pharmaceutical companies shifted their resources to globalize human subjects research in order to obtain the number of subjects necessary for their trials (Petryna et al. 2017). Moreover, this has been further exacerbated by the onset of evidence-based medicine, a paradigm shift within global health after the 1990s that demanded the increased generation of quantitative data to measure the progress of global health interventions, namely for donors who had invested in them (Storeng and Behague 2016). In essence, the landscape of global health maintains colonial undertones that work to generate the conditions for which the West can impose its authority over decision-making on health within the global South (Daffé et al. 2021; Anderson 2014; Pearson 2018). The global South continues to function as the laboratory of the West, which Said stated was inherent to colonial power, as he argued the Orient was made "the live province, the laboratory, the theater of effective Western knowledge" (Said 1978, p. 51 *see also* Crane 2013).

III. The Landscape of Global Maternal Health

In this section, I focus on key policies that shaped the landscape of global maternal health. Prominent global maternal health policies include the Safe Motherhood Initiative (SMI) and the UN Millennium Development Goals (MDGs). These policies reflect biomedical frameworks and were shaped by neoliberalism, thus maintaining colonial undertones that transformed maternal health landscapes in the global South to reproduce Western authority (Allen 2004; Jordan 1980). Key to this process was the use of traditional birth attendants (TBAs), which is the name given to locally trained birth attendants that assist pregnant women during labor (Bergstrom and Goodman 2001).

Safe Motherhood Initiative

Scholars often trace the contemporary landscape of global maternal health to the SMI (MacDonald 2021). In 1987, the World Bank and WHO sponsored a conference to launch the SMI (Mahler 1987). The WHO is understood as a major catalyst of international global health initiatives; thus this program was argued to be the first of its kind to formally address this crisis of maternal mortality (Mahler 1987). The conference followed a call-to-action letter published in *The Lancet* in 1985 by Rosenfield and Maine (1985), who were physicians based in the US that characterized maternal mortality as a "neglected tragedy" (Rosenfield and Maine 1985, p. 83; Mahler 1987). Rosenfield and Maine (1985) compared maternal death rates within the "Third World" and "developed world" and stated, "the major causes of maternal death in developing countries today are the same as they were in industrialised countries 50 years ago-haemorrhage, infection, toxaemia, and obstructed labour" (Rosenfield and Maine 1985, P. 84). They argued for international and national planning to curate "systems of comprehensive maternity care," and centered the support of the WHO and The World Bank on these initiatives (Rosenfield and

Maine 1985, p. 84). In essence, this generated a hierarchical comparison between the "developed" world and "Third World" that worked to validate the authority of Western-based agencies in making decisions regarding maternal health issues within the global South (Rosenfield and Maine 1985, p. 83).

This endeavor was also gendered, as it was under the guise of saving the lives of women in the global South they argued the need to expand Western influence into the region (Rosenfield and Maine 1985; *see* Mohanty et al. 1991). The WHO "Road to Maternal Health" graphic (see Fig. 1) visually depicted the colonial framework of the SMI (WHO 1990). It utilized a caricature of a pregnant poor rural woman, echoing the homogenous representations of women in the global South that operated as a spectacle that served to pathologize local cultures as the reason contributing to the demise of pregnant women within the global South (Allen 2004; Mohanty et al. 1991). Thus, the SMI inevitably worked to curate a landscape of global maternal health that validated Western authority over the health of women within the global South since biomedical frameworks supported by their policies were associated with modernity that local cultures within the global South supposedly lacked in addressing the issue of maternal mortality (Allen 2004).

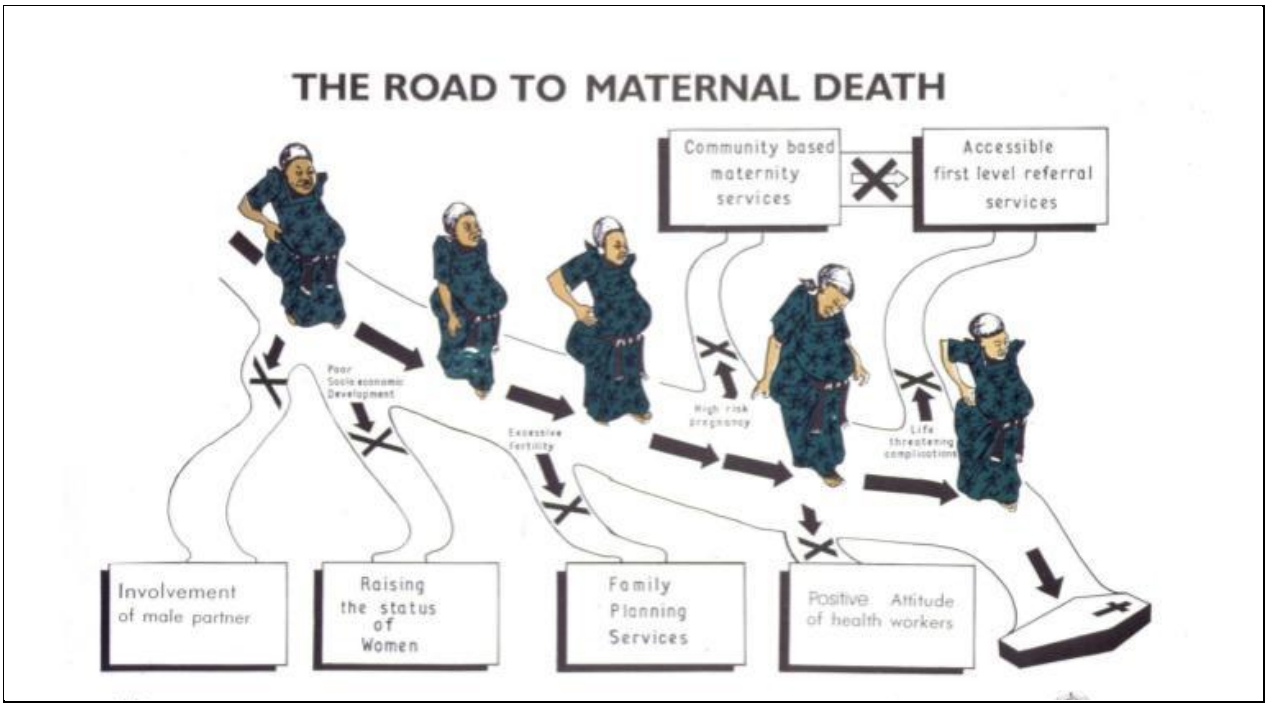

Figure 1. WHO Road to Maternal Death (WHO 1990).

The SMI identified PPH as one of the greatest threats to maternal health and promoted biomedical interventions which ignored the larger social and political factors that led to the disorder (Sai and Measham 1992). For instance, PPH can be linked to a colonial history by its association with maternal anemia (Geller et al. 2006). Anemia is defined on the basis of low hemoglobin concentration within the blood (Rush 2006). Most scholars relegate anemia during pregnancy to iron deficiency (Rush 2006). This is especially an issue among women within the global South who experience higher rates of food insecurity that result in poorer access to nutritious foods (Patel 2012). Furthermore, the issue of food insecurity in parts of the global South has been historicized within a colonial context, where Western nations leeched resources from colonized communities and inhibited them from independently producing nutritious food, ultimately leaving them dependent upon food imports to meet their needs (Bjornlund et al 2022).

This was further complicated by SAPs that restructured the economies of these nations and led to decreased spending on imports which subsequently exacerbated food insecurity (Bjornlund et al 2022). Colonized communities have drawn on this history to demand the redistribution of resources and land to restore the health of their communities (Matties 2016). Nevertheless, the biomedical framework embedded within the SMI functioned to depoliticize PPH to pave the way for the expansion of biomedical technology into the global South to address it (Allen 20014; Jordan 1980). This illustrated the way the use of biomedicine reified Western dominance over the lives of women across the global South.

Traditional Birth Attendants

An important intervention centered within the SMI was the need to train traditional birth attendants (TBAs) on biomedical practices for childbirth (Starrs 2006). Western initiatives to train women who attended the birth of those in their communities predate the SMI, extending back to colonialism (Leedam 1985). This theme continued, as illustrated by a 1975 WHO project that formalized a framework to train TBAs, whom they defined as traditional healers that pulled from religious or mystical frameworks (Verderese et al. 1975). A group of healthcare professionals and programmers working for the WHO conducted a survey of TBAs to identify how maternal care within the global South relied upon locally organized systems of communal networks that centered on these women and argued for the need to mobilize TBAs within global health interventions to curate better systems of maternal care (Verderese et al. 1975). This was because the healing practices of TBAs were characterized as potentially maladaptive and harmful to communities, and thus influencing them would ultimately impact the rest of the community to deter this harm (Ibid).

The WHO also promoted training TBAs on biomedical practices under the guise of reducing maternal death when the SMI was launched (WHO 1992; MacDonald 2022). Global health planners argued biomedical models for childbirth were valuable for ensuring the safety of women because they would offset the risk inherent in childbirth (Bergstrom and Goodburn 2001). In her work Jordan (1980) argued TBA training programs worked to pathologize indigenous knowledge and skill acquisition and reproduce the authority of biomedical practices. This was in part because of the value placed on technology within biomedicine that curated a hierarchal system that granted authority to those who had the knowledge to use this technology (Jordan 1980).

In addition to this work, some emergent scholarship during this time also began to deconstruct the idea of a TBA to highlight how it condensed a diverse group of traditional healers and elders into one category (MacCormack 1989; Pigg 1998). Such a condensation reflected the way women in the global South were homogenized to validate Western authority over them (Mohanty et al. 1991). Thus, in essence, the construct of a TBA and training programs can be further understood as a colonial tool for Western-based global health agencies to expand their influence over women's lives and reproduction (Jordan 1980; Pigg 1998).

Several years following the launch of the SMI, scientists met to assess its progress (Bergstorm and Goodburn 2001). They argued that TBAs' lack of intelligence and resistance to scientific knowledge posed barriers to properly training them to use biomedical practices that were poised to solve the issue of maternal mortality in their communities (Van Lerberghe and De Brouwere 2000). This caused support for TBA programs to dwindle (MacDonald 2022). This shift in opinion about TBAs was further influenced by the emergence of evidence-based medicine within global health which demanded data demonstrating the efficacy of global health

interventions (MacDonald 2021). With the onset of this paradigm, the SMI and initiatives like TBA trainings, fell into a "measurement trap" because they reportedly required large sample sizes to assess and document their progress, thus minimal quantitative data existed to validate their benefits (Behague 2014; Storeng and Behague 2014, p. 265).

Following a global shift away from working with TBAs to improve maternal health, global health policies prioritized training programs for skilled attendants like obstetricians or certified midwives. However, as nations rushed to achieve the United Nations' fifth Millennium Develop Goal (UN MDG 5) to reduce maternal mortality by 50%, which had enveloped the SMI in 2000, there was a surge in support for TBA training programs (MacDonald 2021). Clinicians began to find success working with TBAs in clinical trials to generate data on the efficacy of interventions and drugs (Towghi 2014; MacDonald 2021). The location of TBA training programs within the SMI and MDGs illustrates how the colonial landscape of global maternal health worked to ascribe power to the West to use the global South as their laboratory (Allen 2004; Towghi 2014).

IV. Globalizing Misoprostol

Misoprostol programs developed within the colonial context described above. In this section, I review the history of misoprostol and its eventual emergence within the landscape of global maternal health. Central to this story is the reproduction of the authority of Western-based agencies in making decisions regarding health issues within the global South (Milliard et al. 2015). TBAs have also become essential to misoprostol programs, more specifically within clinical studies for the drug (Towghi 2014).

Off-label uses for reproductive health

Pfizer launched Misoprostol on the market in 1985 for the treatment of gastric ulcers (Weeks et al. 2005). Soon thereafter, studies began to reveal its ability to induce uterine

contractions (Rabe et al. 1987). In 1987, a clinical trial concluded misoprostol increased softening of the cervix, and abdominal pain, and resulted in partial or incomplete abortion (Rabe et al. 1987). Thereafter, the drug began being used off-label in clinics as a uterotonic to induce labor, induce abortion, and treat incomplete abortion (Clark 2002). Off-label use denotes using a medication in a manner that is not specified on the label crafted by regulating agencies like the Food and Drug Administration (Ghinea 2017). Physicians have the authority to prescribe medications for off-label uses, so long as this decision is based on sound scientific evidence (Fugh-Bergman and Melnick 2008). Notably, off-label use is a common practice in obstetrics because pregnant women are often excluded from clinical studies (Grimes 1991). The American College of Obstetricians and Gynecologists eventually endorsed the drug for reproductive health in 1999 (Chong et al. 2004).

The increased use of misoprostol for reproductive health in the clinic led to the emergence of its use for clandestine abortion in some parts of the world (Chong et al. 2004). This was famously studied in Brazil, where the drug was readily available over-the-counter for the treatment of gastric ulcers in the 1990s (Barbosa and Ariha 1993). As physicians and the media spread the news about misoprostol's abortive properties, women in Brazil began obtaining the drug for self-managed abortion, despite this being illegal in the country. In reaction, the government removed over-the-counter access to the drug in 1991 and required prescriptions (Assis and Erdman 2021). Yet, a 1992 study revealed Brazilian women had continued to find ways to access the drug and had developed myriad sophisticated regimens to use it underground, from oral consumption to crushed and "mixed with a gynecological cream" (Barbosa and Ariha 1993, p. 238). In reaction, the Brazilian government further restricted misoprostol use to registered hospitals only (Assis and Edman 2021; Zordo 2016).

Some have argued that this early controversy stigmatized misoprostol and impacted its accessibility around the world (Weeks et al. 2005). For instance, despite the copious amount of scientific evidence argued to demonstrate its efficacy for abortion and labor induction, Pfizer failed to apply for any licensing that would approve misoprostol for these reproductive health uses on its labeling (Weeks et al. 2005). Scholars speculated Pfizer's intransigence stemmed from its need to distance itself from the controversy surrounding the drug's association with clandestine abortion (Wittich et al. 2012). Due to this reticence, misoprostol is still not approved by the Food and Drug Association for use in pregnant individuals (Krugh and Maani 2019; Chong et al. 2004). They have only gone so far as to reword the drug's labeling to recognize its off-label use for reproductive health (Goldberg et al. 2001). The exclusion of reproductive health indications for misoprostol's label also means the drug is not manufactured in the correct dosages required for these uses, resulting in physicians receiving conflicting information on how to use the drug (Faundes 2018; Weeks et al. 2005). Pfizer failed to renew misoprostol's patent in 2000, allowing companies to begin manufacturing generics (Weeks et al. 2005; MacDonald 2021).

Misoprostol for postpartum hemorrhage

Misoprostol would eventually become an important drug for treating PPH for global maternal health interventions. Postpartum hemorrhage remains the leading cause of maternal death globally (Prata et al. 2005). Recall how PPH was depoliticized within the SMI to center on proximate causes (Sai and Measham 1992). The most cited cause of PPH is uterine atony (WHO 2012). During parturition, the body naturally emits the pituitary hormone oxytocin to promote uterine wall contractions (Abrams and Rutherford 2011). Functionally, these contractions are important for the healthy delivery of the infant and placenta and encourage blood to clot as the placenta separates from the uterine wall (Abrams and Rutherford 2011). However, on occasion,

women may experience uterine atony, where there is minimal or no contraction of the uterus, resulting in insufficient clotting and/or detachment of the placenta leading to significant blood loss(Ibid). As a disorder, PPH is clinically characterized as a blood loss of 500 mL or more (Prata et al. 2005).

Treatments for PPH target the uterus through active management of the third stage of labor (AMTSL) (Hobday et al. 2018). AMTSL involves a series of steps after delivery of the fetus, including preventatively giving uterotonics before delivery of the placenta, where the normal uterotonic of choice is oxytocin (Prata et al. 2006; Chu et al. 2012). Uterotonics induce the uterus to contract, thus warding off potential atony and minimizing blood loss (Prata et al. 2006). While oxytocin has been an essential first-line recourse for AMTSL, its need for refrigeration and intravenous infusion has limited its use in resource-poor settings where clinics are lacking and most PPH-related maternal deaths occur (Abbas et al. 2019). Since misoprostol had previously been used as a uterotonic to induce labor and for abortion care, in 2003 scientists began to evaluate whether it could function as an alternative to oxytocin within AMTSL to treat PPH in non-clinical settings (Prata et al. 2006; Prata and Weidert 2016).

Results of the first study to investigate the effectiveness of misoprostol for treating PPH were inconclusive (Hofmeyr et al 1998). Following this, the WHO published their own clinical trials in 2001 and 2004 which continued to be inconclusive about misoprostol's effectiveness in reducing PPH and argued oxytocin should continue to be used for AMTSL (Gulmezoglu et al. 2001; Hofmeyr et al. 2004). All of these studies noted the iatrogenic effects of misoprostol, which included shivering and fever (Hofmeyr et al. 1998; Gulmezoglu et al. 2001; Hofmeyr et al. 2004). Iatrogenesis is defined as an adverse condition resulting from clinical treatment and is generally cited as the fifth leading cause of death in the world (Peer and Shabir 2018)

Opinions regarding the use of misoprostol for treating PPH began to shift in later studies in 2007 and 2008 respectively when scientists began arguing that while not as effective as oxytocin, it could potentially be used when oxytocin was not accessible (Gulmezoglu et al. 2007; Blum et al. 2007; Zuberi et al. 2008). These studies were conducted in South Asia and East Africa and financed by research NGOs (MacDonald 2021). Results of these studies led the WHO to add misoprostol to their Model List of Essential Medicines (EML) in 2011 for the treatment of PPH and in 2015 for its prevention (WHO 2011; WHO 2015). The WHO developed their EML in 1978, claiming drugs played an important role in "maintaining and restoring" health and argued ensuring access to them in the global South was imperative (WHO 1977, p. 9; Whyte et al. 2002).

When the WHO included misoprostol in the EML for PPH in 2011, it was challenged by some who argued the scientific evidence to support this decision was not conclusive (Chu et al. 2012; Hundley et al. 2013). In fact, previous applications to include misoprostol were rejected by WHO for this very reason (Millard et al. 2015). Millard et al. (2015) traced a network of individuals and organizations that organized for misoprostol's inclusion for PPH on the EML in 2011, backed by major private organizations that offered substantial financial support for the effort. These included the Venture Strategies for Health and Development and the Gynuity Health Partners, two organizations based in the United States that centered on making reproductive technology accessible within the global South (Millard et al. 2015). The increased effort for the inclusion of the EML was argued to take place in order for global health agencies to meet the UN MDG 5 deadline of 2015 (Elati and Weeks 2009).

Furthermore, while the WHO pushed to further globalize misoprostol use for PPH, reproductive health indications remained absent from misoprostol's label, which prompted the

need to formalize the dosage needed for treating PPH (Faundes 2018). This was especially important because while there was evidence for misoprostol's potential for reducing maternal mortality, it could be lethal if not dosed properly (Hofmeyr et al. 2009). In 2007, an expert group convened by WHO met to establish the optimal dosages for misoprostol and curated a protocol that directed using 600 micrograms for the treatment of incomplete abortion and the prevention and treatment of PPH (Elati and Weeks 2009). However, other scientists argued there was little difference in effect size between 600 micrograms and lower dosages like 400 micrograms for the treatment and prevention of PPH (Hofmeyr et al. 2009). As higher doses were associated with iatrogenic effects, they advocated for further research to establish the lowest dose of misoprostol to effectively treat PPH (Hofmeyr et a1. 2009). Eventually, in 2012 the International Federation of Gynecology and Obstetrics and the WHO established 600 micrograms as the appropriate dosage for the prevention of PPH and up to 800 micrograms for PPH treatment when oxytocin was not available (Morris et al. 2017).

Misoprostol and TBAs

While scientists debated the official dosage for misoprostol and PPH, a group of physicians and clinicians based in the US organized trials in which TBAs were trained to diagnose PPH and use misoprostol (Prata et al. 2005). The first of these trials was supported by the United States Agency for International Development (USAID), taking place in 2005 before the standard of 800 microgram dose was established (Prata et al. 2005; Morris et al. 2017). This pilot study, conducted by Prata et al. (2005), examined training programs for TBAs in Tanzania aimed to educate them to diagnose PPH and administer misoprostol. They trained TBAs to use the kanga, a rectangular cotton garment, to measure blood loss, where if two kangas were soaked with blood, it indicated blood loss larger than 500 mL, the threshold for diagnosing PPH. Upon the

onset of PPH, TBAs were instructed to administer 1000 micrograms of misoprostol and refer patients to the nearest facility. In their study, they concluded TBAs were able to successfully diagnose PPH based on blood loss and administer the desired dosage of misoprostol for treatment. Notably, women who received misoprostol as part of the study suffered iatrogenic effects, including fever, shivering, nausea, and vomiting. After the publication of the 2005 trial, TBAs within the area were encouraged to continue using misoprostol "outside of a study-controlled environment" (Prata et al. 2009, p. 118).

Prata et al. (2009), through surveys and interviews, collected additional data from women after their 2005 trial to deduce whether misoprostol was being used safely for PPH. They discovered that after their initial study in 2005, TBAs began to vary how they administered the drug, giving it earlier than first directed, potentially to offset the risk of PPH (Prata et al. 2009). They also found TBAs were under-dosing, yet the reason for under-dosing was not made clear, although they conjectured it could have been the result of stock shortages (Prata et al. 2009). Lastly, while they noted iatrogenic effects, including shivering and fever, they argued these were minor in comparison to the risk of not administering the drug (Ibid). Despite these iatrogenic effects, the authors concluded women in the community were enthusiastic about misoprostol and recommended the expansion of its use for PPH (Ibid). These studies (Prata et al. 2005, 2009) were later utilized in publications arguing for the efficacy of misoprostol for PPH (Prata and Weidert 2016).

Later, Prata et al. (2012) built upon this work by publishing a study investigating TBA training programs in Bangladesh. In the Bangladeshi study, they argued TBA's "traditional" knowledge of birthing was an impediment to safe birth practices, but that a local NGO successfully trained TBAs to safely use misoprostol in PPH management, which they argued

corroborated earlier studies about the importance of misoprostol distributed by TBAs could play for PPH and the overall landscape of global maternal health (Prata et al. 2012, p. 2022).

Western-based global health agencies have continued promoting TBA training programs to encourage misoprostol use in the global South, leading to more recent studies investigating TBA abilities to properly diagnose and use misoprostol for PPH (Rajbhandari et al. 2010; Mobeen et al. 2011; Mir et al. 2012; Ejembi et al. 2014; Abbas et al. 2019). These studies were financed by the United Nations, USAID, and the Gynuity Health Partners; within them, clinicians have used 600-800 micrograms of misoprostol and women have continued to experience iatrogenic effects after treatment (Rajbhandari et al. 2010; Mobeen et al. 2011; Mir et al. 2012; Ejembi et al. 2014; Abbas et al. 2019). Some clinicians have utilized campaigns to convince members of the community to help promote pregnancy-related health messages regarding PPH, including the use of misoprostol (Ejembi et al. 2014). The process has included appointing some community members as the "drug-keepers" to dispense drugs to trained TBAs (Ejembi et al. 2014, p. 168).

Despite this enthusiasm, some emergent studies have begun to complicate the sustained optimism for training TBAs to use misoprostol. For instance, in Mozambique, some TBAs had concerns about the lack of access to the resources they needed to complete their tasks, including access to a car to transport women to clinics or proper medical equipment like birth kits (Hobday et al. 2020). Additionally, TBAs complained about their labor conditions and explained fearing retribution from healthcare staff with higher authority within clinics if they made mistakes (Hobday et al. 2020). Global health planners have yet to address these issues as they press forward with TBA misoprostol training initiatives (Ibid). Global health agencies now rely on TBAs, after pathologizing their healing practices, within training programs that are working to generate favorable data on the use of misoprostol for PPH (Towghi 2014). Moreover, as global

health ignores TBAs' lived experiences and condenses TBAs into one uniform entity as auxiliary health workers, the concerns raised by TBAs about their labor conditions and lack of access to resources reflect the coloniality inherent to misoprostol programs (Allen 2004; Pigg 1998; MacCormack 1989).

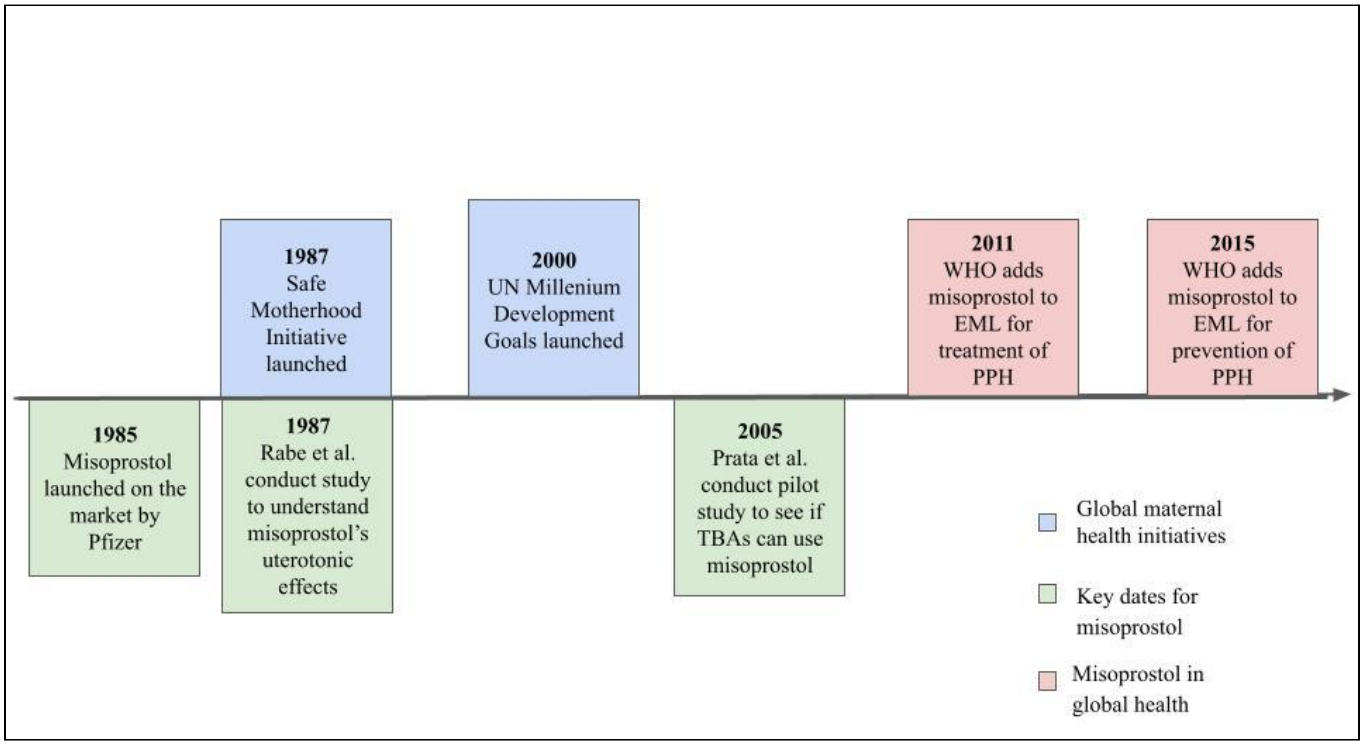

Figure 2. Global Maternal Health and Misoprostol

Misoprostol programs within a postcolonial context

This context indicates how misoprostol programs are functioning as an extension of the larger colonial landscape of global maternal health. Recall, that Western nations dominate decision-making regarding women's reproductive health in the global South (Rosenfield and Maine 1985; Mahler 1987; Allen 2004). This has curated the conditions for which the global

South can function as a laboratory for the West (Said 1976; Towghi 2014; *see also* Crane 2013). This process is mediated through the use of biomedicine and TBAs (Verderese et al. 1975; Jordan 1980). Consequently, misoprostol programs are predicated on this, as displayed through the biomedical framework promoted by the West that served to depoliticize PPH and expand the need for its use for the disorder (Suh 2021; Towghi 2014). Moreover, with this power ascribed to them, Western-based global health agencies have pushed forward in globalizing misoprostol despite inconclusive clinical results on its efficacy for treating PPH (Prata et al. 2005, 2009; Hofmeyr et. al 2012). These agencies have utilized TBAs, after pathologizing their healing practices, within training programs that are working to generate favorable data on its use for PPH under the guise of bringing women essential medicines (Prata et al. 2005, 2009).

In this landscape, Western-based agencies are able to conduct trials, control their safety parameters, and deliberate over appropriate dosages, which is illustrative of enacting epistemic violence over the global South (Prata et al. 2005, 2009; Hofmeyr et. al 2012). Moreover, the concerns raised by TBAs about their labor conditions and lack of access to resources within the Hobday et al. (2020) study, can also be tied to the coloniality inherent to misoprostol programs in the way their lived experiences are ignored to condense their identities into one uniformed entity for the purposes of utilizing them to propagate the use of the drug as auxiliary workers within a neoliberal framework (Allen 2004; Pigg 1998; MacCormack 1989). Interestingly, these programs are also further transforming maternal ecosystems of care as illustrated through the use of other community members that are deputized to help promote the use of misoprostol (Ejembi et al. 2014).

All in all, this echoes how the promotion of misoprostol is predicated on Western-based global health agencies' authority in working to transform local healthcare landscapes to represent

their interests, at the expense of marginalized communities (Towghi 2014; Daffé et al. 2021). In the following section, I highlight misoprostol use in Pakistan. Pakistan has one of the highest rates of maternal mortality in the world due to PPH and has been a prominent site of misoprostol implementation. I offer background on Pakistani healthcare systems and some of the major agencies and NGOs operating in the region to implement the drug and train TBAs. I then review several key clinical and ethnographic studies both on misoprostol implementation and uterotonic usage in Pakistan to ultimately illustrate these programs are reflecting colonial histories and further shape the maternal health landscape in Pakistan.

V. Misoprostol in Pakistan

In this section, I highlight misoprostol use in Pakistan. Pakistan has one of the highest rates of maternal mortality in the world due to PPH and has been a prominent site of misoprostol implementation. I offer background on Pakistani healthcare systems and some of the major agencies and NGOs operating in the region to implement the drug and train TBAs. I then review several key clinical and ethnographic studies both on misoprostol implementation and uterotonic usage in Pakistan to ultimately illustrate how these programs are reflecting colonial histories and further shape the maternal health landscape in Pakistan.

The political context of Pakistan

The country of Pakistan was formed after gaining independence from British India in 1947. It is bordered by the nations of Afghanistan, India, China, and Iran (Fig. 3). There are five recognized provinces in Pakistan: Punjab, Sindh, Khyber Pakhtunkhwa (KPK), Gilgit-Baltistan, and Balochistan. Pakistan is a multiethnic state, where each province is home to distinct linguistic groups (Mushtaq 2009b). Conflicts between ethnic groups have been prevalent since before the formation of the state of Pakistan, exacerbated by British colonization of the

subcontinent (Leake and Haines 2017). Today, ethnic minority groups, including those across Balochistan, Sindh, Gilgit-Baltistan, and KPK, are often cited as systemically marginalized in comparison to Punjabis who are said to control the political, economic, and social resources of the state (Akhtar 2007; Mushtaq 2009b).

Figure 3. Map of Pakistan (obtained from https://www.worldatlas.com/maps/pakistan)

The healthcare landscape in Pakistan

Formalized public health systems within Pakistan are often traced back to the 1760s when the British East India Company established medical clinics to render medical services to military troops and laborers for the company (Mushtaq 2009a). Thus, many major health centers in Pakistan were constructed during British colonialism and remained operational after Partition in

1947 (Syed 2016). Almost twelve years after this date, the Pakistani government motioned to establish 150 more health centers to improve health delivery across the nation (Syed 2016).

Today, the healthcare system in Pakistan is organized into public and private sectors, where each provincial government in Pakistan has an established department of health that serves to program health services within the region (Akhbari et al. 2009; Mumtaz et al. 2013; Shadoul et. al. 2010). The formalization of these sectors was initiated shortly after 1979 when Pakistan was a signatory of the WHO Alma Ata Declaration that promoted neoliberal models of healthcare (Ronis and Nishtar 2007). Neoliberalism is defined as a set of economic reform policies that promote the deregulation of the services and privatization (Steger and Roy 2010). Neoliberal policies have had a drastic effect on the global South, particularly through structural adjustment programs (SAPs) (Ganti 2014). After the establishment of the Alma Ata Declaration, SAPs were administered to function as loans through international financial institutions like the International Monetary Fund (IMF) and World Bank, to nations in the global South during the economic recession in the 1980s (Pfeiffer and Chapman 2010; Thomson et al. 2017). SAPs were forcibly adopted by many nations because of the international funding they provided to remedy the debt crisis of this time (Pfeiffer and Chapman 2010). The neoliberal framework of these programs emphasized the reduction of state control over services and promoted privatization (Thomson et al. 2017).

Consequently, health services were decentralized, effectively shifting resources from the state to community-based clinics (Qureshi 2015). However, this, in turn, forced nations in the global South to cut social spending to meet fiscal targets and negatively affected the amount of money allocated for healthcare, subsequently draining the public sector of resources and skilled

workers (Thomson et al. 2017; Qureshi 2015). Inevitably, this decreased state support for healthcare and led to a greater dependence on the private sector to fill gaps (Suh 2021).

Postcolonial scholars argue neoliberalism is a modern form of economic colonization, often referred to as neocolonialism (Bulhan 2015). This is because, following the implementation of SAPs, health delivery within nations across the global South further became the domain of Western-based global health agencies and NGOs, who subsumed the role of the state to dominate the healthcare sectors within these nations (Nishtar 2004). These agencies further shaped international and national health policies and priorities according to their interests, exacerbating the colonial legacy of Western nations curating dependency within the global South to harness their power over policymaking and programming within the context of health (Turshen 1977; Nishtar 2004; Daffé et al. 2021).

In Pakistan, the public sector is compromised of government health centers called Basic Health Units and Rural Health Units that are often staffed in partnership with locally or internationally operating agencies like the UN (Mumtaz et al. 2013; Shadoul et al. 2010). The private sector can be understood as a network of private health centers, private practitioners, local and international NGOs, and community health workers that function to deliver healthcare to communities (Shadoul et al. 2010). Operating outside these sectors are also traditional healers within communities like *hakeems* (herbal doctors) or *dais,* who are often categorized as TBAs within the literature (Anwar et al. 2012).

Access to healthcare in the nation is fragmented across class and caste lines (Mumtaz et al. 2013). For instance, while healthcare centers within the public sector are understood to be free of cost, individuals must pay out-of-pocket for transport, food, medicine, and surgical supplies (Mumtaz et al. 2013). Studies have illustrated these costs have made it so upper and middle-class

individuals utilize these healthcare centers more often than poorer individuals who cannot afford the additional expenses (Ibid). Moreover, lower-caste individuals often report receiving lesser quality care within these health centers due to discrimination, and thus are also understood to avoid them more often for this reason (Ibid). The distribution of healthcare centers and practitioners is also geographically varied. Rural areas usually maintain a sparse network of public or private healthcare centers and private practitioners (NIPS 2020). This is particularly troublesome for health delivery because two-thirds of the Pakistani population is said to reside within rural areas of each province (Anwar et al. 2012). Studies on health-seeking behaviors across the nation have illustrated individuals living in rural areas largely rely upon traditional healers to fill healthcare needs, only seeking healthcare from the public or private sector in emergency situations (Anwar et al. 2012).

Maternal healthcare in Pakistan

In terms of maternal healthcare, poor women living in rural areas of the nation have far limited access to formalized care or skilled attendants like obstetricians (Akhtar et al. 2014). More than 89% of women give birth at home across the nation with the support of traditional healers like *dais,* thus these women are vital in providing maternal care in rural parts of each province (Mumtaz et al. 2013). To improve access to maternal healthcare, Pakistan has launched several initiatives over the years to improve the delivery of maternal healthcare. In 1951, Pakistan launched a program to train Lady Health Visitors (LHVs) to deliver maternal health services across the nation (Upvall et al. 2002). This was the first program in Pakistan to do so after the nation's formation following partition in 1947 (Upvall et al. 2002). In 1994, Pakistan expanded upon this to establish the Lady Health Workers (LHW) program to further health delivery to women in rural parts of the country that were not able to make it to the clinic (Hafeez

et al. 2011). This program trained women at a health center and then dispatched them to homes in rural areas to provide health education and dispense essential drugs (Hafeez et al. 2011). Thereafter, with the launch of the UN MDGs, the Pakistani government further established the National Maternal, Newborn, and Child Health program in Pakistan and a community midwife program to support LHWs conduct their work and improve access to skilled birth attendants (Akhtar et al. 2014). In the last few years, there has also been an ongoing attempt to include traditional attendants like *dais* within the formal healthcare system (Hafeez et al. 2011). The process of including dais in more formalized maternal health delivery can be further understood within the context of misoprostol use for PPH in Pakistan and the Aga Khan Health Service agency (AKHS) (Abbas et al. 2019; Mir et al. 2013; Mobeen et al. 2011).

Misoprostol use for PPH in Pakistan

The AKHS is a major agency operating within the private healthcare sector of Pakistan to combat maternal mortality. This agency is a part of a network of nine other agencies under the umbrella of the Aga Khan Development Network organization. The Aga Khan organization was established by Aga Khan, a proclaimed religious leader in the Shia Islamic community with a net worth of 13 billion dollars (Reginato 2013). The website for the AKHS notes its commitment to the promotion of healthcare by opening hospitals in various countries, operating community health programs, conducting research, and contributing to the development of global health policy (AKDS 2020). The AKHS is strongly partnered with the UN, holding a prominent position within the Partnership for Maternal, Newborn, and Child Health (PMNCH), which was established by the UN in 2005 to help nations meet the new MDG 5 (Behague 2014). They also often partner with Western-based agencies like the Gynuity Health Partners to fund their programs and studies (Zuberi et al. 2008; Mobeen et al. 2011; Abbas et al. 2019; WHO 2010).

The AKHS receives its funding from a variety of sources, including Aga Khan himself, donations from corporations, and individual donors (AKDN 2020). To date, AKHS provides a substantial amount of healthcare across the nation, operating 450 health centers and 5 major hospitals within the private healthcare sector, including their main Aga Khan University hospital in Karachi, Sindh (AKDN 2020).

The AKHS was crucial in initiating the use of misoprostol for PPH within Pakistan. Misoprostol has been used within clinical settings in Pakistan for reproductive health uses like labor induction and abortion care since the 1990s (Chahal et al. 2017). In 2005, the Zuberi et al. (2008) study took place across four AKHS hospitals in Sindh to establish the efficacy of adding misoprostol to AMTSL to treat PPH in Pakistan (Zuberi et al. 2008). Postpartum hemorrhage remains one of the leading causes of maternal mortality in this region, where Pakistan maintains the second-highest rate of maternal mortality in South Asia, with 410 deaths per 100,000 live births, most caused by PPH (Shah et al. 2016). A dose of 600 micrograms of misoprostol was administered alongside routine use of oxytocin when PPH commenced, and scientists concluded that misoprostol showed potential for treating PPH and should be made available in community-based settings where oxytocin was not available (Ibid). The data collected within this study ultimately contributed to the larger proposal put forth by the WHO to add misoprostol to its EML (Zuberi et al. 2008; WHO 2010).

Following the inclusion of misoprostol in the EML for the treatment of PPH in 2011, the Pakistani government moved to make the drug available over-the-counter (Shah et al 2016). This is a common practice in Pakistan since most drugs are available for purchase at pharmacies without the need for a prescription (Atif et al. 2017). The decision to make misoprostol available was met with contention amongst Pakistani medical professionals (Tribune 2012). While some

were optimistic about its potential for improving maternal health, others denounced misoprostol due to taboos surrounding its well-known use for abortion, while others were afraid of inconsistent use of the drug in face of emerging studies on the nature of uterotonic use in Pakistan during this time (Tribune 2012).[1]

While scholars studied the issue of inconsistent use of uterotonics in Pakistan, the AKHS moved forward with initiatives to train *dais* to administer misoprostol in order to stymie the higher rates of PPH found among poor women living in rural areas of the country (Mobeen et al. 2011; Mir et al. 2012; Abbas et al. 2019). These higher rates were argued to be a product of poor access to formalized maternal healthcare and other factors including lower access to nutritious foods that generated higher rates of maternal anemia due to iron deficiency, placing these women at a higher risk for PPH (Ali et al. 2020; NIPS 2020; Shah et al. 2016). These clinical trials were financed by Western-based agencies like the Bill and Melinda Gates Foundation and the Gynuity Health Partners and worked to recruit *dais* into a network to teach them to diagnose PPH and dispense misoprostol (Mobeen et al. 2011; Mir et al. 2012; Abbas et al. 2019). Scholars have highlighted that *dais* are legally not authorized to be dispensing drugs in Pakistan, however that these laws are overlooked since the number of skilled attendants is limited, resulting in a larger reliance upon *dais* to realize interventions like misoprostol programs (Shah et al. 2016; Towghi 2014).

The first of these clinical trials were conducted from 2006 to 2008 by the AKHS in KPK (Mobeen et al. 2011). In concert with previous clinical trials (Prata et al. 2005, Ejembi et al. 2014), they trained TBAs to diagnose PPH and dispense 600 micrograms of misoprostol and ultimately concluded TBAs could successfully administer the drug for PPH and further encouraged the expansion of misoprostol use and TBA training programs (Mobeen et al. 2011).

Data from this trial has been repeatedly cited to further argue for the efficacy and expansion of misoprostol use for PPH and TBA training (Prata et al. 2012; Bell et al. 2014; Ejembi et al. 2014). The most recent trial, conducted between 2012 and 2014 in KPK, spanned 13 primary health facilities and included 70 trained TBAs within the AKHS network (Abbas et al. 2019). Here, TBAs were instructed to give misoprostol before delivery of the child, a second dose if PPH occurred, and then to refer women to the nearest health facility (Ibid). Abbas et al. (2019) concluded TBAs could safely initiate treatment for PPH during home delivery and could adhere to given protocols. Moreover, while TBAs were able to successfully administer the medication, women who received the drug within both trials experienced iatrogenic effects, including fever and chills (Mobeen et al. 2011; Abbas et al. 2019).

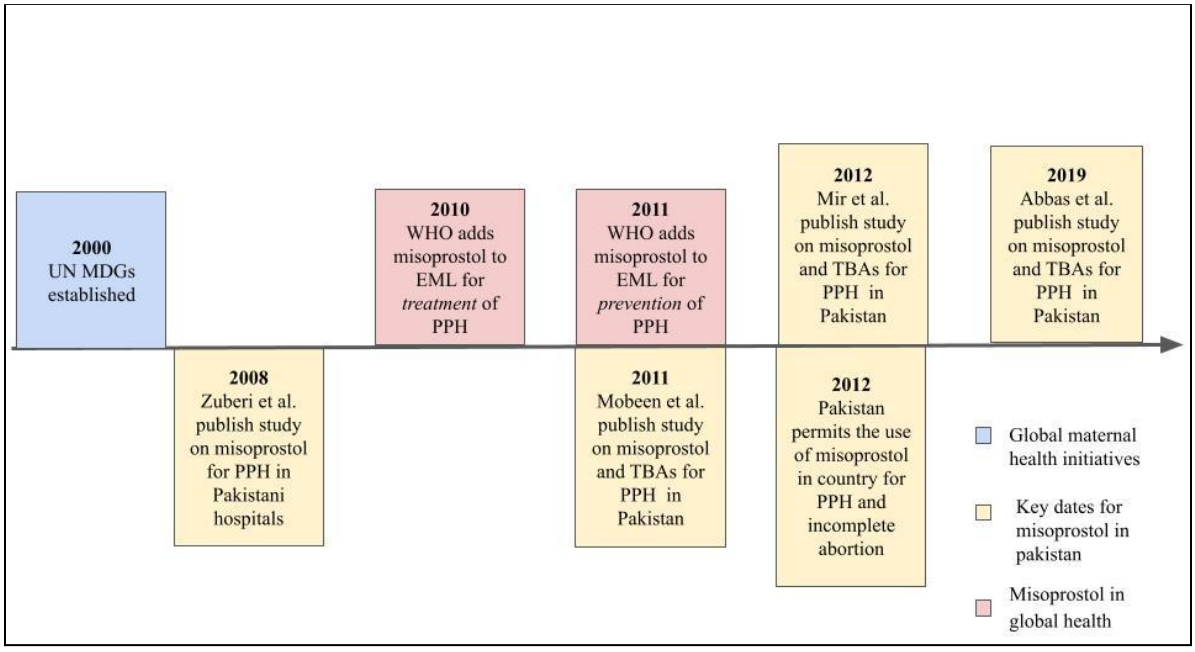

Figure 4. Key Dates for Misoprostol in Pakistan

Using postcolonial theory to understand misoprostol programs in Pakistan

Western-based agencies and their partners, such as AKHS, have continued to expand misoprostol use in Pakistan, namely through these clinical trials (Zuberi et al. 2008; Mobeen et al. 2011; Abbas et al. 2019). These clinical trials are mostly focused on poor, lower-caste communities across KPK and Sindh, which maintain large numbers of ethnic minority communities in Pakistan, rendering the bodies of these Pakistani women experimental subjects Towghi (2014). (Akhtar 2007; Mushtaq 2009b). This practice reflects the use of the global South as a laboratory and the racialized history of biomedicine utilizing the bodies of systemically oppressed and marginalized communities as experimental subjects (Washington 2006; Roberts 1997. In this sense, misoprostol programs in Pakistan function as part of a colonizing project reflecting Western interests, at the expense of minoritized women in Pakistan.

Moreover, by continually promoting the use of misoprostol to treat PPH, global health agencies have depoliticized PPH—rerouting attention from the broader political and economic conditions that render women vulnerable to suffering PPH and promoting misoprostol as the sole intervention (Zuberi et al. 2008; Mobeen et al. 2011; Mir et al. 2012; Abbas et al. 2019). Furthermore, these programs converge with local ecosystems of maternal care as they recruit and train TBAs across the nation to use misoprostol, often for the purposes of collecting clinical data on the efficacy of the drug (Mobeen et al. 2011; Mir et al. 2012; Abbas et al. 2019). Furthermore, Towghi (2014) and Varley (2019) explain how neoliberal healthcare systems have created complications for healthcare workers, creating the conditions for TBAs to under-dose misoprostol, for example, since options are limited and resources and personnel are low.

VI. Conclusion and Future Investigations

In this paper, I use postcolonial theory to contextualize misoprostol programs in Pakistan within the larger colonial history of global health. Framing misoprostol in a postcolonial context allows us to understand how Western global health agencies shape landscapes of maternal health to represent their interests at the expense of marginalized communities and moreover why misoprostol programs continue to be promoted despite inconclusive scientific evidence and issues with inconsistent use. In Pakistan, the implementation of misoprostol is partly the result of a larger colonial history of global health that ascribes power to Western-based agencies to subsequently transform the landscape of maternal health to reflect their interests.

This work has important implications for ongoing conversations about decolonizing global health that has argued for the redistribution of resources, and subsequently, power, from Western nations and global health agencies to generate a paradigm of global health that is based on a more multipolar governance framework that encourages global solidarity and rids the notion that the global South is incapable of finding solutions in terms of healthcare (Daffé et al. 2021; Kwete et al. 2022). Moreover, I argue future investigations into misoprostol programs in Pakistan must consider they are functioning within the context of the War on Terror. The War on Terror has been cited as a colonial endeavor, where gendered colonial discourse to save so-called oppressed Muslim women has justified the expansion of the West into countries like Afghanistan and Iraq (Kumar 2012). Moreover, increased humanitarian aid to certain nations like Afghanistan, Iraq, and Pakistan after 9/11 was cited as a way to secure Western presence and interests within the nation, proliferating Western-based agencies within these regions and reworking policy and state infrastructure along the way (Saleh 2012; Williamson 2011). Scholars have also studied how NGOs operating in countries that were funded by the USAID were more frequently required to

work with the US military to conduct their work (Saleh 2012). Within this context, the line between civilian and combat space has become increasingly blurred, resulting in an increased militarization of global health (Dewachi et al. 2014).

Pakistan was a recipient of USAID and its healthcare landscape has been impacted by this (Saleh 2012). For example, Western-based agencies in Pakistan funded by USAID made international headlines when it was reported they had implemented fake vaccine programs in order to collect DNA samples for purposes of intelligence and anti-terrorist campaigns (Peckham 2016). In turn, this led to the rampant distrust of NGOs who comprise the healthcare system in the nation, ultimately leading to the resurgence of the polio epidemic in the nation (Peckham 2016). By understanding that misoprostol programs are functioning within this context in countries like Pakistan, further investigation into how these politics have impacted these programs could be useful.

Further work with misoprostol also has important implications for the social life of misoprostol. Anthropological work with pharmaceuticals has illustrated that drugs are social objects whose use and meaning transform as they move through different contexts (Whyte et al. 2002). Previous work on the social life of misoprostol has not considered the increase in inconsistent use of the drug by healthcare workers and TBAs (MacDonald 2021). Further investigation into how misoprostol is being used in countries like Pakistan could add valuable insight to the sociality of the drug.

Lastly, by explicitly framing misoprostol as a colonial project, we can center on the necessity of understanding the perspectives of those trained to dispense the drug and individuals that receive treatment with the drug. There is minimal understanding of the relationship between *dais* in Pakistan and the Western-based agencies that seek to recruit them or the experiences of

women who receive the drug. A socio-cultural study of misoprostol TBA training programs that have arguably been central to the implementation of these programs could provide important insights into these perspectives. Moreover, the clinical literature does little to explain how these programs translate the significance and use of misoprostol to TBAs nor how the risk of using the drug is assessed. Moreover, historically communities have resisted global mechanisms of control (Lock and Kaufert 2006). Within the literature discussing misoprostol use, we are seeing how community members are potentially transforming the way misoprostol is to be used (Prata et al. 2009; Towghi 2014; Shah et al. 2016; Varley 2019). Further investigation into this might offer important insight into how these instances might be displays of resistance. Individuals facing the brunt of colonial violence are the experts regarding their history, material reality, and the means needed to resist colonization. Therefore, future work concerned with misoprostol, maternal health, and decolonization must center on these perspectives. Without them, our scholarship remains empty, and our perspectives serve to enact the very same epistemic violence that has been essential to colonial history.

Notes

[1] Inconsistent use of uterotonics in Pakistan can first be illustrated through the Khaskeli et al. (2014) study, conducted at a private medical center in the Jamshoro province of Sindh, between 2011 and 2012 to understand the major iatrogenic issues affecting maternal health within the center. They found the leading cause of iatrogenic injury was the inconsistent use or "misuse" of oxytocin by obstetricians against protocols and warned that if this was not addressed, it could begin exacerbating maternal mortality in the nation (Khaskeli et al. 2014, p. 113). They deduced this issue was the product of inadequate obstetric and gynecological training in the hospital on the proper use of oxytocin and further argued governments and hospitals needed to collaborate to develop better systems of obstetric care as a means of promoting maternal health (Khaskeli et al. 2014).

While Khaleski et al. (2014) worked to blame healthcare personnel working within hospitals for inconsistent use of uterotonics, a later study has offered more insight into some of the structural factors that might be contributing to this (Varley 2019). Varley (2019) offered a thick description of the obstacles maternal healthcare workers were up against in public health centers in Gilgit-Baltistan between 2004 and 2017. These obstacles included the lack of resources, the death of personnel, and issues of bureaucracy within the hospital system (Varley 2019). She illustrated how due to these constraints, healthcare workers were seldom able to adhere to global health protocol measures for the usage of oxytocin, rather choosing to dispense it when it was not required or overusing the drug (Ibid). This was because it functioned as a quick-fix, off-setting further obstetric complications they might have the capacity to handle (Ibid). She highlighted an ironic situation: oxytocin was exacerbating the maternal health issues it was employed to address (Ibid). Ultimately, this work illustrated how protocols curated by

global health policies for uterotonic use weren't accounting for the local realities of clinics in Pakistan within the confines of neoliberalized healthcare systems that drained the healthcare sector of skilled workers and resources (Qureshi 2015). Furthermore, it illustrated how global health agencies' fixation upon magic bullet pharmaceuticals to address maternal health issues were curating landscapes of maternal healthcare in Pakistan that were more dependent upon biomedical technology, echoing previous anthropological critiques of biomedicalizing maternal health (Davis-Floyd 1994; Allen 2004).

These concerns cited by Khaleski et al. (2014) and Varley (2019) regarding inconsistent use of uterotonics in clinics illustrated an important context for misoprostol use within Pakistan. Four years after misoprostol was made available over-the-counter in 2011, Shah et al. (2016) assessed the exposure women had to unregulated use of oxytocin and misoprostol on patients before their arrival at the clinic. They conducted their study from 2013 to 2014 at the Timurgara district headquarters hospital, a public healthcare center in KPK, and found the majority of women that received these drugs before arriving did so in an unregulated manner, meaning it was dispensed by individuals who are not legally authorized to do so (Shah et al. 2016). They found that in the majority of these instances, it was because they received it from LHWs or TBAs, the latter of whom are not legally authorized to dispense medications (Ibid). Shah et al. (2016) provide no context for why this was happening, although ethnographic work conducted by Towghi (2014) in Balochistan illustrated LHWs routinely obtained uterotonics as essential medicines and dispensed them because they functioned as a quick fix to remedy obstetric issues they had no capacity to deal with otherwise. Moreover, Shah et al. (2016) highlighted that 90% of the women who received these uterotonics in an unregulated manner showed significant associations with iatrogenic injury, including stillbirth and uterine rupture (Ibid). Evidently, this study also echoed

the irony present in the Varley (2019) study, where misoprostol was shown to be potentially exacerbating maternal health issues in the nation despite its promotion to remedy them (Tribune 2012; Shah et al. 2016).

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