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Are the Intermediators there?
Structural Equation Modeling on Social Determinants of Health
in Eastern Burma

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Abstract

Social inequalities predominantly shape the population's health outcomes. Especially, basic social structures are the fundamental causes of determinants of health. Meanwhile, there are active intermediary factors of the social determinants of health introduced by the Commission on Social Determinants of Health. This study aims to examine those factors, alongside a fundamental cause perspective, that impact health outcomes. In so doing, the research questions are "do the intermediary factors exist between the fundamental causes and health outcomes?" and if these factors exist, "do they have a significant impact on health outcomes?".

This study constructed its theoretical framework to investigate the study's hypothesis in a statistical model with the household survey data of the women of reproductive age in the conflict-affected areas of eastern Burma. The study has performed a rigorous analysis to evaluate the theoretical model in the Structural Equation Modeling.

The study's findings indicate that the intermediary factors – material, psychosocial and behavioral factors, and access to health – endure between the study population's fundamental causes and health outcomes. The fundamental causes explicitly influence health outcomes through the intermediary factors. The correlations of these intermediary factors are statistically significant, and each intermediary factor has a unique and substantial impact on health outcomes.

Keywords: health; women; inequalities; social determinants; structural equation modeling; Burma/ Myanmar

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Abbreviations

CBHO	-	Community-Based Health Organization
CFA	-	Confirmatory Factor Analysis
CFI	-	Comparative Fit Index
CSDH	-	Commission on Social Determinants of Health
EBRMS	-	Eastern Burma Retrospective Mortality Survey
EHO	-	Ethnic Health Organization
FCT	-	Fundamental Cause Theory
HISWG	-	Health Information System Working Group
ML	-	Maximum Likelihood
MMR	-	Maternal Mortality Rate
RMSEA	-	Root-Mean-Square Error of Approximation
SDH	-	Social Determinants of Health
SEM	-	Structural Equation Modeling
SES	-	Socioeconomic Status
U5MR	-	Under-Five Mortality Rate
WHO	-	World Health Organization
WRA	-	Women of Reproductive Age (15 – 49 years)

1. Introduction

Health inequalities are complex differentials in the population's mortality and morbidity. They are inevitable due to biological, social, and environmental factors (Whitehead, 1991; Riley, 2020). However, an individual's social structure, condition, and socioeconomic status (SES) persistently influence health outcomes apart from biological factors (Solar and Irwin, 2010; Lawrence, 2014). Mainly, basic social structures such as age, gender, education, and occupation are the fundamental social causes that predominantly determine the population's health outcomes (Link and Phelan, 1995; Phelan et al., 2004; 2010). In the first instance, policymakers, practitioners, and researchers have explored social structures moving away from biological determinism to understand social inequalities contributing to the social determinants of health (SDH) within the population. However, the fundamental causes themselves are insufficient to develop effective policy and intervention towards the SDH (CSDH, 2008).

Thus, the Commission on Social Determinants of Health (CSDH) developed a theoretical framework together with the intermediary factors of SDH (CSDH, 2008; Solar and Irwin, 2010). These intermediary factors affect different levels of exposure and vulnerability of the individual's health-compromising outcomes (Link and Phelan, 1995; CSDH, 2008). Additionally, the CSDH's framework provides a technical insight highlighting those active intermediary factors of SDH, and they have a high-level political endorsement from the commission (CSDH, 2008; Solar and Irwin, 2010). Therefore, this study gives a substantial interest in these structural determinants of health, namely their intermediary factors introduced by the CSDH from the fundamental cause perspective. Subsequently, the purpose of the study is to examine the existence of the intermediary factors of the fundamental causes that shape health outcomes of women of reproductive age (WRA) in the conflict-affected areas of eastern Burma. So, the research questions that led this study are "do the intermediary factors exist between the fundamental causes and health outcomes?" and if so, "do these intermediary factors have a significant impact on health outcomes?".

First, this study constructed the theoretical framework based on the CSDH's framework alongside the Fundamental Cause Theory (FCT) to investigate in a statistical approach. The framework consists of four intermediary factors – material, psychosocial and behavioral factors, and access to health – that are endorsed by the CSDH because they are the primary contributors to health outcomes. In addition, they serve as entry points to understand the SDH at the micro-level (Solar and Irwin, 2010). Second, this study developed its measurement model driven by the theoretical framework to analyze in the Confirmatory Factor Analysis (CFA) of the Structural Equation Modeling (SEM). The study chose the SEM because it could evaluate the correlations among the hypothetical factors of the constructed theoretical model, which was the case of the study. The source of data is from household survey data of

the WRA in the conflict-affected areas of eastern Burma. Lastly, this study has carried out both descriptive and model fit analyses for generating the findings to address the research questions. The model fit analysis is conducted in a path diagram of the CFA using a unique measurement model through the reliability estimates, model fit indices, and correlation estimates of each factor.

The study population resides in the border states and regions of eastern Burma where there is no proper access to social and health services due to the prolonged civil conflicts. Mostly, women in those areas have no adequate access to maternal healthcare and other essential healthcare services, making their health outcomes even dire (HISWG, 2015). Eventually, the descriptive findings reflect the context of the study population. Regarding the theoretical model, this study statistically reaffirms the existence of the intermediary factors as the proximal factors in the theoretical framework. Furthermore, the findings indicate the correlations of each intermediary factor are statistically significant. In addition, each intermediary factor demonstrates a unique and substantial role in health outcomes, and they are equally crucial for the study population in eastern Burma. Therefore, each factor should be given different levels of attention to tackling their respective issues.

However, on the other hand, it is impossible to estimate the precise direct and indirect impact of these intermediary factors. Therefore, they deserve further investigation on every aspect of social structures and the generalizability of similar empirical data. Especially, it requires tremendous attention to the SDH in recent days because the COVID-19 pandemic has been exacerbating the current situations of SDH at different levels (WHO, 2021a). Nevertheless, this study supplements further evidence of the constructs of the fundamental cause theoretical model fulfilling a knowledge gap of SDH, namely in the context of eastern Burma. In addition, this study attempts to contribute the empirical evidence for SDG3, SDG5, and SDG10 as health, gender, and inequality are prioritized in the Agenda 2030 (UN, 2015).

2. Background of Study Population

This background section provides the situation of the study population at a glance in the specific context of social and health determinants in eastern Burma that is relevant to the interest of the study. This section attempts to introduce the backdrop of social and health disparities of the WRA in the conflict-affected border states and regions of eastern Burma as an overview of the context before presenting the following sections of the study. Burma, also known as Myanmar, becomes one of the least developed countries in the world due to authoritarian rule, economic mismanagement, and civil conflicts driven by excessive extraction of natural resources and social exclusion under military rule. To that end, the country was ranked 147 out of 189 countries in the Human Development Index (OECD, 2018; UNDP, 2020). In addition, severe poverty is widespread across the country, especially among ethnic minority groups (World Bank, 2020).

Moreover, health was a neglected and underinvested area like other human and social development sectors in Burma to address essential social and healthcare services (Risso-Gill et al., 2014; Latt et al., 2016). As a result, Burma's maternal mortalities are incredibly high among the Greater Mekong Sub-region countries. For instance, the Maternal Mortality Rate (MMR) is 282 per 100,000 live births in Burma, the second-highest country among Southeast Asia countries compared to 185 in Lao PDR and 160 in Cambodia (MOHS, 2016; Tang and Zhao, 2017; World Bank, 2019). The main factors of high MMR in Burma come from inadequate access to essential healthcare services fueled by basic social causes of SDH (Blas and Kurup, 2010; MOHS, 2016; WHO, 2019).

Especially in the conflict-affected border states and regions of eastern Burma, systematic social and health disparities are even dire because of the prolonged civil conflicts and the lack of economic and social development (HISWG, 2015; Tang and Zhao, 2017). Mainly, women in these states and regions suffer a double burden of diseases due to lack of adequate access to maternal healthcare, water and sanitation, and persistently presence of communicable and non-communicable diseases (Purkey et al., 2019). Consequently, maternal and infant mortality rates are much higher than the corresponding national averages of Burma. For example, the MMR was 721 per 100,000 live births in 2008, which is almost three times higher than the national figure (282 per 100,000 live births) in the same year. It is crucially important to note that these figures withstand the monotony country setting with longstanding complex humanitarian disasters like Somalia, where MMR is 1,010 deaths per 100,000 live births (HISWG, 2015; World Bank, 2019). With this caveat in mind, this study makes an effort to examine the SDH in a specific context of the WRA in eastern Burma. The following section expresses the purpose and research questions of the study.

3. Purpose and Research Question

The ultimate purpose of the study is to evaluate the research hypothesis that the existence of the intermediary factors of basic social structures significantly impacts health outcomes of the study population of the WRA in the conflict-affected states and regions of eastern Burma. In light of addressing health and social inequalities of the WRA, it is essential to recognize the actual correlations of these intermediary factors of SDH that shape health outcomes because social determinants and health have been known by their means to direct policy of the SDH (CSDH, 2008). Therefore, this study examines the strengths of these correlations between the fundamental causes and health outcomes synthesized by the underlying intermediary factors using a statistical approach. The research questions that directed the study are:

1. Do the intermediary factors exist between the fundamental causes and health outcomes?
2. If so, do these factors have a significant impact on health outcomes?

One should keep in mind that this study does not intend to claim the correlations among these factors whether they contribute positive or negative outcomes to women's health. Without a doubt, there will be more positive outcomes on health in a universal consensus if there is better access to health. Instead, the most important for this study is to signify the intermediary factors in a statistical measurement model through the fundamental cause theoretical framework for health outcomes, which is essential to understand within a specific context, namely the WRA in eastern Burma. In addition, the main reason for selecting this study area is in favor of the household survey data available with the relevant variables to conduct this study. Moreover, this study opted for the specific context of the study population because there was a knowledge gap in the similar approach of SDH of WRA in eastern Burma even though their unfavorable social and health situations have been dire for decades.

4. Literature Review

This section presents the preliminary literature that comes across during the literature review for conceptualizing the theoretical framework of the study to construct a statistical measurement to be evaluated for the study's hypothesis. This relevant literature supplements a typical scope on the SDH, focusing on fundamental structural causes of women's social structures that affect their health and well-being in the context of eastern Burma.

4.1. Social Determinants of Health

Since the 1970s, the researchers have been acknowledging the influences of social determinants that have a significant impact, either advantage or disadvantage, on health outcomes (Lawrence, 2014). However, the complexity is a cause of understanding health outcomes. When it considers biological and social factors, assessing health outcomes becomes more complex (Solar and Irwin, 2010). Especially, social inequalities such as income inequalities, unequal access to resources, healthcare, and education shape different outcomes on health and well-being of the population (Blas and Kurup, 2010; Solar and Irwin, 2010; WHO, 2017). The term "social determinants of health" refers to social contexts, norms, and structures that strongly shaped health outcomes (CSDH, 2008). It has been more and more pronounced over the past decades because biological factors are not the sole influence on health outcomes (Link and Phelan, 1995). For example, Bonita et al. (2006) argued that social factors such as social structures, positions, and SES could undermine the health and well-being of the population to obtain a fair opportunity of their entitled health potential. The levels of severe risk factors for diseases can be affected by unfavorable social structures and conditions that contribute to adverse health outcomes (Bonita et al., 2006; CSDH, 2008). Meanwhile, people will have different health outcomes due to biological, social, and environmental factors. There is no panacea to cure all these inequalities of health outcomes.

It is noteworthy that the high-level political body, the CSDH of the WHO developed the theoretical framework of SDH, especially for the intermediary factors (CSDH, 2008). The CSDH has been promoting its social determinant framework and provides a solid political endorsement on the approach of its framework because the commission is the main producer of the context and research in that field (CSDH, 2008; Blas and Kurup, 2010; Solar and Irwin, 2010). Particularly for this reason, this study investigated the political and technical documents that lead the policy on SDH. Not surprisingly, this study acknowledged that the commission is the leading producer of the most vital political and technical documents of SDH apart from individual publications across different academic journals. Therefore, a series of the CSDH's documents this study reviewed are: *"health equity through action on the social determinants of health"* (CSDH, 2008); *"equity, social determinants, and public health programmes"*

(Blas and Kurup, 2010); and *"a conceptual framework for action on the social determinants of health"* (Solar and Irwin, 2010). This study thoroughly investigated these technical documents to construct the study's theoretical framework. Even though this literature review provides an in-depth understanding of SDH, this study extended its literature review on gender in determinants of health, especially for women, because the study population of the study is the WRA in eastern Burma.

4.2. Gender in Determinants of Health

According to Skolnik (2016), a woman's health relates to both sex and gender. Sex means biological differences born as a person, whereas gender is social differences. From a biological perspective, women have a considerable volume of unique natural risks from iron-deficiency anemia to pregnancy-related complications that can cause unfavorable health outcomes (Skolnik, 2016). From a social perspective, the systematic unequal distributions of social structures for women pose more dire consequences of health (Solar and Irwin, 2010). Vlassoff (2007) coined unequal distributions of social stratification go even worse for women's health. Significantly, the absence or lack of social structural causes such as education and occupation of women utterly constrain their access to essential healthcare services (Skolnik, 2016; Goicolea et al., 2017). With these perspectives of SDH, this study explored social theories that could facilitate constructing the theoretical framework in the specific context.

4.3. Searching for a Theoretical Ground

There is the remarkable emergence of social approaches in the later twentieth century related to health. They conceptualized a dual meaning which refers to promoting or undermining the health status of individuals and population by the social phenomenon. Furthermore, the phenomenon distributes the equal processes of social factors across groups in society (Regidor, 2006; CSDH, 2008). However, these theoretical concepts remain considerably ambiguous. Many of these theories limit the impracticality of simultaneously defining social inequalities to the determinants of health (Regidor, 2006). These ambiguities make the disagreements among and between policymakers, practitioners, researchers, and the public regarding reducing social determinants (Culyer, 2001; Solar and Irwin, 2010). For example, Culyer (2001) argued that no single theory could treat social inequalities in health. However, fortunately, there is a common accord that unequal social distributions are systematically associated with the health and well-being of the people, no matter where they live or work, and tackling the SDH is the fairest approach to enhance health for all people in society (Culyer, 2001; Bonita et al., 2006; Solar and Irwin, 2010; Blas and Kurup, 2010).

Furthermore, there is a growing trend of literature that confirms that multiple disease outcomes subsequently influence health inequality, and it is affected by these health outcomes through numerous

risk factors. Mainly, for the past decades, a significant and compelling series of empirical evidence accumulates that social structures posit an influential role – aside from biological factors – shaping health disparities across the extensive ranges of settings and populations (Haas, 2006; Braveman and Gottlieb, 2014). Lieberman (1985 cited in Phelan et al., 2010) introduced the concept of recognizing basic social structures as fundamental causes of health differences. Later, House et al. (1990; 1994 cited in Phelan et al., 2010) have applied the theory of fundamental causes for the first time to determine the association between social structures and health outcomes.

Link and Phelan (1995) argued that an individual's social structures predominantly shape the persistent mechanism that leads towards social inequality in health as the fundamental causes in access to serviceable social resources for health advantage (Phelan et al., 2010). In the meantime, it is essential to acknowledge that social factors and health outcomes have dynamic and complex relationships that are not simple. (Braveman and Gottlieb, 2014). Therefore, Phelan et al., 2010 coined that the fundamental causes and their mediators should be served the same level of attention given today and beyond by the global health community as the entry points for reducing social determinants of women's health apart from biological factors (Phelan et al., 2010; Braveman and Gottlieb, 2014). Thus, this study decided to choose the fundamental cause perspective as the theoretical ground to construct the theoretical framework with the dynamic and complex associations across social factors.

Finally, numerous studies have reported social influences on population health outcomes, namely social determinants against women's healthcare utilization (Krieger et al., 2010; Jayasinghe, 2015). The earliest literature this study reviewed about women's SDH was *"the framework of analyzing the determinants of maternal mortality"* by McCarthy and Maine (1992). Also, Babalola and Fatusi (2009) researched the determinants of maternal healthcare utilization in Nigeria. In addition, there are two studies conducted with a similar scope of this study: *"the socio-economic determinants of maternal health care utilization in Turkey"* by Celik and Hotchkiss (2000) and pregnant women's psychosocial factors and SES indicators related to household food security by Laraia et al. (2006). Particularly from Burma, a limited number of publications existed for the SDH, namely for women in the context of eastern Burma.

The most relevant article published is health inequity to access health service in northern Burma by Tang et al. (2017). However, these studies applied different theories and methods, which were not the same as those applied in this study. Similar literature available in terms of both scope and methodology is that Kiani et al. (2020) published the SEM of psychosocial determinants of health in women's reproductive decision making in Iran. However, it focuses only on the psychosocial factor. In contrast, unlike others, this study has more comprehensive social factors approaching the SDH endorsed by the

CSDH from the fundamental cause perspective using a robust statistical technique. As no publication is available yet for these kinds of studies, namely in the specific context of eastern Burma, this study claims to be the first research of the WRA in the conflict-affected areas of eastern Burma.

Most importantly, this study acknowledges tremendous attention to the SDH because the existing situation of SDH has been disproportionately affected and exacerbated by the COVID-19 pandemic at the individual and national, regional, and global levels (WHO, 2021a). In addition, the Agenda 2030 prioritized health and well-being, gender, and inequality as the most crucial issues to be tackled in its agenda. Therefore, this study contributes the empirical data for SDG3 to ensure and promote healthy lives and well-being of women, namely Target 3.1, 3.7, and 3.8, and SDG5 to empower gender equality, and SDG10 to reduce social determinants (UN, 2015). Please see the details of the theoretical framework in Section 4 and the methodological discussion about the SEM in Section 5.

5. Theoretical Framework

As aforementioned, health inequalities are inevitable and unavoidable, rather complex differentials in mortality and morbidity among the population (Whitehead, 1991; Riley, 2020). Biological determinism historically framed health inequality that an individual's characteristics and behavior cause health differences fueled by their biological attributes such as genetic and microbiology factors (Gericke et al., 2017). Biological determinism exclusively recognizes health differences as natural causes, ignoring social and cultural factors (Buchanan, 2010; Vinney, 2019). However, besides biological determinants, many researches have been acknowledging that social factors persistently influence health outcomes (Marmot et al., 2008; Antonovsky 1967 cited in Phelan, 2010).

There are comprehensive and widely observed associations between an extensive range of health outcomes and measures of an individual's social structure, condition, and SES. Typically, they are in the forms of wealth, knowledge, prestige, and power that impact health (Link and Phelan, 1995; Braveman and Gottlieb, 2014). Health inequalities link to access to resources for the use of preventing risks or minimizing the disease when it occurs, and subsequently, the associations of basic social structural causes and health outcomes are existed and reproduced over time (Link and Phelan 1995; Phelan et al., 2010; Riley, 2020). However, many theories of health determinants stuck with differentiating among segmentations of boundaries or population through documenting the attributions of social disparities in gender, ethnicity, and SES (Riley, 2020).

5.1. Fundamental Cause Theory

Among various social and health theories, the FCT developed by Link and Phelan becomes the most developed theoretical model. The theory attempts to disentangle the puzzle of why social structures in health persist and how they produce health inequality in defiance of medical technology and disease elimination (Link and Phelan, 1995; Phelan et al., 2004). In particular, the FCT attempts to treat social structures in health by determining their structural factors because persons with high SES will likely use their resources to prevent diseases, seek care, and engage in healthy behaviors for their health advantage. However, in contrast, persons with low SES will have some extent of reluctance against their health-enhancing behaviors (Link and Phelan, 1995; Riley, 2020). To that end, the rich will be rich, and the poor will be poor, which becomes long-term negative consequences of social structures in health over generations.

In the meantime, the FCT itself has limitations to determine some kind of social determinants because they have a wide range of open and multifaceted factors as aforementioned. Therefore, it cannot ignore different determinants linked to environmental and biological factors beyond social perspectives

(Lawrence, 2014). However, despite that, the FCT is an excellent approach that acknowledges social structures, including their structural factors such as age, gender, ethnicity, and SES as fundamental causes influencing health outcomes through multiple proximal risk factors (Link and Phelan, 1995; Phelan et al., 2004; 2010; CSDH, 2008). Primarily, these proximal factors, herein the intermediary factors, play a causal role in the SDH because they are the entry points to understand micro-level determinants based on the individual's respective social structures through different exposure and vulnerability to health-engaging conditions as these factors strongly connect to each other (Solar and Irwin, 2010; Irwin et al., 2017).

Irwin et al. (2017) highlighted that many social factors affect population health outcomes, but not all factors are equally important. The CSDH has selected to focus on fundamental causes of social structural factors and four main intermediary factors as the active influencers that shape health outcomes of the population (CSDH, 2008; Solar and Irwin, 2010). From practitioners' view, it is essential to identify and determine the micro-level perspective of these factors to tackle the SDH through more micro-level targeted interventions. Meanwhile, these social factors are also crucial for policymakers to shape and formulate effective micro-level health policies (Irwin et al., 2017). The empirical evidence has proved that it is an entry point to engender long-lasting reductions in SDH because the only macro-level policy of reducing poverty itself does not help to improve widespread and persistent SDH (Braveman and Gottlieb, 2014).

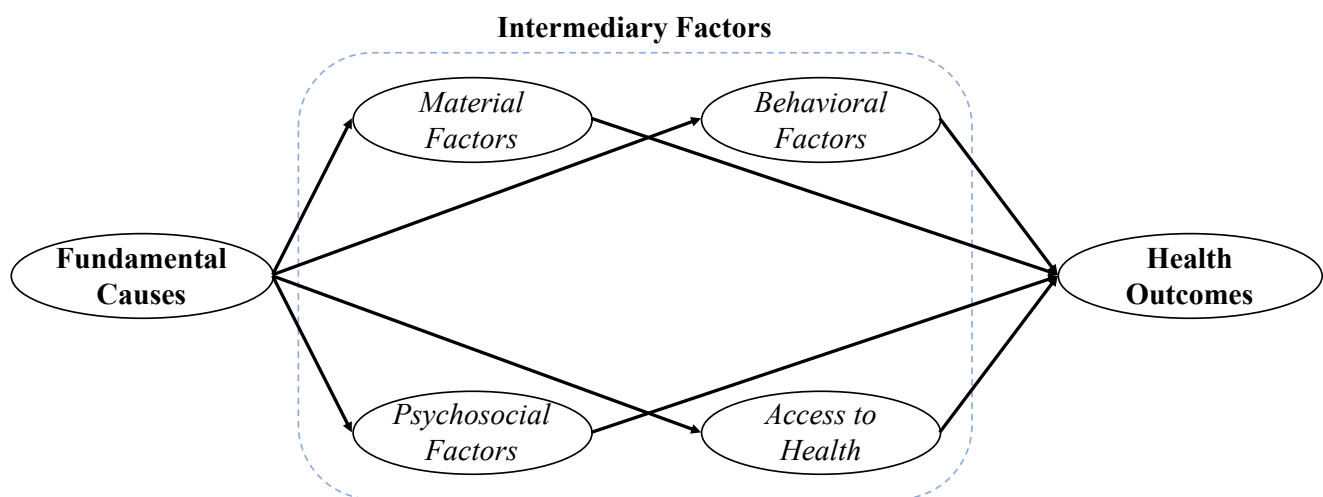


Figure 1: The theoretical framework of the study

Source: The author's own compilation, adapted from Solar and Irwin, 2010, p. 48

This study developed its theoretical framework (Figure 1) based on the CSDH's framework alongside the fundamental cause perspective. The figure demonstrates, from left to right, the fundamental causes of the social structures of the people directly affect the intermediary factors such as material, behavioral,

psychosocial factors, and access to health that individual's exposure and experience at the micro-level. Then each intermediary factor impacts health outcomes at the macro-level. In an overview, the fundamental causes that subsequently influence health outcomes throughout the intermediary factors as the proximal mediators (Solar and Irwin, 2010; Irwin et al., 2017). This study describes each component of the theoretical framework below, highlighting its contribution to the SDH.

5.2. Fundamental Causes

The term “fundamental cause” refers to the structural factors that generate social structures and the result of individuals' social position in which part of the CSDH's framework. According to Graham's notion, the structural factors shape “the distribution of downstream social determinants”, and they can refer to the term “intermediary determinants of health”. It will be discussed in the following subsections of the intermediary factors (Solar and Irwin, 2010). In addition, the structural factors generate and reinforce social class divisions of individual social position within the different structures of power, prestige, and access to resources. Especially, age, gender, ethnicity, and SES are the proximal indicators as the most critical structures of the resultant SES (CSDH, 2008; Solar and Irwin, 2010).

5.2.1 Gender

Regarding age and gender, girls and women specifically in reproductive age (15 – 49 years) are more vulnerable to systematic discriminations in terms of their access to power, prestige, and resources. Moreover, these discriminations immediately and brutally affect their health and well-being (CSDH, 2008; Marmot et al., 2008; Blas and Kurup, 2010; Skolnik, 2016). In addition, the basis of social divisions and discriminatory practices apply based on racial and ethnic differences, especially women who belong to a marginalized ethnic group. They face systematic racial discrimination and exclusion in societies for every aspect of their entity, opportunity, and trajectory along the life course (CSDH, 2008; Irwin et al., 2017). On account of those discrimination and exclusion, the marginalized ethnic women's health outcomes and indicators are drastically worsening compared to some privileged groups or populations on averages (Blas and Kurup, 2010; Solar and Irwin, 2010).

5.2.2 Education

Furthermore, education is an indicator to measure an individual SES frequently. For example, the level of education scores by years of completed education or the highest education achieved such as primary or secondary or college and university (CSDH, 2008; Braveman and Gottlieb, 2014). It is important to note that the knowledge and skills acquired from education completed influence a person's cognitive functioning. It affects the level of more receptive to health education messages and enables them to communicate or access appropriate health services (Solar and Irwin, 2010). However, it should

bear in mind that assessing levels of education achieved or the number of years in school could not mean the quality of the educational experience. Instead, it means to a person's knowledge, cognitive abilities, and analytical competencies with the role of education, namely engaging in health outcomes (CSDH, 2008; Blas and Kurup, 2010).

5.2.3 Occupation

In addition, the most usual approach to classifying people within their societies is their occupations and positions in the labor market, grouping them into different social classes. In the meantime, the occupation has a stronger relationship with health because it produces income which directly contributes material resources for health (CSDH, 2008; Blas and Kurup, 2010). In that effect, Solar and Irwin (2010) highlighted occupations are social standings relates to health outcomes. The higher standings can afford certain privileges such as access to education, better healthcare, and more housing amenities. However, these high-standing conditions are generally inaccessible for women and girls because social determinants like gender discriminate their abilities to access respected and formal occupations (Solar and Irwin, 2010). On that account, most women and girls are either unemployed or working in precarious and informal occupations (CSDH, 2008). To that end, these indicators of structural factors such as age, gender, ethnicity, education, and occupation as the fundamental causes shape the intermediary factors. (CSDH, 2008; Irwin et al., 2017).

5.3. Intermediary Factors

As aforementioned, the CSDH introduced these four intermediary factors – material, behavioral and psychosocial factors, and access to health – as the active predominant influencers of health in its technical framework (CSDH, 2008; Solar and Irwin, 2010). There is an extensive political endorsement from the commission to tackle these factors coupled with the structural factors of the fundamental causes of SDH. Notably, the formations of underlying fundamental causes shape these intermediary factors throughout determining and controlling different levels of exposure and vulnerability to the individual's health-compromising conditions (CSDH, 2008; Solar and Irwin, 2010). In addition, these intermediary factors are causally connected to the SDH linking to a wide range of a person's standings, such as health-related behavioral and physiological factors (Lawrence, 2014, Irwin et al., 2017).

5.3.1. Material Factors

The material factors are associated with the physical environment, including housing and consumption potential (Solar and Irwin, 2010). An individual's social resources connect to the quality of these material circumstances for health and exposure to health risks (Link and Phelan, 1995; Phelan et al., 2004). For example, one of the material factors of SES is to measure housing characteristics through

several housing amenities that directly impact an individual's health, such as owning a latrine and access to drinking water. These housing amenities are benchmarks of material factors associated with specific exposures to diseases (Solar and Irwin, 2010; UNICEF and WHO, 2008). For instance, a household with no adequate access to sanitation such as drinking water and latrine may lead to increased risks of diseases and infection like diarrhea and cholera.

5.3.2. Behavioral Factors

Social differences in behaviors directly connect to health which can be either promoting or damaging health from the perspective of SDH. Thus, behavioral factors are manifestly important in the intermediary factors of health (Solar and Irwin, 2010). Mainly, health-enhancing behaviors are unevenly distributed based on fundamental causes, and they can appear as an essential factor of health outcomes (Link and Phelan, 1995; Phelan et al., 2004; 2010). Health-seeking behavior is a part of the broader concept of health behavior that individuals undertake, whether action or inaction, to perceive themselves to solve a health problem or to be ill for the mean of seeking appropriate remedies, either person or materials (Skolnik, 2016). Health outcomes – both individual and population morbidity and mortality – can be worsened due to inappropriate health-seeking behavior (Latunji and Akinyemi, 2018).

5.3.3. Psychosocial Factors

The psychosocial factors comprise a person's stressful living circumstances, no adequate social support, and the degrees of experiences and life situation. These factors may vary between different social groups discerning unpleasure, depression, and hopelessness for coping in their day-to-day lives (CSDH, 2008; Irwin et al., 2017). The SES of individuals may become a cause of long-term stress that engages with stressful and adverse life events. For example, a mediator of the psychosocial factors is household food insecurity that explicitly exacerbates social status and depression at individual and household levels (Willis and Fitzpatrick, 2016). Substantially for disadvantaged and marginalized groups, they have more vulnerability in encountering more stress, uncertain circumstances, and depressive symptoms in their life due to household food insecurity (Laraia et al., 2006). Consequently, food security plays a crucial position in a person's physical health outcomes through dietary intake and psychosocial status that causes health outcomes (Pangaribowo et al., 2013). These psychosocial factors affect the long-term consequences of SDH (CSDH, 2008; Solar and Irwin, 2010).

5.3.4. Access to Health

Solar and Irwin (2010) argued that the health system could be considered an additional relevant intermediary factor, and there are various approaches to elucidate the functioning and the SDH. The

health system's position may be more pertinent to access to health assimilating different people's exposure and vulnerability (Solar and Irwin, 2010; WHO, 2021b; Irwin et al., 2017). Access to health commonly refers to its four dimensions: availability, accessibility, acceptability, and affordability, which enables the population's access to healthcare services and enhancing healthcare coverage. Also, adequate access to health services promotes maintaining and improving population health (Peters et al., 2008; WHO, 2021b). However, on the other hand, access to healthcare has no definitive account for different social patterning of health outcomes. Despite that, access to health in a health system plays a crucial position in contributing individuals' differential consequences of illness in their life-course (Solar and Irwin, 2010; WHO, 2021b).

5.4. Health Outcomes

Taken together, the fundamental causes of the social structures and the intermediary factor imperatively impact the population's health outcomes (CDSH, 2008; Solar and Irwin, 2010). Meanwhile, historical and political contexts and the demographic composition of the societies affect the impact of epidemics and emergencies on population health (Braveman and Gruskin, 2003). Therefore, measuring health outcomes is complex because of different aspects of influences. However, health outcomes across different population groups are a measurable impact on health that encompasses comparative health status and indicators as a benchmark of the progress of the society. Mainly, health outcomes can be measured through these social factors as proxy indicators at the macro-level and micro-level (CDSH, 2008; Solar and Irwin, 2010). Finally, the substantial empirical evidence proves that capturing health outcomes in general measures is an effective manner to estimate the population's health outcomes such as life expectancy, mortality, morbidity, and self-reported health like physical health and self-esteem (Solar and Irwin, 2010).

In conclusion, the relationships between the fundamental causes, the intermediary factors, and health outcomes are very sophisticated, dynamic, and very large. Despite the concerted efforts to eliminate the SDH, the fundamental causes and the intermediary factors have persistently remained at both micro and macro levels in various forms, short-term and long-term, in different settings. (Whitehead, 1992; Lawrence, 2014; Phelan et al., 2004; Riley, 2020). Therefore, there is no panacea to tackle all these structural causes and intermediary factors. Moreover, it is impossible to identify what exact factor is the leading cause to other indeed in each specific context (Blas and Kurup, 2010; 2017). However, understanding these relationships between the fundamental causes, the intermediary factors, and health outcomes through the FCT enables a comprehensive approach to fulfill the purpose of the study. Please see detailed methodological discussions about the statistical method, data source and process, ethical consideration, and limitations in the following section.

6. Methodology

Throughout these theoretical backgrounds described above, this study has selected a statistical technique called the SEM to evaluate the study's theoretical framework. Notably, many studies have used regression analysis as a conventional method to analyze data, especially in health research. The regression analyses examine the causal relationships between dependent and independent variables of the available or collected data (Rogerson, 2001). However, this study has the complexity of the hypothetical model that consists of the fundamental causes, the intermediary factors, and health outcomes. They will be measured by the proximity variables available, which are relevant to each factor. However, some variables represent at the micro-level, whereas other variables are the macro-level indicators such as the patterns of health-seeking behaviors and practical constraints. And also, they have different influences between independent and dependent variables that go into one direction to another, which not known how to measure. Therefore, this study requires measuring both micro and macro levels in the theoretical model and examining the hypothetical relationships across the model's factors, which is difficult to measure in the regression analysis.

Fortunately, that is the SEM's ability to measure the estimation of the hypothetical relationships among the underlying factors at different levels in a constructed model (Bollen and Pearl, 2013). Also, it can estimate the strengths of factors within the theoretical model (Hays et al., 2005). Remarkably, the SEM is well-known for its exclusive features of managing complex correlations among variables of the theoretical model (Rahman et al., 2015). As a result, the SEM has been accepted as one of the most pronounced statistical techniques to assert theoretical models by the quantitative studies of the multi-discipline (Bowen and Guo, 2011; Rahman et al., 2015). Significantly, the use of the SEM multiplies in the healthcare sector due to the availability of user-friendly statistical software such as AMOS, EQS, and Mplus (Hays et al., 2005; Blunch, 2017). Therefore, this study has adopted the SEM as a conventional technique that fulfills the requirements of the study.

6.1. Structural Equation Modeling

The SEM is a collected instrument to analyze the correlations between the hypothetical factors driven by the theoretical model (Rahman et al., 2015). The main advantage of the SEM is to construct the theoretical model with the hypothetical factors for large sample sizes (Bowen and Guo, 2011; Berkout et al., 2014). Moreover, it commonly serves as a general technique to prove the theoretical model throughout the estimated values of the observed variables (Bowen and Guo, 2011). The term SEM can often refer to the CFA and the Exploratory Factor Analysis (EFA) (Bowen and Guo, 2011; Berkout et al., 2014). It can also apply in both the confirmatory mode known as the CFA to test the model and the EFA to build a model (Rahman et al., 2015).

6.1.1. Confirmatory Factor analysis

The CFA is an extraordinary approach of the SEM that allows testing complex multiple-factor models across cross-sectional and longitudinal data of the studies. The CFA's rule of thumb is that it is necessary to have a prior theoretical model before any data process and analysis (Bowen and Guo, 2011; Berkout et al., 2014). Significantly, most experts of this technique suggest having a theoretical model, also called the measurement model, for conducting data analysis. For example, Bowen and Guo (2011) recommend having a theoretical model which can guide to perform a rigorous SEM analysis to ensure all the hypothetical relationships in a more visible form of the model (Hays et al., 2005; Bowen and Guo, 2011; Berkout et al., 2014). Therefore, this study has constructed its prior hypothetical model as the theoretical framework (Figure 1) introduced earlier in the theoretical chapter.

In the CFA, the constructed theoretical model can specify how to manifest variables related to the latent variables and how latent variables correlate with one another. The latent variables are the constructed variables to be measured and observed in the study. For example, this study assumes that the intermediary factors – material, psychosocial and behavioral factors, and access to health – impact health outcomes. Therefore, they are placed in the latent variables to measure in the study (Rahman et al., 2015; Blunch, 2017). On the other hand, the manifest variables can also be described as observed and indicator variables. The manifest variables come from the data through the participants' responses in research or survey, and they support measuring the latent variables of the study. For example, women's education levels and occupations are the manifest variables obtained from the study's data to measure the fundamental causes' latent variable. The correlation of each manifest variable with its respective latent variables can be indicated as a factor loading (Rahman et al., 2015).

With the specified latent and manifest variables, the CFA can verify the fitness of the measurement model through different estimation techniques (Widhiarso and Kozeny, 2013; Blunch, 2017). Additionally, the CFA simultaneously assesses direct and indirect impacts of one variable to multiple variables (Bowen and Guo, 2011; Widhiarso and Kozeny, 2013; Blunch, 2017). The CFA can also specify and measure the significant estimates of the correlations among the latent variables and their manifest variables of the measurement model using the standardized scales (Hays et al., 2005; Bowen and Guo, 2011). Lastly, the CFA commonly formulate the model's estimates by linear regression equations and visually demonstrated by path diagrams (Hays et al., 2005).

6.1.2. Path Diagram

Generally, many studies presented their SEM models in path diagrams (Rahman et al., 2015). *"The path diagram is a summary of theoretically suggested relationships among latent variables and indicator variables, and directional and nondirectional relationships among latent variables"* (Bowen and Guo, 2011, p. 5). A typical path diagram has three main geometric figures – ellipse, rectangle, circle – and arrows suggesting causal influences between latent variables, manifest variables, and errors of the model (Bowen and Guo, 2011; Rahman et al., 2015).

- Latent variables are in ellipses (Rahman et al., 2015; Blunch, 2017).
- Manifest variables are in rectangles (Rahman et al., 2015).
- Arrows present the correlations between latent variables, manifest variables, and errors in a path diagram (Rahman et al., 2015).
- Errors are in circles. They are unknown causes of the latent and manifest variables (Rahman et al., 2015).

All in all, the SEM, namely the CFA, provides a comprehensive statistical technique to measure the theoretical model of the study through its fundamental and intermediary factors towards health outcomes in the specific context of women's health in eastern Burma. Therefore, this study designed a measurement model in a path diagram guided by the theoretical framework for model fit analysis. The path diagram of the study can be observed in Section 6.3 after the next section of the source of the study's data.

6.2. Source of Data

This section is about the study's data from the Eastern Burma Retrospective Mortality Survey (EBRMS) collected by the Health Information System Working Group (HISWG) in 2013. The detailed study design, sample size, data collection, and selection criteria are as follows.

6.2.1. Study Design and Sample Size

The EBRMS 2013 aimed to estimate mortality and morbidity in each coverage area of the HISWG's members – ethnic health organizations (EHOs) and community-based health organizations (CBHOs) – but no limits to the additional interests of demographics, migration, maternal and child health, general health and well-being, food security and nutrition, malaria, water and sanitation, human right violations, and access to health (HISWG, 2015; Parmar et al., 2015).

Regarding the study design, the EBRMS adapted a two-stage household sampling method to develop the sampling frame and estimated the under-five mortality rate (U5MR) in each EHOs and CBHOs' coverage area. HISWG has constructed the sampling frame based on the village-level population lists of its members that they collected last year. The population list consisted of 456,786 people (87,841 households), and the average household size was 5.2 people per household. Mostly, these populations were ethnic minorities and internally displaced people, and they resided in Karen State, Karenni State, Mon State, Shan State, Bago Region, and Tanintharyi Region (Figure 2). The sampling method of the EBRMS has selected the villages as clusters using population proportional to size (PPS) as the first stage. After that, the enumerator randomly selected 30 households in each cluster using proximity sampling during field data collection as the second stage (HISWG, 2015; Parmar et al., 2015).

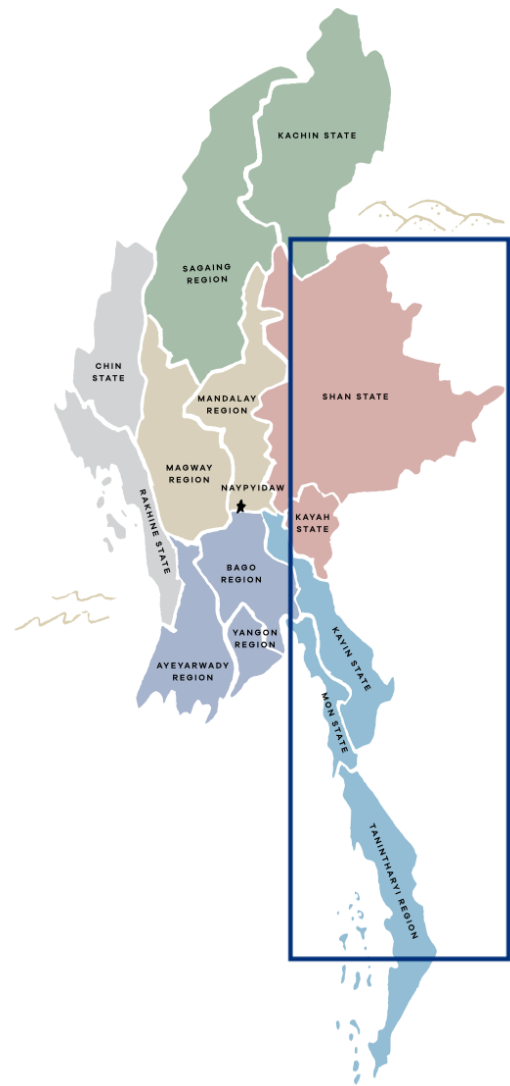


Figure 2: The map of the study area

Source: The author's own compilation, adapted from HISWG, 2015 and FOI, 2018

For the sample size, HISWG has stratified the population into five administrative boundaries of the EHOs and CBHOs' coverage areas and calculated the sample size by oversampling 10% for non-response or missing data. The calculation suggested that the sample size of 1350 households in each coverage area allows for the precision of U5MR. As a result, HISWG finalized the sample size with a total of 6,759 households (225 clusters) to collect the data in the EBRMS 2013 that makes it possible to estimate overall U5MR in the areas of the EHOs and CBHOs. However, due to the enumerators' security concerns during data collection, it was only able to collect 219 clusters of 6,620 households in eastern Burma (HISWG, 2015; Parmar et al., 2015).

6.2.2. Data Collection

HISWG has developed the survey questionnaire (Annex 11.1) in English and four local languages: Burmese, Sgaw Karen, Mon, and Shan. For field implementation, HISWG has recruited 80 enumerators from its members' networks. First, the enumerators attended a two-week hand-on-learning training conducted in their local language covering house sampling method, interviewing

procedures, obtaining informed consent, handling adverse events, and using global positioning units (GPS). After that, all enumerators collected the data using the survey questionnaire from July to September 2013 in the states and regions where they can securely and physically access to collect household data in eastern Burma. (HISWG, 2015; Parmar et al., 2015).

6.2.3. Criteria of Participation

In the EBRMS, the enumerators requested the head of household (either man or women) to participate in the survey. If there was no head of household available, the enumerators selected the following order of household members: WRA with the youngest children under-five; WRA currently pregnant; and lastly, oldest WRA. Once the participants consented, they answered the first 78 survey questions through a verbally informed consent process (HISWG, 2015; Parmar et al., 2015). After that, the enumerators continued interviewing all WRAs in the same household who had an under-five child or currently pregnant at the time of the study for an additional 19 maternal health questions to complement pregnancy-related data (HISWG, 2015). Furthermore, HISWG developed the interview protocol that allows the respondents to refuse or decline their participation in the survey. Also, they had the rights to withdraw from the study at any time. In addition, HISWG excluded the questionnaires noted with the following conditions: either refused or uncompleted due to distress or refused to continue; not consented by the head of household; and not at home (HISWG, 2015; Parmar et al., 2015).

For this study, the selection criteria are the WRA who participated in the EBRMS 2013 and responded to the following sections of the questionnaire in the EBRMS 2013: respondent profile (Section 1), general health and wellness (Section 5), healthcare access and practices (Section 6), water and sanitation (Section 7), food security (Section 8), and maternal health (Section A, B, and C) (Please see the questionnaire at Annex 11.1). According to the criteria, the study extracted a subset of women's data from the main dataset of the EBRMS.

6.3. Data Process and Analysis

Before starting data analysis, the data (n = 1882) is imported into IBM® SPSS® Version 27 to clean and recode all variables for data analysis (IBM, 2020a). In addition, "don't know," "not applicable," "refused," and "missing" of each variable were recoded to "system missing" as listwise deletion to eliminate incomplete data (Nicholas, 1991; Hammett et al., 2015). The recoding process attentively undertook to avoid possible gaps of data through the initial checking and correcting procedure because it is impossible to replace those values with some kinds of assumption in each variable on every

occasion. Additionally, the study created several new dummy variables to measure the model fit (Nicholas, 1991; Hammett et al., 2015; Arbuckle, 2020). For example, drinking water sources are recategorized into a new variable according to WHO's definition (UNICEF and WHO, 2008). Henceforth, this study has performed two parts of data analyses: descriptive analysis and model fit analysis, to answer the research questions of the study. The detailed procedures are as follows.

6.3.1. Descriptive Analysis

In the first part, this study analyzes the overall characteristics of the study population using IBM® SPSS® to generate the descriptive statistics of each factor (Nicholas, 1991; Hammett et al., 2015). The total sample is 1882, as stated above. However, it should bear in mind that there are sample size changes for some indicators for two reasons. First, some skip patterns in the questionnaire that the respondents did not require to answer specific questions. For example, if a person did not seek healthcare, then that person did not have to respond where they sought care and how they went there (Annex 11.1). The second reason is about missing data that exist within variables. However, there was no further treatment for missing data in this study because any variable in the dataset does not have more than 5% of missing data (Tabachnick and Fidell, 2007 cited in Berkout et al., 2014). The tables in Section 7.1 accordingly present the distributions of the study population through fundamental causes, material factors, behavioral factors, psychosocial factors, access to health, and health outcomes.

6.3.2. Model Fit Analysis

Firstly, the path diagram of the study model is constructed based on the theoretical framework of the study. After that, the analysis evaluated the model and its data ($n = 1882$) using IBM® SPSS® Version 27, and IBM® SPSS® AMOS (Analysis of Moment Structure) Version 27 for data reliabilities, model fit indices, and the factor loadings between the fundamental causes, the intermediary factors, and health outcomes (IBM, 2020b). The initial stage of the model fit analysis evaluated the data under identical conditions for its reliability using reliability estimates. The reliability analysis evaluates the reliability of the total scale and subscale values from the data for internal consistency and to choose the most suitable manifest variables to construct the measurement model (Black et al., 2015; Blunch, 2017). Please see the details of the reliability analysis in Section 7.2.1.

After the reliability analysis, the study has structured the measurement model in a path diagram (Figure 3) with its latent variables, manifest variables, and errors as the extended diagram of the theoretical framework of the study (Bowen and Guo, 2011; Rahman et al., 2015; Blunch, 2017). In the diagram, the latent variables of the fundamental causes, the intermediary factors, and health outcomes are back

by their respective manifest variables in the measurement model. First, the latent variable of the fundamental causes connects to the four intermediary factors – material, behavioral and psychosocial factors, and access to health – in the separate latent variables with their respective manifest variables. Then each latent variable of four intermediary factors links to health outcomes with its manifest variables as same as the theoretical framework.

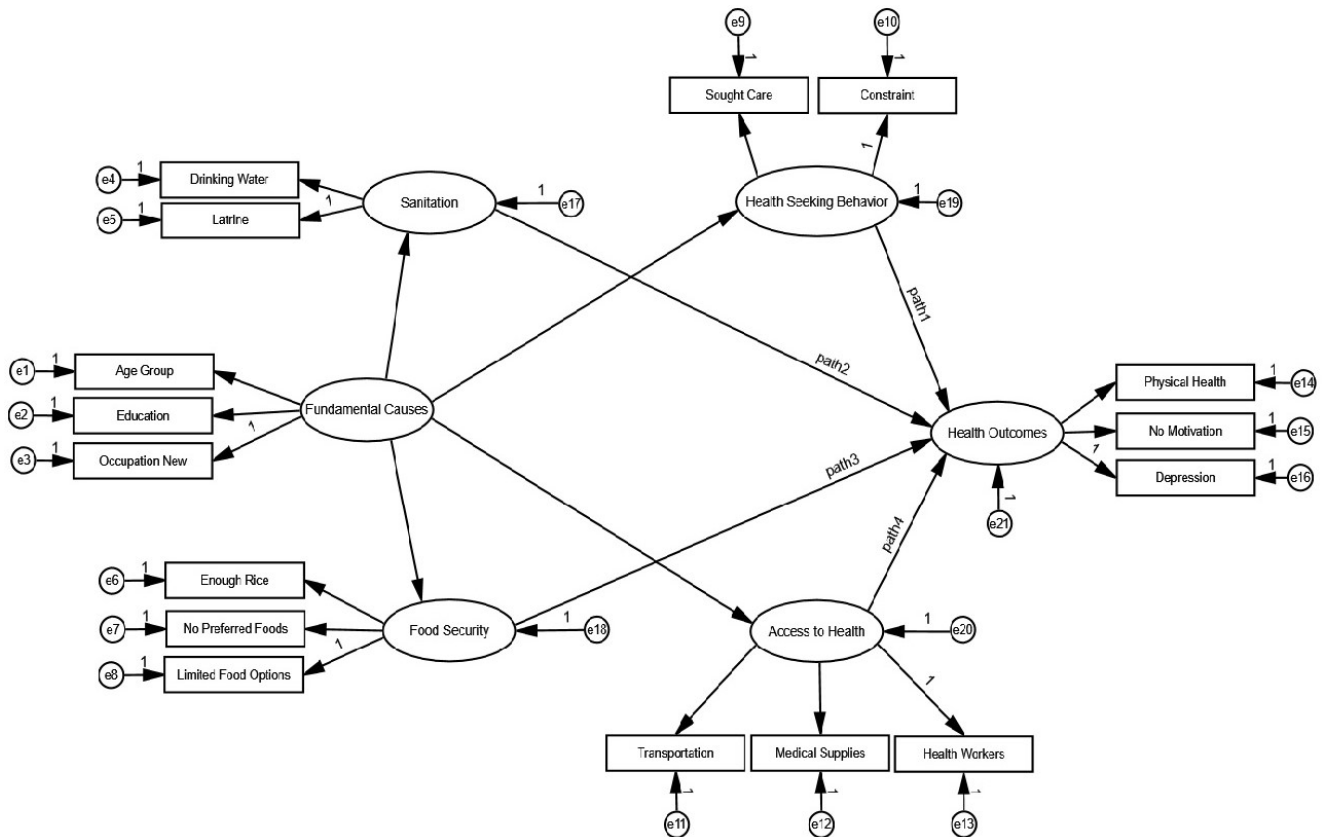


Figure 3: The path diagram of the study

Source: The author's own diagram, adapted from Solar and Irwin, 2010, p. 48

This study has named the correlations between each intermediary factor and health outcomes as "path1", "path2", "path3", and "path4" to evaluate their significant levels in the measurement model to address the research questions (Bowen and Guo, 2011; Widhiarso and Kozeny, 2013; Blunch, 2017). Throughout the model fit analysis, the findings suggest the model's fitness by evaluating the factor loadings of those factors through each latent variable in the path diagram (Bowen and Guo, 2011; Berkout et al., 2014; Blunch, 2017). Moreover, several fit indices can evaluate the overall model fit through a standard estimation. In addition, the estimates of each factor loading can be tested whether they are statistically significant or not with standardized values in the CFA (Kline, 2016; Blunch, 2017). The findings of both reliability and model fit statistics reveal in Section 7.2.

6.3.3. Variable Measures

In the measurement model of the study, the following variables are a set of manifest variables for each latent variable of the factors based on the availability of data from the EBRMS 2013. This study chose them by their valid reliability scales after thoroughly scrutinizing each variable in the reliability analysis. The details of these variables and their values are in Annex 11.1 and 11.2.

- The three manifest variables of the “fundamental causes” are age group, education, and occupation. Age is grouped by specific intervals of WRA; Education is categorized by highest education completed from none to above high school; Occupation is reclassified by formal and informal works such as farmer, worker, vendor, and others, including unemployment (CSDH, 2008).

Even though ethnicity is a fundamental cause, it did not include in the model because there is no subordination among these ethnic groups as they experience the same conflict settings in eastern Burma. Also, it does not restrict other manifest variables within the fundamental causes due to a high portion of data distributed only by two ethnic groups (Please see the distribution in Section 7.1.1).

- The material factors include household ownership of latrine and drinking water sources for the model construct, described as “sanitation”. The ownership of latrine is either yes, no, or shared with someone; Drinking water sources are categorized by the three-step ladder, such as unimproved, improved, and piped (UNICEF and WHO, 2008).
- The psychosocial factors have three manifest variables of “food security,” which comprise not having enough staple food, unable to eat preferred foods, and eating limited foods due to lack of resources. They are measured by the scales (never, rarely, sometimes, and all the time) of the Household Food Insecurity Access Scale (HFIAS) for Measurement of Food Access of FANTA III (Coates et al., 2007; HISWG, 2015).
- The manifest variables of the behavioral factors are about “health-seeking behavior” whether the WRA sought care or not while they or their household members were sick (yes/ no). If not, there were constraints for not seeking care (yes/ no) (HISWG, 2015).

- For “access to health,” the availability (never, sometimes, and always) of healthcare personnel, medicines, and medical supplies and the means of transportation are chosen as the manifest variables (HISWG, 2015).
- Finally, “health outcomes” consists of self-reported general health and wellness of women about physical health scored by good, fair, and poor; and motivation and depression rated by none, a little, most, and almost all the time (HISWG, 2015).

6.4. Ethical Consideration

For the EBRMS 2013, Institutional Review Boards approved the study protocol and provided ethical review at Partners HealthCare and the University of California Los Angeles (HISWG, 2015). Mainly for this study, HISWG has granted formal permission to the author to conduct the research using their population data of the EBRMS 2013. Furthermore, the author submitted an ethical application to the Community Ethics Advisory Board (CAB) at the Mae Tao Clinic, Mae Sot, Thailand. As a result, the CAB provided an ethical review and allowed to conduct the study.

This study commits do no harm to any respondents and enumerators regarding their confidentiality and security. This study performed all its data processes as guided by the ethical guidelines of the CAB and LUMID. Therefore, there is no possibility to identify any personal information of the respondents in this study. Also, the data is stored only in a secured folder during the data process and analysis. Finally, the author will transfer the study's data and related files to the HISWG upon completing this study for further use and research in its studies.

6.5. Limitations

- In a typical SEM study, the measurement model must be constructed and tested with some pilot data even before field data collection (Hays et al., 2005; Bowen and Guo, 2011; Berkout et al., 2014; Blunch, 2017). However, this study has constructed the measurement model to analyze based on the available social and health variables in the EBRMS.
- During the initial discussion with the HISWG about the potential use of EBRMS data in this study, it planned to conduct this study with the recent data collected in 2019. However, the ongoing COVID-19 pandemic resulted in the delayed process of 2019 data. Therefore, it could not yet be

released for any data analysis. As a result, this study can only use the most accessible data at the HISWG, collected in 2013.

- In general, the SES indicators consist of education, occupation, and income – either individual or household – to measure a person or family's SES (Blakely et al., 2004). However, there was no income indicator collected in EBRMS 2013 (Annex 11.1), and therefore, this study cannot include income information due to the availability of the data.
- This study constructed the measurement model in the specific social and health settings of the WRA in the conflict-affected areas of eastern Burma. Therefore, the study's findings may have limitations to generalize into another setting even within the same region.

7. Findings

The study reveals its findings in the following two subsections. The first one is about the descriptive statistics of the distributions of the study population with their fundamental causes, the intermediary factors, and health outcomes. At the same time, the second subsection contributes to the theoretical model of the study regarding the correlations between the fundamental causes, the intermediary factors, and health outcomes, presenting the model fit indices and the estimates of factor loadings.

7.1. Descriptive Statistics

In this section, the descriptive statistics of the study population show the results of the overall sample. They are mainly in number and percent with some respective mean, median, mode, minimum, and maximum, whenever they are relevant – for instance, the minimum and maximum times to travel to seek healthcare services. These results attempt to convey the readers to the background information and characteristics of the study population in terms of their sociodemographic and fundamental causes, the intermediary factors, and self-reported health conditions. However, most importantly, these descriptive results are an integral part of the study to validate the model fit statistics for interpreting the findings in the study.

7.1.1. Demographic and Fundamental Causes

Table 1 describes the findings of the demographic distributions of the sampled WRA by states and regions along with their age groups, ethnicities, educations, and occupations. Among these women, above half of them (53.1%) resided in Karen State, whereas the rest of the women lived in other five states and regions followed by Mon, Karenni, Shan, Tanintharyi, Shan, and Bago. The findings indicate that the youngest age was 16 years and the oldest was 49 years. In addition, the results display that almost 80% of women were between 21 and 40 years with a median age of 32 years. Similar to the findings of states and regions, a little over half of the women (53.7%) had reported as Karen ethnic followed by 30.2% of Mon, relatively similar figures of Shan (7%) and Karenni (6.3%), and only a few of them were Burmese (1.4%). Regarding education, around 40% of women had no education at all, and another 40% of women had up to primary education while only 2.5% of them were able to obtain above high school. Finally, the findings reveal that the vast of women (88%) had precarious and informal works defined by the CSDH, such as farmers, daily workers, private vendors, and sellers (CSDH, 2008). On the other hand, less than 1% of women had a formal occupation as factory workers, where almost 5% of women were unemployed.

Table 1: The findings of demographic and fundamental causes

<i>Demographic and Fundamental Causes</i>	<i>Number</i>	<i>Percent</i>	<i>Cumulative Percent</i>	
<i>States and Regions</i>	Mon	287	15.3	15.3
	Karen	993	53.1	68.4
	Karenni	214	11.4	79.9
	Shan	138	7.4	87.3
	Bago	66	3.5	90.8
	Tannintharyi	172	9.2	100.0
	Total	1870	100.0	
<i>Age Group (Year)</i>	15-20	94	5.0	5.0
	21-30	748	39.7	44.7
	31-40	712	37.8	82.6
	41-49	328	17.4	100.0
	Total	1882	100.0	
	Mean ± SD	32.7 ± 7.7		
	Median	32		
	Mode	30		
	Min - Max	16 - 49		
<i>Ethnicity</i>	None	9	.5	.5
	Karen	1010	53.7	54.1
	Karenni	119	6.3	60.5
	Shan	132	7.0	67.5
	Mon	569	30.2	97.7
	Burmese	26	1.4	99.1
	Other	17	.9	100.0
	Total	1882	100.0	
<i>Education (Grade)</i>	None	742	39.8	39.8
	1-5	701	37.6	77.4
	6-10	326	17.5	94.9
	Above 10	47	2.5	97.4
	Other Education	48	2.6	100.0
	Total	1864	99.0	100.0
<i>Occupation</i>	None	83	4.4	4.4
	Farmer	1296	69.0	73.4
	Factory Worker	11	.6	74.0
	Private	79	4.2	78.2
	Seller	114	6.1	84.2
	Daily Worker	151	8.0	92.3
	Other	145	7.7	100.0
	Total	1879	100.0	

7.1.2. Material Factors

This section reveals the status of material factors of the study population, including sources of drinking water and household ownership of latrine (Table 2). Regarding drinking water, UNICEF and WHO categorized drinking water sources into a form of ‘drinking water ladder’ as a three-step ladder: the improved drinking water sources as the first step of the ladder followed by piped sources and unimproved sources as the last part of the ladder (UNICEF and WHO, 2008). The findings of Table 2 indicated that the common source of drinking water of the respondents (60.3%) was unimproved

sources: unprotected dug well, unprotected spring, and surface water such as rivers, ponds, streams, canals, and irrigation channels, followed by 31.7% of the respondents who had piped household water connection for drinking water. In comparison, only 7.3% had improved sources like protected dug well and springs. Meanwhile, even though it is a small number, about 1% had no drinking water source. Obviously, above 40% of the respondents' households did not own a latrine, and almost 1.5% of them had to share the latrine with someone, which is nearly half of the sampled women had no latrine.

Table 2: The findings of material factors

<i>Material Factors</i>		<i>Number</i>	<i>Percent</i>	<i>Cumulative Percent</i>
<i>Drinking water</i>	None	13	.7	.7
	Unimproved Source	1135	60.3	61.0
	Improved Source	137	7.3	68.3
	Piped	596	31.7	100.0
	Total	1881	100.0	
<i>Own latrine</i>	No	770	41.0	41.0
	Yes	1080	57.6	98.6
	Shared	26	1.4	100.0
	Total	1876	100.0	

7.1.3. Behavioral Factors

In terms of the behavioral factors, Table 3 indicates the health-seeking behavior of the sampled women whether they sought healthcare or not while they and their family members were sick. Almost 40% of the respondents did not seek care when they or a household member was sick during the last twelve months. For those who sought care when they were sick the last time (n = 1258), the first individuals they sought treatment from were village health workers and medic (47%), ethnic clinics (21.4%), drug stores, and pharmacies (15.2%), doctors and nurses (10.4%), and family, relatives, and friends (4.5%). Only a few people sought care at traditional healers (1.4%). For those who did not seek care (n = 619), two-third of them (63%) had one or more constraints with the range from one to seven constraints together due to practical and financial constraints. The main constraints they had were: they could not leave work and children; insecurity/ safety concerns; healthcare facilities are too far away; and treatments were too expensive for them.

Table 3: The findings of behavioral factors

<i>Behavioral Factors</i>		<i>Number</i>	<i>Percent</i>	<i>Cumulative Percent</i>
<i>Sought care</i>	No	619	33.0	33.0
	Yes	1258	67.0	100.0
	Total	1877	100.0	

<i>First-person sought to get care (n=1258)</i>	Doctor, Nurse, MW	131	10.4	10.4
	Ethnic Clinic	269	21.4	31.8
	VHW, Medic	590	46.9	78.7
	Traditional Healer	18	1.4	80.1
	Friend, Family, Relative	57	4.5	84.6
	Drug Store, Pharmacy	191	15.2	99.8
	Missing	2	0.2	100.0
	Total	1258	100.0	
<i>Constraints not seeking care (n=619)</i>	No constraints	220	35.5	36.1
	One or more constraints	390	63.0	98.5
	Missing	9	1.5	100.0
	Total	619	100	
	Min-Max	1-7		

7.1.4. Psychosocial Factors

The psychosocial factors (Table 4) show the levels of food security of households' food access and consumption of the study population within the past thirty days. The status of food security was measured by three indicators of the Household Food Insecurity Access Scale (HFIAS) (Coates et al., 2007). The findings suggest that each of these three indicators distributed similar patterns within the study population. First, almost one-third of the sampled women reported that their household sometimes worried (3 – 10 times, 14.3%) and all the time (every day, 14.1%) about not having enough rice which is the staple food for them. Then, in the second indicator, the number went up a bit higher, which was almost 35% of the respondents and their household members that were, sometimes or all the time, unable to eat the foods they preferred due to lack of resources. Finally, the findings appear that 27% of them had, sometimes or all the time, eaten limited foods day after day for the same reason of lack of resources.

Table 4: The findings of psychosocial factors

<i>Psychosocial Factors</i>		<i>Number</i>	<i>Percent</i>	<i>Cumulative Percent</i>
<i>Not enough rice</i>	Never	974	51.9	51.9
	Rarely	369	19.7	71.6
	Sometimes	269	14.3	85.9
	All the time	265	14.1	100.0
	Total	1877	100.0	
<i>No preferred foods</i>	Never	793	42.2	42.2
	Rarely	431	23.0	65.2
	Sometimes	401	21.4	86.6
	All the time	252	13.4	100.0
	Total	1877	100.0	
<i>Limited food options</i>	Never	990	53.3	53.3
	Rarely	371	20.0	73.3
	Sometimes	302	16.3	89.6
	All the time	193	10.4	100.0
	Total	1856	100.0	

7.1.5. Access to Health

The descriptive findings of access to health (n = 1258) are presented in Table 5 which are about types of transportation and travel time to get healthcare services and maternal healthcare such as antenatal, delivery, and postnatal care. The findings indicate that most of the women who sought care (68.7%) walked to healthcare facilities to receive health services, and 20% of them took motorbikes where a few of them used cars, bicycles, and boats (other). Regarding the duration of travel to get care, a high percentage (74%) of the respondents took up to one hour to get health services either at facilities or at healthcare personnel like medics, health workers, and traditional birth attendants, and some of them (11.1%) took one to two hours. The median of travel time was 0.25 hours while the mode is 0.10 hours subsequently with a minimum of 0.0 hours and a maximum of up to 48.5 hours.

Table 5: The findings of access to health

<i>Access to Health</i>		<i>Number</i>	<i>Percent</i>	<i>Cumulative Percent</i>
<i>Type of transportation (n=1258)</i>	Walking	864	68.7	68.7
	Bicycle	37	2.9	71.6
	Motorbike	252	20	91.7
	Car	62	4.9	96.6
	Other (Boat)	11	0.9	97.5
	Missing	32	2.5	100.0
	Total	1258	100	
<i>Time to get care (hours) (n=1258)</i>	Up to 1	931	74	74
	1-2	140	11.1	85.1
	2-3	61	4.8	89.9
	3-4	36	2.9	92.8
	4-5	10	0.8	93.6
	Above 5	29	2.3	95.9
	Missing	51	4.1	100
	Total	1258	100	
	Mean ± SD	1.17 ± 3.3		
	Median	0.25		
	Mode	0.10		
Min - Max	0.0 - 48.5			
<i>Antenatal care</i>	No	813	45.3	45.3
	Yes	981	54.7	100.0
	Total	1794	100.0	
<i>Delivery Attendants (n=1545)</i>	Doctor, Nurse	135	8.7	8.7
	HA, MW, AMW	56	3.6	12.4
	Ethnic HW, Medic	228	14.8	27.1
	TBA	1042	67.4	94.6
	Other	84	5.4	100.0
	Total	1545	100.0	
<i>Postnatal care (n=1498)</i>	No	980	65.4	65.4
	Yes	518	34.6	100.0
	Total	1498	100.0	

Table 5 also reveals the most crucial part of WRA, which is maternal healthcare. For antenatal care before childbirth, the findings show a prominent number that above 45% of the sampled women did not have any pregnancy-related or antenatal care during their last or current pregnancies. Regarding delivery attendants during the last childbirth (n = 1545), most women (67.4%) were attended by traditional birth attendants, followed by about 15% of them having ethnic health workers and medics. Obviously, the findings indicate that more than 5% of women delivered with the assistance of their family, relatives, and friends (other) who may be neither skilled nor trained personnel for delivery. Despite that, the figure was even worse when it comes to postnatal care (n = 1498). More than 65% of women did not have any optimal postpartum care for themselves and their newborn child during the first six weeks following childbirth, which is the most critical period for newborn and maternal survival (WHO, n.d.).

7.1.6. Health Outcomes

For health outcomes, it measured the respondents' three self-reported general health and wellness based on their day-to-day living experiences (Table 6). Obviously, most of the respondents, 92% of them, reported that they have good or fair physical health, while only 8% said they had poor health in the past twelve months. Additionally, about 8.5% of them felt little interest or pleasure in doing things most of the time and almost all the time within the past two weeks. Similarly, 7.8% of the sample women felt down, depressed, and hopeless most of the time and almost all the time. Overall, most of them, over 90%, reported that none or a little time of feeling little interest or pleasure and feeling down or depressed.

Table 6: The findings of self-reported health outcomes

<i>Health Outcomes</i>		<i>Number</i>	<i>Percent</i>	<i>Cumulative Percent</i>
<i>Self-reported physical health</i>	Good	1012	54.2	54.2
	Fair	706	37.8	92.0
	Poor	150	8.0	100.0
	Total	1868	100.0	
<i>Felt little interest or pleasure</i>	None	1063	57.0	57.0
	A little of the time	646	34.6	91.6
	Most of the time	128	6.9	98.5
	Almost all the time	28	1.5	100.0
	Total	1865	100.0	
<i>Felt down, depressed, hopeless</i>	None	1224	65.6	65.6
	A little of the time	498	26.7	92.2
	Most of the time	106	5.7	97.9
	Almost all the time	39	2.1	100.0
	Total	1867	100.0	

After all, the descriptive statistics section presents the background characteristics of the fundamental causes; material, behavioral and psychosocial factors, and access to health; and health outcomes of the study population. Thanks to these figures and numbers, this study continued to perform the model fit analysis to evaluate the measurement model. Please see the analysis and findings of the model fit in the following section.

7.2. Model Fit Statistics

The ultimate purpose of this section is to address both research questions of the study whether the intermediary factors exist in the theoretical model or not. And then, if they exist, it identifies the significant correlations of the intermediary factors on health outcomes throughout the model. This study performed a rigorous process of the CFA to evaluate the model fit and its correlations across the factors. Firstly, the study conducted a reliability analysis to measure the internal consistency of the manifest variables from the dataset to construct the study model. Then the measurement model is chosen in which facilitates performing model fit estimation. Afterward, this study evaluated the measurement model using several recommended model fit indices in a standard estimation technique. The following paragraphs describe the process and results of the reliability, model fit indices, and factor loading estimates of the model fit statistics.

7.2.1. Reliability Analysis

The first prerequisite of a measurement model is to estimate the reliability relationships of the manifest variables from the study's dataset. The reliability analysis results present the identical scales of each manifest variable in repeated measurements amongst similar conditions (Blunch, 2017). Then the reliability analysis produces the proportion of true scales of the manifest variables. It also estimates the internal consistency of the manifest variables while they evenly load on a measurement model (Graham, 2006; Black et al., 2015; Blunch, 2017). The reliability results commonly represent in total scale and subscale scores from the constructed model, and it typically measures with Cronbach's alpha. Significantly, the coefficient alpha (α) can provide a highly accurate estimation of reliability using the characteristics of the data of the respective model even though the underlying assumptions of it always may not meet (Graham, 2006; Black et al., 2015)

The Cronbach's alpha (α) scale can report in unstandardized and standardized estimates. These two estimates could be up to equal figures as some manifest variables have the same standard deviations. The estimate results in a scale (α) of .4, which is acceptable. The estimate of .7 is good for choosing the measurement model's manifest variables (Blunch, 2017). Once the reliability analysis settles with

the satisfied scales of the manifest variables, the next step is to choose the most appropriate measurement model to estimate the model fit.

7.2.2. Measurement Model

In the classical test theory of the CFA, there is a family of the measurement models, and it can divide into three models: congeneric, tau-equivalent, and parallel (Graham, 2006). The congeneric model freely estimates factors, factor loadings, and correlations. The tau-equivalent constrains factors to evaluate the model fit, and the parallel model is naming factors and errors for estimation (Table 7) (Graham, 2006; Bowen and Guo, 2011). The differences between these three models are the assumptions on the manifest variables whether they have the same influences on the latent variables or not. Also, they have different assumptions of scales and the comparative importance of various factors (Bowen and Guo, 2011).

Table 7: The characteristic of the measurement models

Measurement Model	Factor Loading	Error Variance
Congeneric	$path1 \neq path2 \neq path3 \neq path4$ (Unconstrained)	$e_1 \neq e_2 \neq e_3 \neq e_4$ (Unconstrained)
Tau-Equivalent	$path1 = path2 = path3 = path4$ (Constrained Equal)	$e_1 \neq e_2 \neq e_3 \neq e_4$ (Unconstrained)
Parallel	$path1 = path2 = path3 = path4$ (Constrained Equal)	$e_1 = e_2 = e_3 = e_4$ (Constrained Equal)

(Adapted from Widhiarso and Kozeny, 2013; Bowen and Guo, 2011)

The tau-equivalent model doesn't require to have the same influences of all manifest variables on all latent variables to be measured in the theoretical model (Graham, 2006; Bowen and Guo, 2011). It is essential for this study that it cannot assume that all latent variables of the intermediary factors are equally good to be measured. It appears that these variables have different impacts on health outcomes. Therefore, the tau-equivalent model is the most appropriate approach for this study to examine the theoretical model with different levels of influences from the manifest variables of the intermediary factors.

Another rationale that makes the tau-equivalent relevant is that it allows the measurement of similar scales of the manifest variables. In the EBRMS 2013, the questionnaire (Annex 11.1) had the same scales among the most manifest variables from recording yes or no to scoring levels. For example, sought care: yes or no, and not enough rice: never, rarely, sometimes, and all the time. Thus, these variables may have identical scales on each manifest variable that can be analyzed in the tau-equivalent model. Taking these rationales into consideration, such as the assumption and level of

scales of the manifest variables that sensitive to choose the measurement model, the tau-equivalent model is the most suitable model to examine the model fit indices of the study.

7.2.3. Reliability Estimates

As the reliability analysis is an essential process of the CFA aforementioned (Section 6.3.2), this study performed a reliability analysis with all sixteen manifest variables of the measurement model, aiming to estimate the acceptable internal consistency of those variables. However, the “sought care” variable dropped from the estimates due to zero variance. Therefore, there were fifteen manifest variables estimated through the analysis using IBM® SPSS®. The results show that the total estimate (α) of all variables is above the acceptable level for both unstandardized (.55) and standardized (.44) scales. It appears that these two estimates have an unequal scale of about .11, which means the range of standard deviations among some manifest variables is slightly wide (Table 8) (Blunch, 2017). Despite that, the reliability analysis results suggest that the total estimates of both unstandardized and standardized scales (α) are acceptable for this measurement mode.

Table 8: The reliability estimates of the study

		Cronbach's Alpha (α)
<i>Total estimate</i>		.55
<i>Total estimate (Standardized)</i>		.44
No.	Manifest Variables	
1	<i>Age Group</i>	.54
2	<i>Education</i>	.56
3	<i>Occupation</i>	.57
4	<i>Physical Health</i>	.55
5	<i>No Motivation</i>	.54
6	<i>Depression</i>	.51
7	<i>Constraint</i>	.57
8	<i>Health Workers</i>	.57
9	<i>Medical Supplies</i>	.56
10	<i>Transportation</i>	.55
11	<i>Latrine</i>	.55
12	<i>Drinking-Water</i>	.55
13	<i>Not enough Rice</i>	.43
14	<i>No Preferred Foods</i>	.42
15	<i>Limited Food Options</i>	.43

Table 8 presents the subscale of reliability estimates of each manifest variable from the measurement model alongside the total estimates. The reliability estimates of the manifest variables are range from minimum .42 to maximum .57. The last three indicators – “not enough rice” (.43), “no preferred foods” (.42), and “limited food options (.43)” – have just above the margin (.4). However, the rest of the manifest variables have more than .5 of the α . That means they all are above the acceptable scales of the reliability estimate (Blunch, 2017). Despite that, the reliability analysis results suggest that the

total estimates of both unstandardized and standardized scales (α) are acceptable for this measurement model supported by each estimate of the manifest variables of the model (Blunch, 2017). With these supportive reliability results of the measurement model, this study evaluated the model fit and examined the correlations between fundamental causes, the intermediary factors, and health outcomes. The following section reveals the results of the model fit indices of the study.

7.2.4. Evaluating Model Fit Indices

In CFA, model fit refers to what extent the measurement model implies the pattern of correlations constructed with the sample data. Thus, it can interpret with model fit indices to estimate the overall fit of the model. Notably, the crucial part of evaluating model fit is assessing a series of model fit indices instead of measuring a single model fit index (Berkout et al., 2014). It primarily recommends reporting multiple fit indices for interpreting model fit because those indices have different approaches to determine strengths and weaknesses of model fit measure (Bentler, 2007 cited in Berkout et al., 2014). In general, the SEM generates the estimated values to minimize the discrepancy between the manifest variables and the latent variables from the measurement model (Bowen and Guo, 2011; Berkout et al., 2014).

For the model fit estimation, this study used the Maximum Likelihood (ML) estimation because it is the most widespread estimation algorithm in the SEM. Also, it is the default estimator in statistical platforms that facilitate SEM analyses because of its consistency, efficiency, and scale invariance, and freeness (Bowen and Guo, 2011; Berkout et al., 2014; Hartwell et al., 2019). Furthermore, ML estimation can produce efficient true estimates with consistently lower standard errors when the measurement model and criteria meet (Bowen and Guo, 2011; Hartwell et al., 2019). Especially, it is suitable for data with similar scales of the manifest variables and large sample size. For instance, the minimum data required is about 200 samples. ML estimation's main advantages are its ability to engage with missing data (Enders and Bandalos, 2001 cited in Berkout et al., 2014). ML estimates missing values of each sample based on available data and then uses these values in variance determination (Enders, 2001 cited in Berkout et al., 2014). Therefore, this study selected the ML as an applicable method due to the number of sample sizes and some missing data presented in the dataset, even although it is less than a few percent.

ML estimation commonly uses a series of fit indices such as chi-square (χ^2), Bentler's comparative fit index (CFI), and root-mean-square error of approximation (RMSEA) to estimate model fit (Berkout et al., 2014; Blunch, 2017). The chi-square in comparison with the degrees of freedom (df) is applied to observe a level of statistically significant correlations between the manifest variables, and the latent

variables implied from the measurement model (Schumacker and Lomax, 2012; Kline, 2011 cited Blunch, 2017). The null model reveals no difference between the manifest variables and the latent variables, whereas a larger chi-square value means greater model misfit. The statistically significant p -value of the chi-square is <0.05 (Berkout et al., 2014; Blunch, 2017).

Also, the CFI is a commonly applied incremental model fit index. It evaluates how the measurement model is better than another model comparing congeneric, tau-equivalent, and parallel models (Kline, 2011 cited Blunch, 2017). The range of CFI is 0 to 1, and the greater value of the CFI means a better model fit. For example, CFI 1 is a perfect fit, whereas .90 – .95 is a good fit (Kline, 2016; Blunch, 2017). Additionally, the RMSEA also examines the misfit of the measurement model while adjusting for sample size and model complexity (Brown, 2006 cited in Blunch, 2017). In contrast to the CFI, the smaller value of RMSEA means the better model fit even in the same range, 0 to 1. For instance, RMSEA 0 is a perfect fit where .05 – .08 is a close fit (Schumacker and Lomax, 2012; Blunch, 2017).

Table 9: The model fit indices of study

<i>Model Fit Statistic</i>	<i>Chi-square (χ^2)</i>	<i>Df</i>	<i>CFI</i>	<i>RMSEA</i>	<i>P</i>	<i>χ^2/DF</i>
Tau_Equivalent	692.4	99	.89	.06 (.05 - .06)	.00	6.99

Bearing in mind caveats in these model fit indices, Table 9 describes the results of the measurement model of the study in terms of estimating model fit. Firstly, the chi-square figure suggests that the study model is statistically significant, and it rejects the null of the exact model fit ($p < 0.01$) (Berkout et al., 2014; Blunch, 2017). Moreover, the CFI indicates that the mode is almost a good fit level (.89) (Kline, 2016; Blunch, 2017), and also the RMSEA verifies the model is a close fit (.06) with the range of .05 to .06. Thus, thanks to these results, it can be concluded that the tau-equivalent model of the study is a good fit model and statistically significant.

In addition to examining the tau-equivalent model, this study has subsequently performed further estimations on congeneric and parallel models during the analysis to investigate any justification for the model fit, notwithstanding the results appear almost the same indices. For example, CFI .89, RMSEA .06, and $p < 0.01$ for congeneric, and CFI .83, RMSEA .07, and $p < 0.01$ for parallel model. All in all, the results of the model fit indices verify that the theoretical model of the study is a good fit model with the fundamental causes, the intermediary factors, and health outcomes of the study population. Since the model fit analysis statistically confirmed the existence of these factors within the fundamental cause theoretical model for the first research question of the study, the following section shows the estimates of the factor loadings of the intermediary factors that examined their significant impacts on health outcomes.

7.2.5. Estimating Factor Loadings

This section reveals the results of the factor loadings through the standardized regression estimates of the ML estimation of the model fit analysis. This study tested all factor loadings between every latent and manifest variable. However, only the factor loadings between the fundamental causes and health outcomes connected by each intermediary factor are presented in this section to address the second research question. The complete list of all estimates between the latent and manifest variables is in Annex 11.3.

The ML estimation measures the strengths of each factor loading by the possible range of the estimate of -1 to 1, along with the statistically significant p-value (<0.01). The positive estimate means one factor is improved; another factor is also improved. For example, if fundamental causes are improved, material factors like drinking water and latrine are improved. Whereas negative stands where one factor is improved, another factor is decreased. For instance, when fundamental causes are getting better, the percent of not seeking care could be declined and vice versa. Regardless of their positive or negative correlation values, both estimates are equally important across the factors inside the measurement model, indicating a significant impact from one factor to another (Bowen and Guo, 2011; Berkout et al., 2014; Blunch, 2017).

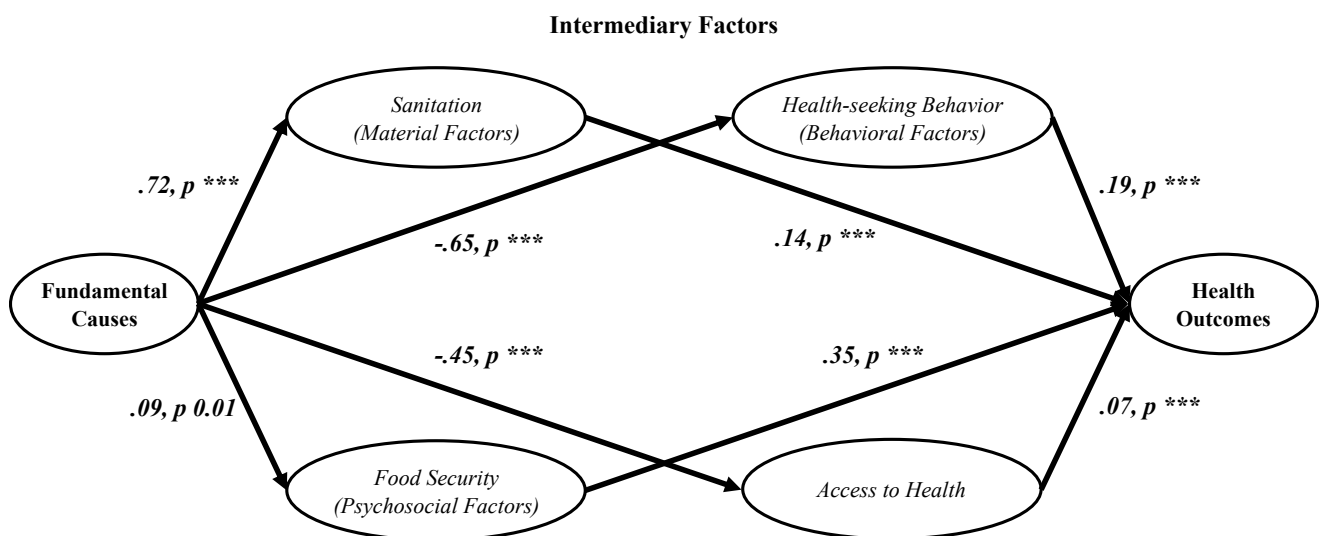


Figure 4: The factor loadings of the study model

*** is statistically significant, Source: The author's data analysis, adapted from Solar and Irwin, 2010, p. 48

Figure 4 demonstrates the standardized estimates of the factor loadings of the study model with their values on each factor together with p-value, and *** means the estimates are statistically significant. In sum, the results verify that all factor loadings of the latent variables significantly connect each other within the range of estimates from -.65 to .72. Moreover, among these factor loadings, the estimates

between “fundamental causes” and “health outcomes” through “sanitation” have both positive values (.72, .14), which indicate that the material factors have a significant impact on “health outcomes”. Similarly, “health outcomes” are also significantly affected by “food security” as a mediator of the psychosocial factors showing that the factor loadings are .09 and .35 even though one of the p values is exact 0.01, which is relatively significant.

The third factor loading from “fundamental causes” to “health outcomes” mediated by “health-seeking behavior” has both positive and negative values (-.65, .19), and these estimates confirm that the behavior factors directly impact both “fundamental causes” and “health outcomes”. Similarly, the mediating factor of “access to health” between “fundamental causes” and “health outcomes” also has a similar pattern of the estimates (-.45, .07) like “health-seeking behavior”. Ultimately, the results prove that the fundamental causes coherently correlate to health outcomes mediated by the intermediary factors. Meanwhile, these intermediary factors have significant correlations with health outcomes as constructed in the study model.

8. Discussion

The findings of the model fit indices and factor loadings indicate the study's theoretical model is valid, addressing the first research question that the intermediary factors exist between the fundamental causes and health outcomes. Furthermore, the study answered the second research question by statistically reaffirming the significant impacts of the intermediary factors on health outcomes. It has been observed in the factor loadings, the fundamental causes – age, education, and occupation – are the leading causes that significantly shape the intermediary factors. In the meantime, it can also interpret that each intermediary factor – material, psychosocial, and behavioral factors, and access to health – respectively impact health outcomes as the proximal factors of the fundamental causes, namely in the specific context of the WRA in eastern Burma. However, these fundamental and intermediary factors have different levels of effect in the theoretical model. For example, the correlations between the fundamental causes and the intermediary factors have both positive and negative influences: .72 with the material factors; -.65 with the behavioral factors; -.45 with access to health; and .09 with the psychosocial factors. Meanwhile, all intermediary factors have distinct influences in a range of .07 to .35 on health outcomes. Nonetheless, these findings endorse the study's assumption of choosing the measurement model that these fundamental and intermediary factors were not equally good to be evaluated and did not exactly have the same impacts on health outcomes.

Firstly, the findings imply that the material factors, namely sanitation, have the most substantial influence (.72) of the fundamental causes among the intermediary factors. Mainly, where more than 80% of women had no education or low literacy, and precarious and informal occupations in eastern Burma, these fundamental causes affect their access to improved housing amenities (Phelan et al., 2004; Solar and Irwin, 2010; Braveman and Gottlieb, 2014). Moreover, because of these fundamental causes, 60% of WRA in eastern Burma rely on unimproved drinking water sources, and 40% of them did not have a latrine. As a result, their poor amenities induce them into health risks of diseases and infections (Phelan et al., 2004; CSDH, 2008; Skolnik, 2016; WHO, n.d). On the other hand, the material factors have a lesser influence (.14) on health outcomes, even though this study has expected to see a larger effect of the material factors as they immediately shape health outcomes. One potential reason of resulting a low impact on health outcomes from the material factors could be using sanitation as a sole material factor in the study because of the availability of the study's data. There are more material factors to be considered as material factors other than sanitation. Therefore, future research should consider incorporating more variables of the material factors in order to enhance understanding of the correlation between the fundamental causes, the material factors, and health outcomes. Besides that, the material factors still significantly shape health outcomes of the WRA in eastern Burma.

Similarly, the fundamental causes shape food security as a psychosocial factor (.09) that limits their ability to access foods adequately because of their lower standing of education and occupation. For example, around 40% of WRA experienced sometimes or all the time food-insecure conditions within the past thirty days. Moreover, it can assume that they have insufficient dietary intake due to the conflicts in eastern Burma. As a result, they are prone to risks of diseases and infections that directly affect short-term and long-term physical and mental health outcomes (Willis and Fitzpatrick, 2016). The findings support this assumption that the psychosocial factors have the most decisive impact on health outcomes (.35) compared to the three other factors even they have less influence from the fundamental causes (.09). Furthermore, one potential reason that makes the psychosocial factors have the highest impact on health outcomes because of the manifest variables of health outcomes. The variables of health outcomes are self-reported physical health, motivation, and depression of women, which attentively correlate to psychosocial issues, and thus, it could get a strong influence. Therefore, it should give more attention to this correlation between the psychosocial factors and health outcomes when further evaluation approaches this factor.

Regarding health-seeking behavior, it is a predominant factor of the behavioral factors (-.65). Hence, it can interpret that the negative factor loading means there is a reverse influence from the behavioral factors to the fundamental causes. The study draws an assumption on this reverse influence that the sampled population did not seek healthcare because most of them were the precarious and informal workers perceiving uncertain natures of work comparing to formal workers. For example, 88% of the WRA worked in precarious and informal occupations that make them more uncertain about managing their works and times. As a result, one-third of the WRA did not seek care because they were busy with their work or children. In contrast, the behavioral factors have a positive factor loading (.19) which is the second-highest among the intermediary factors towards health outcomes. Hence, it is reasonable that having practical or financial constraints may prevent seeking healthcare services in time to receive proper treatments that contribute to adverse health outcomes (Evans et al., 2013; Skolnik, 2016). However, this is a context-specific assumption from the perspective of the health-seeking behavior of the WRA in eastern Burma. Thus, it requires further investigations on the behavioral factors, namely the correlation between the fundamental causes and these behavioral factors.

Similar to the behavioral factors, access to health reversely influence the fundamental causes (-.45). Based on the literature review, this study can conclude that there were no differences between the study population regarding the availability, acceptability, and affordability of access to health because they shared similar settings of education, occupation, and no adequate healthcare system in eastern Burma (HISWG, 2015; Parmar et al., 2015; Purkey et al., 2019). Likewise, the descriptive findings suggest that

most of the WRA share a similar pattern of accessibility in terms of transportation and distance. For instance, almost 70% of them walked to healthcare facilities, and 75% were within one-hour distance from facilities. Therefore, this study assumes that the reverse influence of access to health can be due to a potential issue of the WRA's security, stability, and freedom of movement in eastern Burma based on where they reside (HISWG, 2015). Even though they were under active-conflict settings, they have different levels of conflicts and security concerns within villages, townships, and states and regions. For example, some areas had more conflicts and security threats, whereas others had more stability and fewer conflicts. Thus, those WRA who live in areas where more secure and fewer conflicts may have better access to health than others in more active conflicts and insecure places. However, this is an arbitrary assumption of the study, and further investigation is required.

Despite that, the findings still suggest that the accessibility of access to health was one of the issues for the study population. For instance, 45% of them did not receive antenatal care, and 65% did not have postnatal care, which is crucial for themselves and their newborn children. In addition, access to health impacts health outcomes (.07) which is the lowest influence among the intermediary factors. It is commonly accepted that access to health has a significant impact on health outcomes. However, this result reflects the CSDH's argument that access to health has no definitive account for differentiating social patterns of health outcomes (Solar and Irwin, 2010). To that end, it requires further evidence to enhance understanding of each dimension of access to health towards health outcomes, namely in the context of eastern Burma.

Finally, these fundamental and intermediary factors are equally important for women's health, especially for the WRA in the conflict-affected states and regions of eastern Burma. Moreover, the findings indicate that each factor has its distinct and interesting influence, presenting different correlations between the fundamental causes and health outcomes. In the sense that the findings of this study described above, each intermediary factor could serve as the entry points to examine further correlations between the fundamental causes and health outcomes. However, regardless of their influence level, the findings navigate that each of these intermediary factors has its significant impact between the fundamental causes and health outcomes of the WRA in eastern Burma.

9. Conclusion and Implication

In conclusion, this study evaluated the hypothetical model of the technical framework assessing basic social structures, intermediary factors, and health outcomes among the study population. The theoretical model was assessed by a unique measure using the standard estimation necessary to evaluate the quality of the model fit and its estimates in the SEM through the CFA. The study proved the basic social structures as the fundamental causes of SDH. Furthermore, these fundamental causes affect health outcomes throughout the intermediary factors. Notably, each of the intermediary factors demonstrates their distinct impacts on health outcomes indicating within the statistically significant level. In addition, this study found that two intermediary factors have a reverse influence on the fundamental causes. Thus, each intermediary factor gives a unique and interesting point to be considered. Therefore, each correlation between the fundamental causes and health outcomes should be given different levels of attention for tackling the SDH. However, all in all, it can conclude that the intermediary factors introduced by the CSDH are the predominant factors of SDH, and each factor has significant impacts on the health outcomes of the study population in the conflict-affected areas of eastern Burma.

Additionally, the findings of this study provide further evidence of the constructs of SDH from the fundamental cause perspective. Also, the study acknowledges the previous theoretical framework and research of SDH, namely the conceptual framework for action on the SDH developed by the CSDH (CSDH, 2008; Solar and Irwin, 2010). As a result, this study contributes the empirical evidence-based supports as the entry points to enhance long-lasting reductions of SDH at the macro-level by confirming the significant impacts of the intermediary factors on health outcomes at the micro-level. Besides that, the findings of the study supplement the empirical evidence for the data need of SDH during the COVID-19 pandemic (WHO, 2021a) and for the SDG3, SDG5, and SDG10 of the Agenda 2030 (UN, 2015).

In essence, thanks to the previous literature that discussed the importance of these social intermediary factors and health outcomes using similar methodologies, this study reflects the growing influence of social determinants of population health (Hays et al., 2005; Hoffmann et al., 2019; Hartwell et al., 2019; Kiani et al., 2020). However, as described through this study, health outcomes are complex differentials, vis-à-vis the SDH are rather complex issues historically rooted across the population. Thus, even from the FCT, it still limits to determine some multifaceted determinants. Nevertheless, this study attempted to examine some of their critical intermediary factors through the fundamental perspective. However, it is impossible to precisely estimate each intermediary factor's actual direct or indirect impact on health outcomes without taking every aspect of these factors and their respective issues into account.

Furthermore, as this study initiated the expansion of empirical research around the SDH, it enriches understanding the intermediary factors of fundamental cause determinants of health, namely in the context of eastern Burma purposively for the first time. Meanwhile, it requires further research and studies for every aspect of social and health determinants and for supplementing the generalizability of the empirical results of similar findings. Therefore, the intermediary factors of SDH deserve further investigation with the most recent data, preferably with a similar scope of the study. Remarkably, it critically requires further empirical study and research to confront the current situation of SDH, which is unevenly exacerbated by the COVID-19 pandemic (WHO, 2021a).

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11. Annex

11.1. EBRMS 2013 Questionnaire

Eastern Burma Retrospective Mortality Survey (2013)

Cluster ID: ___ ___
 HH ID: ___ ___

Eastern Burma Health and Human Rights Survey (2013)

Survey ID:

Date:
 D D M M 1 3
 Y Y

Cluster ID:

HH ID:

If this is different than the village assigned, please write the original village name below and explain why you are at this village:

Introduction

Hello. I am a young colleague who has been asked to assist BMA/ BPHWT/ KDHW/ KnMHC/ MNHC/ SHC. We are doing a study about the health and human rights situation of your community. We are collecting this information from you and other people from the community so that we can learn about your health access, beliefs, practice and human rights status in your community. We believe that this information will help us understand health situation in your community and enable to better address your community priorities.

Procedures

You and your household were selected for inclusion into this study through a random procedure, and because you are within the eligible age range. If you agree to participate in this study, we will ask you about how you stay healthy, how you seek health care, health priorities and human rights situation in your community. We will measure mid-upper arm circumference (MUAC) of all females aged 15-49 years and all children aged under 5 years from your household. [FOR HOUSEHOLD NUMBER – 1, 15 and 30: WE WILL TEST ALL HOUSEHOLD MEMBERS FOR MALARIA BY RAPID TEST]. Asking these questions will take 45 to 60 minutes.

Benefits and risks

There is no risk to your health from participating in this survey. Some of the questions in the survey ask about your health and your family. If any questions are upsetting or difficult for you to answer, we can skip those questions. You may choose to refuse any question in this survey. Also, you may stop the interview at any time. You will not receive any specific incentive, such as money, food, or health care for you or your family, for participating in this survey. By participating in this survey, we believe that you and your community may benefit in the long-term, as the information will help us to address health priorities in your community.

Questions and Concerns

I will attempt to answer any questions you may have concerning this survey. If you don't understand the questions, please ask me to explain more. If you have further questions including about what this information will be used for you may contact any clinic belonging to Burma Medical Association, Back Pack Health Worker Team, Karen Department of Health and Welfare, Karenni Mobile Health Committee, Mon National Health Committee, or Shan Health Committee. If you do not know the location of the closest clinic to your village, you can ask me, or your village leader.

Confidentiality

Your identity will remain confidential and the answers will be kept private. When we combine and analyze this information together, it will not be possible for anyone to link the answers to you.

Voluntary Participation

Refusing questions or declining to participate will not limit your ability to access any of the health or other services provided in your community. You have the right to withdraw from this survey at any time, and there will be no effect on you or your family.

Are you willing to be in this study? 0 = No (Refused - DO NOT CONTINUE INTERVIEW, skipping HH) 1 = Yes (CONTINUE INTERVIEW) 2 = Survey incompleting because the respondent was distressed 3 = Survey incompleting because the respondent refused to continue 7 = Not at home (attempted to contact 3 times, skipping HH)	<input type="text"/>
---	----------------------

Date:
 D D M M Y Y

Signature of Person Obtaining Consent: _____

Signed copies of this consent form must be retained on file by the surveyor.

Eastern Burma Retrospective Mortality Survey (2013)

Cluster ID: ____

HH ID: ____

Section 2: - Out Migration Table

Now I would like to ask you some questions about members of this household who have lived here less than 12 MONTHS AGO but have since moved away. IF THERE IS NO PERSON MIGRATE OUT OF THIS HOUSEHOLD IN THE PAST 12 MONTH, GO TO NEXT SECTION.

No.	2.A: Age (by YEARS and MONTHS) IF A CHILD IS UNDER 1 MONTH OLD, CODE "00". 666 = Don't know 888 = Refused		2.B: Sex 0 = Male 1 = Female 6 = Don't know 8 = Refused	2.C: How is this person related to you? 00 = Self 01 = Parent 02 = Husband/ Wife 03 = Child 04 = Uncle/ Aunt 05 = Brother/ Sister 06 = Nephew/ Niece 07 = Friend 08 = Cousin 09 = Other relative 66 = Don't know 88 = Refused			2.D: When did this person leave this household? 1 = 1 to 3 months 2 = 4 to 6 months 3 = 7 to 9 months 4 = 10 to 12 months 5 = over 12 months 6 = Don't know 8 = Refused	2.E: Where did they move to? 0 = Inside your state 1 = Outside your state, but inside Burma 2 = Thailand 3 = Malaysia 4 = Other (Please record specific place for each person)	2F. What is the MAIN reason he/she moved away? 01 = Work 02 = Education 03 = Family 04 = Marriage 05 = Insecurity 06 = Improved security 07 = Land confiscated 08 = No reason 09 = Other 66 = Don't know 88 = Refused	
	Years	Months		Code	Other					
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

Eastern Burma Retrospective Mortality Survey (2013)

Cluster ID: ___ ___

HH ID: ___ ___

Section 3 - Death Table

For each person in this household who died, please tell me the age, sex and cause of death. Please include very little babies that cried or showed signs of life but later died or are still born. IF THERE IS NO PERSON DIED IN THIS HOUSEHOLD, GO TO NEXT SECTION.

No.	3A. Age For both YEARS and MONTHS		3B. Sex 0 = Male 1 = Female 6 = Don't know 8 = Refused	3C. How is this person related to you? 00 = Self 01 = Parent 02 = Husband/ Wife 03 = Child 04 = Uncle/ Aunt 05 = Brother/ Sister 06 = Nephew/ Niece 07 = Friend 08 = Cousin 09 = Other relative 66 = Don't know 88 = Refused	3D. Cause of Death <i>(List only one. If the answer is 08 = Other, write down specific cause in the beside column, otherwise skip it.)</i>	3E. Cause of Death Code Choices
	Year	Month				
1						01 = Diarrhea
2						02 = Malaria
3						03 = ARI
4						04 = Landmine
5						05 = Gunshot
6						06 = Pregnancy - Related
7						Maternal Death (Women dies < 42 days after pregnancy, Abortion and Miscarriage)
8						07 = Neonatal Death (Newborn dies < 28 days old.)
9						08 = Other
10						66 = Don't know
						88 = Refused

Eastern Burma Retrospective Mortality Survey (2013)

Cluster ID: ___ ___

HH ID: ___ ___

Section 4. Background information

No.	Question	Coding	Response	Skip patterns
1	What is the highest standard of education you have completed?	0 = None 1 = 1 to 5 standard 2 = 6 to 10 standard 3 = Above 10 standard 4 = Other education (Short course/ Monastery) 6 = Don't know 8 = Refused	<input type="checkbox"/>	
2	What languages do you speak well? (<i>record up to 2 responses</i>)	01=Pwo Karen 07=English 02=Sgaw Karen 08=Other(____) 03=Burmese 66=Don't Know 04=Shan 77=N/A 05=Karenni 88=Refused 06=Mon	<input type="checkbox"/> <input type="checkbox"/>	
3	What religion are you?	0=None 5=Other (_____ 1=Christian 6=Don't Know 2=Buddhist 8=Refused 3=Islam 4=Animist	<input type="checkbox"/>	
4	What is your ethnicity?	0=None 5=Burmese 1=Karen 6=Don't Know 2=Karenni 7=Other (_____ 3=Shan 8=Refused 4=Mon	<input type="checkbox"/>	
5	What describes your marital status?	0 = Single 1 = Currently married 2 = Widow/widower 3 = Separated or divorced 8 = Refused	<input type="checkbox"/>	
6	What is your occupation?	00 = None 01 = Farmer/ Peasant 02 = Factory worker 03 = Private business 04 = Seller 05 = Daily worker 06 = Other (_____ 66 = Don't know 88 = Refused	<input type="checkbox"/> <input type="checkbox"/>	

Section 5. General Health and Wellness

7	How would you describe your physical health during the PAST 12 MONTHS?	1 = Good Health 2 = Fair Health 3 = Poor Health 6 = Don't know 8 = Refused	<input type="checkbox"/>	
8	Over the PAST 2 weeks, how often have you felt little interest or pleasure in doing things?	0 = None of the time 3 = Almost all the time 1 = A little of the time 6 = Don't know 2 = Most of the time 8 = Refused	<input type="checkbox"/>	
9	Over the PAST 2 weeks, how often have you felt down, depressed, or hopeless?	0 = None of the time 3 = Almost all the time 1 = A little of the time 6 = Don't know 2 = Most of the time 8 = Refused	<input type="checkbox"/>	

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Eastern Burma Retrospective Mortality Survey (2013)

Cluster ID: ____

HH ID: ____

Section 6. Healthcare access & health practices				
No.	Question	Coding	Response	Skip patterns
10	When you or anyone in this household are sick, did you or that person seek care IN THE PAST 12 MONTHS?	0 = No 1 = Yes 6 = Don't know 8 = Refused	<input type="checkbox"/>	If 0 skip to Q17
11	Has anyone in your household been treated by any of the following providers in the PAST 12 MONTHS? (READ EACH CHOICE OUT LOUD)		0 = No; 1 = Yes; 6 = DK; 7 = NA; 8 = Refused	
	a. Medical doctor/ Nurse		0 1 6 7 8	
	b. HA/ MW/ AMW		0 1 6 7 8	
	c. Medic/ Ethnic health worker		0 1 6 7 8	
	d. Tradition birth attendant		0 1 6 7 8	
	e. Traditional healer		0 1 6 7 8	
	f. Drug store/ pharmacy		0 1 6 7 8	
	g. Other _____		0 1 6 7 8	
12	The last time you were sick, who was the FIRST person you sought treatment from?	0 = Doctor/Nurse/ MW (at government hospital or clinic) 1 = Ethnic clinic 2 = VHW/ Medic 3 = Traditional healer 4 = Friend/relative/family member 5 = Drug store or pharmacy 6 = Don't know 7 = N/A 8 = Refused	<input type="checkbox"/>	If 2 to 8, skip to Q15
13	If you first seek care at a health care facility, are health workers available there?	0 = Never 1 = Sometimes 2 = Always 6 = Don't know 7 = N/A 8 = Refused	<input type="checkbox"/>	
14	Are medicines and medical supplies available at this health facility or with this health worker?	0 = Never 1 = Sometimes 2 = Always 6 = Don't know 7 = N/A 8 = Refused	<input type="checkbox"/>	
15	If you go to get treatment at the facility or with this health worker, how do you travel there?	0 = Walking 1 = Bicycle 2 = Motorbike 3 = Car 4 = Other (_____) 6 = Don't know 7 = N/A 8 = Refused	<input type="checkbox"/>	
16	How long does it take for you to reach there?	00-48 = Number of hours OR 66 = Don't know- ---->	<input type="text"/>	
		00-59 = Number of minutes OR 66 = Don't know 77 = N/A 88 = Refused	<input type="text"/>	
17	If you didn't seek care, what was the reason? CHOOSE ALL THAT APPLY <i>(Prompt: Is there anything else?)</i> DO NOT READ RESPONSES OUT LOUD. CIRCLE YES FOR RESPONSES MENTIONED AND MARKED. CIRCLE NO FOR RESPONSES NOT MENTIONED OR MARKED.	0 = No, 1 = Yes, 6 = Don't know, 8 = Refused		
		<input type="checkbox"/> Did not feel very sick	0 1 6 8	
		<input type="checkbox"/> Could not leave work	0 1 6 8	
		<input type="checkbox"/> Could not leave children	0 1 6 8	
		<input type="checkbox"/> Treatment too expensive	0 1 6 8	
		<input type="checkbox"/> Clinic/hospital too far away	0 1 6 8	
		<input type="checkbox"/> No health worker nearby	0 1 6 8	
		<input type="checkbox"/> Too sick to go clinic	0 1 6 8	
		<input type="checkbox"/> Due to insecurity/ safety concern	0 1 6 8	
<input type="checkbox"/> Other (_____)	0 1 6 8			

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18	Have you or anyone in your household been denied health care because of your religion or ethnicity in the PAST 12 MONTHS?	0 = No 1 = Yes 6 = Don't know 7 = N/A 8 = Refused	<input type="checkbox"/>	
19	Has anyone in your household been verbally mistreated or insulted by a health worker in the PAST 12 MONTHS?	0 = No 1 = Yes 6 = Don't know 7 = N/A 8 = Refused	<input type="checkbox"/>	
Section 7: Diarrhea, Water & Sanitation				
No.	Question	Coding	Response	Skip patterns
20	When do you wash your hands? CHOOSE ALL THAT APPLY <i>(Prompt: Is there anything else?)</i> DO NOT READ RESPONSES OUT LOUD. CIRCLE 1 FOR RESPONSES MENTIONED AND MARKED. CIRCLE 0 FOR RESPONSES NOT MENTIONED OR MARKED.	0 = No, 1 = Yes, 6 = Don't know, 8 = Refused		
	<input type="checkbox"/> I do not wash my hands		0 1 6 8	
	<input type="checkbox"/> After using the toilet		0 1 6 8	
	<input type="checkbox"/> Before preparing food		0 1 6 8	
	<input type="checkbox"/> Before eating		0 1 6 8	
	<input type="checkbox"/> After helping a child go to the toilet / changing a diaper		0 1 6 8	
21	Does your household have it's own latrine?	0 = No 1 = Yes 2 = Yes, we share with other households. 6 = Don't know 8 = Refused	<input type="checkbox"/>	If 0, skip to Q25
22	Show me your own latrine. CIRCLE YES AND MARKED THAT YOU SEE THE LATRINE MATCHED WITH THE CHOICE, CHOOSE ALL THAT YOU SEEN. IF NOT CIRCLE NO.	0 = No, 1 = Yes, 6 = Don't know, 7 = N/A, 8 = Refused		
	<input type="checkbox"/> Has a roof		0 1 6 7 8	
	<input type="checkbox"/> Has walls		0 1 6 7 8	
	<input type="checkbox"/> Has a door		0 1 6 7 8	
	<input type="checkbox"/> Has a plastic bowl		0 1 6 7 8	
	<input type="checkbox"/> Has a ceramic bowl		0 1 6 7 8	
	<input type="checkbox"/> Has an air flow pipe		0 1 6 7 8	
	<input type="checkbox"/> Has a deep hole		0 1 6 7 8	
	<input type="checkbox"/> It is dirty / Has a bad smell		0 1 6 7 8	
	<input type="checkbox"/> It doesn't have enough water		0 1 6 7 8	
	<input type="checkbox"/> Other (_____)		0 1 6 7 8	
23	Do you use the latrine that you have? <i>(Read out responses)</i>	0 = Never 1 = Sometimes 2 = Always 6 = Don't know 7 = N/A 8 = Refused	<input type="checkbox"/>	If 1 or 2, skip to Q25
24	Why don't you use the latrine that you have? CHOOSE ALL THAT APPLY DO NOT READ RESPONSES OUT LOUD. CIRCLE YES FOR RESPONSES MENTIONED AND MARKED. CIRCLE NO FOR RESPONSES NOT MENTIONED OR MARKED.	0 = No, 1 = Yes, 6 = Don't know, 7 = N/A, 8 = Refused		
	<input type="checkbox"/> Dirty		0 1 6 7 8	
	<input type="checkbox"/> Smells bad		0 1 6 7 8	
	<input type="checkbox"/> Not my custom		0 1 6 7 8	
	<input type="checkbox"/> Too far		0 1 6 7 8	
	<input type="checkbox"/> Erodes the earth		0 1 6 7 8	
	<input type="checkbox"/> Water source unaccessible or too far		0 1 6 7 8	
	<input type="checkbox"/> Other (_____)		0 1 6 7 8	

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25	Where do your household normally get water for drinking? <i>CHOOSE ALL THAT APPLY DO NOT READ RESPONSES OUT LOUD. CIRCLE YES FOR RESPONSES MENTIONED AND MARKED. CIRCLE NO FOR RESPONSES NOT MENTIONED OR MARKED.</i>	0 = No, 1 = Yes, 6 = Don't know, 8 = Refused		
		<input type="checkbox"/> Pipe (plastic, bamboo, or metal)	0 1 6 8	
		<input type="checkbox"/> Pump	0 1 6 8	
		<input type="checkbox"/> Gravity flow	0 1 6 8	
		<input type="checkbox"/> River or stream	0 1 6 8	
		<input type="checkbox"/> Pond or lake	0 1 6 8	
		<input type="checkbox"/> Spring	0 1 6 8	
		<input type="checkbox"/> Open well	0 1 6 8	
		<input type="checkbox"/> Closed well	0 1 6 8	
		<input type="checkbox"/> Rain water (basin, pot, bamboo)	0 1 6 8	
<input type="checkbox"/> Other (_____)	0 1 6 8			
26	In the last 24 hours, did anyone in your household drink water that was not boiled or filtered?	0 = No 1 = Yes 6 = Don't know 8 = Refused	<input type="checkbox"/>	

Section 8: Food Security

For each of the following questions, consider what has happened in the past 30 days. Please answer whether this happened never, rarely (once or twice), sometimes (3-10 times), or often (more than 10 times) in the past 30 days.

27	Did you worry that your household would not have enough rice?	0 = Never 1 = Rarely (once or twice) 2 = Sometimes (3 - 10 times) 3 = All the time 6 = Don't know 8 = Refused	<input type="checkbox"/>	
28	Were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	0 = Never 1 = Rarely (once or twice) 2 = Sometimes (3 - 10 times) 3 = All the time 6 = Don't know 8 = Refused	<input type="checkbox"/>	
29	Did you or any household member eat just a few kinds of food day after day due to a lack of resources?	0 = Never 1 = Rarely (once or twice) 2 = Sometimes (3 - 10 times) 3 = All the time 6 = Don't know 8 = Refused	<input type="checkbox"/>	

Section 9: Malaria

No.	Question	Coding	Response	Skip patterns
30	How many bednets do you have in your household? <i>ASK RESPONDENT TO SHOW YOU THE NETS AND ONLY COUNT THOSE THAT ARE OBSERVED TO BE FUNCTIONAL AND NOT DAMAGED.</i>	00 - 10 (Record as integer) 30.A: RESPONSE -	<input style="width: 30px; height: 20px; border: 1px solid black;" type="text"/>	
		30.B: OBSERVATION - 66 = Don't know 88 = Refused	<input style="width: 30px; height: 20px; border: 1px solid black;" type="text"/>	
31	How many bednets did you treat with KO Tab?	00 - 10 (Record as integer) 31: RESPONSE - 66 = Don't know 88 = Refused	<input style="width: 30px; height: 20px; border: 1px solid black;" type="text"/>	<i>IF YOUR RESPONSE IS 0 - GO TO 33.</i>

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32	When is the last time your bednets treated with KO Tab? <i>(Prompt to categorize)</i>	0 = Never 1 = Less than 6 months ago 2 = 6 months to 1 year ago 3 = More than 1 year ago 6 = Don't know 7 = N/A 8 = Refused	<input type="checkbox"/>	
33	How many LLITNS do you have in your household? <i>ASK RESPONDENT TO SHOW YOU THE NETS AND ONLY COUNT THOSE THAT ARE OBSERVED TO BE FUNCTIONAL AND NOT DAMAGED.</i>	00 - 10 (Record as integer) 33.A: RESPONSE -	<input type="text"/>	
		33.B: OBSERVATION - 66 = Don't know 88 = Refused	<input type="text"/>	<i>IF YOUR RESPONSE IS 0 - GO TO 35.</i>
34	When did your household get this (the most recent) LLITNs ? <i>(Prompt to categorize)</i>	1 = Less than 1 year ago 2 = 1 to 2 years ago 3 = More than 2 years ago 6 = Don't know 7 = N/A 8 = Refused	<input type="checkbox"/>	
35	IN THE PAST 12 MONTHS, please think about all the people in this household who had fever. For the person who most recently had fever, was s/he tested for malaria?	0 = No 1 = Yes 2 = Nobody had fever 6 = Don't know 8 = Refused	<input type="checkbox"/>	<i>If 0 or 2, skip to Q39</i>
36	Did the person get treated for malaria by a health worker or medic or VHW?	0 = No 1 = Yes 2 = The result was malaria negative 6 = Don't know 7 = N/A 8 = Refused	<input type="checkbox"/>	<i>If 0 and 2, skip to Q39</i>
37	When this person took the malaria medicine, did a health worker come to the house at least once to ensure that this person took all of the medicine at the right time?	0 = No 1 = Yes 2 = Was not given pills for treatment 6 = Don't know 7 = N/A 8 = Refused	<input type="checkbox"/>	<i>If 2, skip to Q39</i>
38	If a health worker did not visit your house, did this person finish all malaria pills themselves?	0 = No 1 = Yes 6 = Don't know 7 = N/A 8 = Refused	<input type="checkbox"/>	

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Cluster ID: ____

HH ID: ____

Section 10: Human Rights

No.	Question	Coding	Response	Skip patterns
39	How many people from your household were forced to work against their will by soldiers or authorities in the past 12 MONTHS, including those people who have died? This includes forced landmine sweeping, portering, carrying arms, building roads, being camp servants, forced recruitment and include if people had to pay fee to not do forced work.	Record as integer 00 = None 66=Don't Know 88=Refused	<input type="text"/> <input type="text"/>	If 00, skip to 41.
40	For each person who was forced to work against their will, please write the total number of days in the past year he/she was forced to work. (# Days/ 666 = Don't know/ 777 = N/A/ 888 = Refused)	Person #1	<input type="text"/> <input type="text"/> <input type="text"/>	
		Person #2	<input type="text"/> <input type="text"/> <input type="text"/>	
		Person #3	<input type="text"/> <input type="text"/> <input type="text"/>	
		Person #4	<input type="text"/> <input type="text"/> <input type="text"/>	
		Person #5	<input type="text"/> <input type="text"/> <input type="text"/>	
41	Is there any of the following projects happening in your village: <i>CHOOSE ALL THAT APPLY</i> <i>READ RESPONSES OUT LOUD. CIRCLE YES FOR RESPONSES MENTIONED AND MARKED. CIRCLE NO FOR RESPONSES NOT MENTIONED OR MARKED.</i>	0 = No, 1 = Yes, 6 = Don't know, 8 = Refused		
		<input type="checkbox"/> Dam	0 1 6 8	
		<input type="checkbox"/> Mining	0 1 6 8	
		<input type="checkbox"/> Road/Bridge/Highway	0 1 6 8	
		<input type="checkbox"/> Timber	0 1 6 8	
		<input type="checkbox"/> Pipeline	0 1 6 8	
42	In the PAST 12 MONTHS until now, have soldiers, authorities or private businesses demanded any of the following things from you: <i>CHOOSE ALL THAT APPLY</i> <i>READ RESPONSES OUT LOUD. CIRCLE YES FOR RESPONSES MENTIONED AND MARKED. CIRCLE NO FOR RESPONSES NOT MENTIONED OR MARKED.</i>	0 = No, 1 = Yes, 6 = Don't know, 8 = Refused		
		<input type="checkbox"/> Rice	0 1 6 8	
		<input type="checkbox"/> Food	0 1 6 8	
		<input type="checkbox"/> Land	0 1 6 8	
		<input type="checkbox"/> Livestock	0 1 6 8	
		<input type="checkbox"/> Foodstock	0 1 6 8	
		<input type="checkbox"/> Money	0 1 6 8	
		<input type="checkbox"/> Other - _____	0 1 6 8	
43	In the PAST 12 MONTHS until now, have soldiers, authorities or private businesses destroyed, killed or taken any of the following things from you: <i>CHOOSE ALL THAT APPLY</i> <i>READ RESPONSES OUT LOUD. CIRCLE YES FOR RESPONSES MENTIONED AND MARKED. CIRCLE NO FOR RESPONSES NOT MENTIONED OR MARKED.</i>	0 = No, 1 = Yes, 6 = Don't know, 8 = Refused		If their land was not confiscated, skip to Q.44.
		<input type="checkbox"/> Rice	0 1 6 8	
		<input type="checkbox"/> Food	0 1 6 8	
		<input type="checkbox"/> Land	0 1 6 8	
		<input type="checkbox"/> Livestock	0 1 6 8	
		<input type="checkbox"/> Foodstock	0 1 6 8	
		<input type="checkbox"/> Money	0 1 6 8	
		<input type="checkbox"/> Other - _____	0 1 6 8	
43.A:	How many acres of your lands have been confiscated by soldiers, authorities or private businesses?	Record as integer 666=Don't Know 777 = N/A 888=Refused	<input type="text"/> <input type="text"/> <input type="text"/>	
44	In the PAST 12 MONTHS until now, did you give any of the following things to soldiers, authorities or private businesses because of fear or to prevent soldier violence: <i>CHOOSE ALL THAT APPLY</i> <i>READ RESPONSES OUT LOUD. CIRCLE YES FOR RESPONSES MENTIONED AND MARKED. CIRCLE NO FOR RESPONSES NOT MENTIONED OR MARKED.</i>	0 = No, 1 = Yes, 6 = Don't know, 8 = Refused		
		<input type="checkbox"/> Rice	0 1 6 8	
		<input type="checkbox"/> Food	0 1 6 8	
		<input type="checkbox"/> Land	0 1 6 8	
		<input type="checkbox"/> Livestock	0 1 6 8	
		<input type="checkbox"/> Foodstock	0 1 6 8	
		<input type="checkbox"/> Money	0 1 6 8	
		<input type="checkbox"/> Other - _____	0 1 6 8	

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45	In the PAST 12 MONTHS until now, how many people in your household were shot at by a soldier or authorities, including those people who have died?	Record as integer 00 = None 66 = Don't Know 88 = Refused	<input type="text"/>	
46	In the PAST 12 MONTHS until now, how many people in your household were stabbed by a soldier or authorities, including those people who have died?	Record as integer 00 = None 66 = Don't Know 88 = Refused	<input type="text"/>	
47	In the PAST 12 MONTHS until now, how many people in your household were beaten by a soldier or authorities, including those people who have died?	Record as integer 00 = None 66 = Don't Know 88 = Refused	<input type="text"/>	
48	In the PAST 12 MONTHS until now, how many people in your household were detained/ tied up by a soldier or authorities, including those people who have died?	Record as integer 00 = None 66 = Don't Know 88 = Refused	<input type="text"/>	
49	Among all people who have lived in your household in the PAST 12 MONTHS, how many have experienced a landmine/UXO injury? Please also include those who have died.	Record as integer 00 = None 66 = Don't Know 88 = Refused	<input type="text"/>	
50	Now we would like for you to think about the PAST 15 YEARS. Among all people who have lived in your household in the PAST 15 YEARS, how many have experienced a landmine/UXO injury? Please also include those who have died.	Record as integer 00 = None 66 = Don't Know 88 = Refused	<input type="text"/>	

Surveyor: "Thank you for taking the time to participate in this survey. We appreciate your help in assessing this community health services and needs. Now, if there are women between age 15 - 49 who is either currently pregnant or has at least 1 child under age 5, we would like to interview all of them. Is that fine?"

PLEASE VERIFY # OF WOMEN TO BE INTERVIEWED FOR PART 2 WITH WHAT WAS INCLUDED IN THE HOUSEHOLD TABLE.

Eastern Burma Retrospective Mortality Survey (2013)

Cluster ID: ____
HH ID: ____

THIS PART OF THE QUESTIONNAIRE IS ONLY FOR ALL WOMEN AGE BETWEEN 15 TO 49 WHO IS EITHER CURRENTLY PREGNANT OR HAS AT LEAST 1 CHILD UNDER AGE 5 LIVING IN THE SAME HOUSEHOLD. IF THERE IS NO WOMEN WITHIN THE CRITERIA, THEN THIS PART OF SURVEY IS NOT NEEDED. PLEASE READ THE SAME CONSENT AS YOU HAVE READ FOR THE HEAD OF HOUSEHOLD BEFORE YOU START THIS PART OF INTERVIEW.

Survey ID:

Woman ID:

Date:
 D D M M Y Y

Are you willing to be in this study?
 0 = No (Refused - DO NOT CONTINUE INTERVIEW, skipping HH)
 1 = Yes (CONTINUE INTERVIEW)
 2 = Survey incompleted because the respondent was distressed
 3 = Survey incompleted because the respondent refused to continue
 4 = Head of household does not consent to the women being part of the survey
 7 = Not at home (attempted to contact 3 times, skipping HH)

Signature of Person Obtaining Consent: _____

Section A: Pregnancy History				
No.	Question	Coding	Response	Skip patterns
1	How many times have you been pregnant? INCLUDE CURRENT PREGNANCY AND ALL PREVIOUS PREGNANCIES, INCLUDING ABORTIONS/MISCARRIAGES.	00-15 = Record as integer 66=Don't know 88=Refused	<input type="text"/> <input type="text"/>	
1a.	How many times have you been pregnant in the past two years? INCLUDE CURRENT PREGNANCY AND ALL PREVIOUS PREGNANCIES IN THE LAST 2 YEARS, INCLUDING ABORTIONS/MISCARRIAGES.	0-5 = Record as integer 6=Don't know 8=Refused	<input type="text"/>	
2	How many times have you had therapeutic/spontaneous abortions?	0 = Never 1-5 = Record as integer 6=Don't know 8=Refused	<input type="text"/>	
3	How old were you during your first pregnancy?	10 - 49 = Age in Years 66 = Don't know 88 = Refused	<input type="text"/> <input type="text"/>	
4	If you are currently pregnant, how many months has it been?	0 = Not currently pregnant 1 = less than 3 months 2 = 3 to 6 months 3 = Above 6 months 6 = Don't know 8 = Refused	<input type="text"/>	
5	How many months and years ago was the end of your last pregnancy? <i>(If current pregnancy is first pregnancy, write "00" for months, and "00" for years.)</i> INCLUDING ABORTIONS/MISCARRIAGES.	00-Currently first pregnancy	<input type="text"/> <input type="text"/>	
		01-20 Years Record integer ----> 00-11 Months Record integer 66=Don't know ----> 88=Refused	<input type="text"/> <input type="text"/>	

Eastern Burma Retrospective Mortality Survey (2013)

Cluster ID: ____

HH ID: ____

Section B: ANC (During Last or Current Pregnancy)				
For the following questions I am going to ask you about ANC visits, by this I mean a visit by a trained traditional birth attendant, health worker or medic in your village, ethnic clinic and nurse or doctor at a hospital.				
No.	Question	Coding	Response	Skip patterns
6	How many antenatal care visits did you have during your last/current pregnancy?	0 = Never 1 = One 2 = Two 3 = Three 4 = Four 5 = More than 4 times 6 = Don't know 8 = Refused	<input type="checkbox"/>	If 0 = No skip to Q.8.
7	Who provided antenatal care to you during your last/current pregnancy? <i>CHOOSE ALL THAT APPLY</i>	0 = No, 1 = Yes, 6 = Don't know, 8 = Refused		
		<input type="checkbox"/> Doctor/Nurse	0 1 6 8	
		<input type="checkbox"/> HA/ MW/ AMW	0 1 6 8	
		<input type="checkbox"/> Ethnic health worker/ medic	0 1 6 8	
		<input type="checkbox"/> Traditional Birth Attendant	0 1 6 8	
		<input type="checkbox"/> Other (_____)	0 1 6 8	
8	How many days did you take daily energy pills during your last/current pregnancy? <i>(ESTIMATE NUMBER OF DAYS)</i>	0 = Never 1 = Less than a month 2 = 1 to 2 months 3 = 2 to 3 months 4 = More than 3 months 6 = Don't know 8 = Refused	<input type="checkbox"/>	
9	How many times did you receive deworming pills during your last/current pregnancy?	0-5 = Record times as integer 6 = Don't know 8 = Refused	<input type="checkbox"/>	

Section C: Delivery and PNC (Last Pregnancy)				
No.	Question	Coding	Response	Skip patterns
10	Describe the result of your last pregnancy.	0 = Currently pregnant 1 = Miscarriage/Abortion 2 = Still Birth 3 = Live birth (died) 4 = Live birth (still alive) 6 = Don't know 8 = Refused	<input type="checkbox"/>	If 0 or 1, go to Q.16.
11	Who delivered your last baby? <i>CHOOSE ALL THE APPLY</i> <i>(Probe to make sure respondent is not calling MHW/HW a doctor)</i>	0 = No, 1 = Yes, 6 = Don't know, 7 = N/A, 8 = Refused		
		<input type="checkbox"/> Doctor/Nurse	0 1 6 7	
		<input type="checkbox"/> HA/ MW/ AMW	0 1 6 7	
		<input type="checkbox"/> Ethnic health worker/ medic	0 1 6 7	
		<input type="checkbox"/> Traditional Birth Attendant	0 1 6 7	
		<input type="checkbox"/> Other (_____)	0 1 6 7	
12	When did you begin breastfeeding your last baby after delivery?	0 = Did not breastfeed 1 = Less than 1 hour 2 = 1 to 6 hours 3 = Within 7 to 24 hours 4 = 1 day to 3 days 5 = After 3 days 6 = Don't know 7 = N/A 8 = Refused	<input type="checkbox"/>	If 0 go to Q15

Eastern Burma Retrospective Mortality Survey (2013)

Cluster ID: ____

HH ID: ____

13	For how many months did you breastfeed your last baby?	01-09 Record as integer 10 = ten or more months 11 = currently breastfeeding 66 = Don't know 77 = N/A 88 = Refused	<input type="text"/>	
14	When did you start giving your last baby anything, including water, to eat or drink besides breast milk? This doesn't include water giving together with medication.	1= 0-6 months 2= After 6 months 3= still exclusively breastfeeding 6= Don't know 7 = N/A 8=Refused	<input type="text"/>	
15	How many times did you receive postnatal care visits within 1 and half months after delivery?	0 - 5 Record as integer 6=Don't Know 8=Refused	<input type="text"/>	

Section D: Family Planning and Contraception

No.	Question	Coding	Response	Skip patterns
16	Are you planning for more children?	0 = No 1=Yes 6=Don't Know 8=Refused	<input type="text"/>	
17	Do you currently do anything to prevent a pregnancy?	0 = No 1= Yes 2 = Not needed (widow/ divorced) 6=Don't Know 8=Refused	<input type="text"/>	<i>If 0 or 2 end the survey.</i>
17a.	What are you doing (which method are you using) NOW to prevent a pregnancy? <i>CHOOSE ALL THAT APPLY</i> <i>(Read all choices to interviewee)</i>	0 = No, 1 = Yes, 6 = Don't know, 7 = N/A, 8 = Refused <input type="checkbox"/> Oral pills <input type="checkbox"/> Depo Injection <input type="checkbox"/> IUD <input type="checkbox"/> Norplant <input type="checkbox"/> Male condom <input type="checkbox"/> Female Condom <input type="checkbox"/> Sterilization <input type="checkbox"/> Calendar method/withdrawal/ abstinence <input type="checkbox"/> Exclusive Breastfeeding <input type="checkbox"/> Traditional medicine/ method <input type="checkbox"/> Other (_____)	0 1 6 7 8 0 1 6 7 8 0 1 6 7 8 0 1 6 7 8 0 1 6 7 8 0 1 6 7 8 0 1 6 7 8 0 1 6 7 8 0 1 6 7 8 0 1 6 7 8 0 1 6 7 8	

Surveyor: "Thank you for taking the time to participate in this survey. We appreciate your help in assessing this community health services and needs. Is there any other women we could interview?"

IF THIS WOMAN IS ONLY WOMAN OR THE LAST PERSON TO BE INTERVIEWED, THIS SURVEY IS COMPLETED. IF THERE ARE ANOTHER WOMEN YOU COULD INTERVIEW, PLEASE CONTINUE WITH ANOTHER SET OF FORM FOR PART 2 ONLY.

11.2. The list of variables of the study

No.	Sec. ¹	Q#.	Indicator	Factor	Analysis
1	1	--	States and Regions	Structural	Descriptive
2	1	--	Women Age	Structural	Descriptive and CFA
3	4	4	Ethnicity	Structural	Descriptive
4	4	1	Highest education completed	Structural	Descriptive and CFA
5	4	6	Occupation	Structural	Descriptive and CFA
6	7	25	Sources of drinking water	Material	Descriptive and CFA
7	7	21	Have an own latrine	Material	Descriptive and CFA
8	6	10	Seek care in the past 12 months	Behavioral	Descriptive and CFA
9	6	12	First people you sought treatment from	Behavioral	Descriptive
10	6	17	Constraints for not seeking cares	Behavioral	Descriptive and CFA
11	8	27	Not enough rice	Psychosocial	Descriptive and CFA
12	8	28	Unable to eat kinds of foods you preferred	Psychosocial	Descriptive and CFA
13	8	29	Eat just a few kinds of food day after day	Psychosocial	Descriptive and CFA
14	6	15	Types of transportation to get treatment	Access to Health	Descriptive and CFA
15	6	16	Time to get to health facilities	Access to Health	Descriptive
16	6	13	Health workers available	Access to Health	CFA
17	6	14	Medicines and medical supplies available	Access to Health	CFA
18	B	6	Number of antenatal care visits	Access to Health	Descriptive
19	C	11	Delivery attendants of the last baby	Access to Health	Descriptive
20	C	15	Receive postnatal care	Access to Health	Descriptive
21	5	7	Physical health during the past 12 months	Health Outcomes	Descriptive and CFA
22	5	8	Felt little interest or pleasure in doing things	Health Outcomes	Descriptive and CFA
23	5	9	Felt down, depressed, or hopeless	Health Outcomes	Descriptive and CFA

¹ Section 1: Respondent's age, currently pregnant
Section 4: Background information
Section 5: General health and wellness
Section 6: Healthcare access & health practices
Section 7: Diarrhea, water & sanitation
Section 8: Food security
Section B: ANC (During Last or Current Pregnancy)
Section C: Delivery and PNC (Last Pregnancy)

11.3. The standardized estimates of the factor loadings

	<i>Factor Loadings</i>	<i>Estimate</i>	<i>S.E.</i>	<i>P²</i>
<i>sanitation_mf</i>	← <i>fundamental_causes</i>	.72	.12	***
<i>health_seeking_behavior_bf</i>	← <i>fundamental_causes</i>	-.65	.15	***
<i>access_to_health</i>	← <i>fundamental_causes</i>	-.45	.08	***
<i>food_security_pf</i>	← <i>fundamental_causes</i>	.09	.11	.01
<i>health_outcomes</i>	← <i>health_seeking_behavior_bf</i>	.19	.02	***
<i>health_outcomes</i>	← <i>sanitation_mf</i>	.14	.02	***
<i>health_outcomes</i>	← <i>food_security_pf</i>	.35	.02	***
<i>health_outcomes</i>	← <i>access_to_health</i>	.07	.02	***
<i>agegp</i>	← <i>fundamental_causes</i>	.12	.10	***
<i>education</i>	← <i>fundamental_causes</i>	-.10	.13	***
<i>occupation</i>	← <i>fundamental_causes</i>	.28		.00
<i>enough_rice</i>	← <i>food_security_pf</i>	.82	.03	***
<i>preferred_food</i>	← <i>food_security_pf</i>	.88	.03	***
<i>limited_food</i>	← <i>food_security_pf</i>	.84		***
<i>drinking_water_cat</i>	← <i>sanitation_mf</i>	.27	.11	***
<i>latrine</i>	← <i>sanitation_mf</i>	.68		***
<i>soughtcare_new</i>	← <i>health_seeking_behavior_bf</i>	.18	.03	***
<i>constraint_yn</i>	← <i>health_seeking_behavior_bf</i>	.94		***
<i>transportation_new</i>	← <i>access_to_health</i>	.16	.24	***
<i>medicines</i>	← <i>access_to_health</i>	-1.02	.66	***
<i>health_worker_new</i>	← <i>access_to_health</i>	.46		***
<i>physical_health</i>	← <i>health_outcomes</i>	.33	.03	***
<i>no_motivation</i>	← <i>health_outcomes</i>	.66	.05	***
<i>depression</i>	← <i>health_outcomes</i>	.89		***

² $p < 0.01$ (***) is statistically significant.