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The Relationship Between Maternal Healthcare Service Utilization, Experiences of Violence, and Mental Health in the Tea Gardens of Bangladesh

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The Relationship Between Maternal Healthcare Service Utilization, Experiences of Violence, and Mental Health in the Tea Gardens of Bangladesh

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An abstract of a thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Public Health in Global Health
2020

Abstract

Objective: To determine the relationship between maternal healthcare service utilization, experiences of violence, and mental health in the tea gardens of Bangladesh.

Methods: Data from a cross-sectional survey collected June-July 2019 were analyzed. 100 women were recruited using convenience sampling, 20 women from five tea gardens participating in the Bagan Mayer Jonno Initiative. Descriptive statistics, cross tabulations, and odds ratios were generated using SAS 9.4 Software (Cary, NC).

Conclusions: Maternal healthcare service utilization was higher than among women surveyed at baseline in 2016. Women's perceived autonomy is low, the burden of mental health and experiences of violence are high, but there was no clear relationship between the exposures of interest and maternal healthcare service utilization.

Public Health Implications: Though not associated with low service utilization in this sample, violence against women, poor mental health, and low levels of women's autonomy in the tea gardens require further attention.

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Thank you to Dr. Animesh Biswas of the United Nations Population Fund (UNFPA) Bangladesh and Dr. Abdul Halim from the Center for Injury Prevention and Research Bangladesh (CIPRB) for inviting me to participate in the evaluation of the Bagan Mayer Jonno in Bangladesh in the summer of 2019. I appreciate all of the CIPRB research staff and health volunteers in the tea gardens who were instrumental in data collection. It was an incredible experience learning about this program and supporting the great work that CIPRB and UNFPA is doing to improve the health of mothers and children in the tea gardens.

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Thank you to my wonderful thesis chair, Dr. Dabney Evans, for her help throughout this process and for reading my numerous thesis drafts. I would also like to thank Dr. Shivani Patel, without whom I would never have been able to complete the statistical analysis for this project. I am grateful for Dr. Patel's patience with my constant stream of confused questions.

Without the hard work of Cinderella Akbar, this program evaluation and analysis would not have been possible. I will be forever indebted to her for her kindness and will always cherish her friendship.

Finally, I would like to sincerely thank all of the generous and kind women who welcomed our research team into their homes and took the time to complete our survey.

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Acronyms

Antenatal Care (ANC)
Bagan Mayer Jonno Initiative (BMJI)
Bangladesh's Ministry of Health and Family Welfare (MHFW)
Bangladesh Tea Board (BTB)
Centers for Disease Control and Prevention (CDC)
Center for Injury Prevention and Research Bangladesh (CIPRB)
Intimate Partner Violence (IPV)
Postnatal Care (PNC)
United Nations Population Fund (UNFPA)

Literature Review

Introduction

Women, who are the majority of laborers in Bangladesh's tea gardens, have particularly high rates of maternal mortality and morbidity due, in part to, poverty, child marriage, adolescent pregnancy, and gender inequality (Biswas, Abdullah, & Halim, 2016). Most mothers who work in the tea gardens do not receive adequate pre- and post-natal care and deliver their babies at home without a trained birth attendant, increasing their risk of complications (Biswas et al., 2016). Governmental and non-governmental health interventions in the tea gardens have primarily focused on increasing the availability of healthcare services by training midwives and volunteers. However, there has not been adequate attention given to variations in maternal health care utilization, women's mental health, and women's experiences of violence.

This literature review explores key background topics to justify research about maternal healthcare service utilization in relation to mental health and experiences of violence in the tea gardens of Bangladesh.

Methods

This literature review of available articles, reports, and data explores maternal health in Bangladesh; maternal health in the tea gardens of Bangladesh; and maternal healthcare utilization in relation to experiences of violence and maternal mental health. Information was gathered from peer-reviewed databases (EBSCO and PubMed) through keyword searches using the following terms: maternal, health, mortality, morbidity, tea

gardens, Bangladesh, healthcare, service, utilization, mental health, gender-based, intimate partner, domestic, and violence. Articles were included if they were written in English.

Bangladesh-specific information was preferred, however articles broadly related to maternal healthcare service utilization, maternal mental health, and maternal health related to violence were included. Additional information was gathered from gray literature which was sought from the Center for Injury Prevention Bangladesh and Tea Board Bangladesh websites. Any reference to the health of tea garden workers on either of these websites was included.

Overview of Maternal Health in Bangladesh

Bangladesh's healthcare system has dramatically improved in the last 20 years, with increased health coverage and service utilization (Perkins et al., 2019). However, according to the WHO's 2015 Bangladesh Health Systems Review, Bangladesh's health system is not adequately prepared to address non-communicable diseases, violence, mental health, high maternal mortality rates, or poor maternal and child nutrition (World Health Organization. Regional Office for the Western, 2015).

Bangladesh's maternal mortality ratio has decreased in recent years, from 348 (per 100,000 live births) in 2005 to 172 in 2017, due in large part to government efforts with donor support (Bangladesh, 2018 ; Kamal, Curtis, Hasan, & Jamil, 2016). Efforts by the national government have included upgrading health facilities to provide emergency obstetric care, revamping the Community Skilled Birth Attendants program in 2003, and initiating a maternal health voucher plan (Kamal et al., 2016). All of these efforts aimed to increase the availability and utilization of skilled maternal health care, especially increasing

the number of births facilitated by a skilled attendant which many argue is the most critical strategy to combat maternal mortality (Kamal et al., 2016; Zere et al., 2013). Births attended by a skilled health professional in Bangladesh have increased from 26.5% in 2010 to 50% in 2016, but that rate is still unacceptably low and there are disparities between urban and rural populations as well as based on level of education (Bangladesh, 2018).

Bangladesh's national targets are to reduce its maternal mortality ratio to 105 (per 100,000 live births) by 2021 and to the Sustainable Development Goal of 70 by 2030 (Bangladesh, 2018). While there have been significant improvements in maternal health, Bangladesh is the world's most densely populated nation and has a relatively high maternal mortality, meaning much more work needs to be done if Bangladesh is going to reach its goals (Bangladesh, 2018 ; Perkins et al., 2019; Rajia, Sabiruzzaman, Islam, Hossain, & Lestrel, 2019; WHO, 2019).

There are many disparities in maternal health outcomes and access to care. The rate of adolescent pregnancy, which is related to complications and premature death, is high, especially among girls with low education living in poverty, and was reported at 113 per 1,000 female adolescents aged 15-19 in 2017 (Bangladesh, 2018 ; M. M. Islam, Islam, Hasan, & Hossain, 2017). Fewer poor and rural women receive antenatal care (ANC) care than wealthier and urban women due to access of services, community value of traditional birth attendants, and perceived lack of need (Haider et al., 2017). Bangladeshi women have reported to be largely unaware of their right to healthcare, which has been associated with low levels of healthcare utilization, including giving birth with the assistance of a skilled birth attendant (Perkins et al., 2019).

Maternal Health in the Tea Gardens of Bangladesh

Background: tea gardens of Northern Bangladesh

Under British colonial rule, Bangladesh's first tea gardens were established in the mid-19th century (Hossain, Khan, & Khandaker, 2019). Migrants from India, also under British control, came to work in the tea gardens under the promise of high wages and improved quality of life, which were not fully realized (M. N. Islam & Al-Amin, 2019). Bangladesh now has 166 tea gardens, producing 18 million kg of tea and earning 1.8 billion dollars, accounting for approximately 1% of Bangladesh's GDP (Abdullah, Biswas, & Halim, 2016; M. N. Islam & Al-Amin, 2019). There are two major areas for tea production: Sylhet division in the north and Chittagong in the south (Idris, 2018).

Over 440,000 people aged 18 and older live in the tea gardens of Sylhet division in northern Bangladesh, over 100,000 of whom are employed as tea pickers in the tea gardens (Abdullah et al., 2016; M. N. Islam & Al-Amin, 2019). More than 70% of tea garden workers harvesting leaves are women, earning up to approximately 1USD daily (85 taka) dependent on the amount of tea leaves picked (M. N. Islam & Al-Amin, 2019; Zaman & Abir, 2017). Most of the tea garden workers are descendants of the original tea garden workers who migrated from India and who come from diverse ethnic and religious backgrounds, though the majority are Hindus from lower castes (M. N. Islam & Al-Amin, 2019).

The tea gardens are overseen by the Bangladesh Tea Board (BTB), the "statutory body constituted under the Tea Ordinance 1977 to regulate, control and promote the cultivation and sale of Tea in Bangladesh" (Board, 2019). BTB is tasked with overseeing Bangladesh's tea plantations to "identifying the cultivable land of Tea Garden, its maximum use, encouragement to small tea cultivation, increase and improve tea production, meet the

internal demand of tea and restore lost tradition of tea exports" (Board, 2019). While one of its functions is to "to undertake welfare measures for tea garden laborers and employees", as BTB is subject to labor laws and other government oversight, there are often conflicts of interest between the BTB, each tea garden's management staff , unions, community leaders (panchayats), and employees (Board, 2019; Idris, 2018).

Tea garden workers are designated as either "permanent" or "temporary" workers. Permanent workers are eligible for housing, medical care, land for personal gardening, daily rations, and festival bonuses while temporary workers are not (M. N. Islam & Al-Amin, 2019; Zaman & Abir, 2017). Very few tea garden employees own land, as housing provided is owned by the tea garden authorities, and few are able to save any of their earnings after daily costs of living, leading to cycles of poverty (Idris, 2018; M. N. Islam & Al-Amin, 2019). When a worker retires, they often transfer ownership of their job, or name (naam), to a family member so that they can continue to live in the house in the tea garden (M. N. Islam & Al-Amin, 2019). Most women do not have additional sources of income due to limited mobility and familial obligations (M. N. Islam & Al-Amin, 2019). Additionally, most tea gardens offer primary schooling but secondary schooling is often expensive and inaccessible, leading to low levels of educational attainment and low literacy rates (Idris, 2018; M. N. Islam & Al-Amin, 2019).

Maternal Health in the Tea Gardens

Living conditions and health in the tea gardens are poor. There is little access to clean water, proper sanitation, adequate food, and medical care (M. N. Islam & Al-Amin, 2019). Under the Bangladesh Labor Act of 2006, the tea garden authority is expected to

provide medical facilities and services to workers, yet these services are inadequate (Idris, 2018; Zaman & Abir, 2017). Facilities are understaffed and only provide primary care services, leaving tea garden residents to seek care for chronic and complicated conditions at expensive facilities outside of the tea gardens, from NGOs operating inside of the tea gardens, or from traditional healers (M. N. Islam & Al-Amin, 2019; Zaman & Abir, 2017).

According to a 2016 baseline evaluation report published by the Center for Injury Prevention Bangladesh (CIPRB), the United Nations Population Fund Bangladesh (UNFPA Bangladesh), and Bangladesh's Ministry of Health and Family Welfare (MHFW), the sexual and reproductive health of women in the tea gardens is of particular concern (Abdullah et al., 2016). In the 166 tea gardens from January-December 2015, 70 maternal deaths, 216 neonatal deaths, and 205 stillbirths occurred (Abdullah et al., 2016). In 2014, 39.1% of maternal deaths reported in Moulvibazar district of Sylhet occurred in the tea gardens, though the proportion of people in the district (1.9 million) who live in the tea gardens (320,000) is much smaller (16.8%).

In 2016, among women surveyed in 25 tea gardens of Moulvibazar who had a live birth in the past year, 4% of women 19 and under and 5% of women over 19 reported received at least 4 ANC visits and only 17% of women received PNC (Abdullah et al., 2016). Over three quarters (77%) of women gave birth at home and only 56% of women gave birth with the help of a skilled birth attendant (Abdullah et al., 2016). Knowledge of sexual and reproductive health topics, including ANC care, maternal complications, and family planning were low (Abdullah et al., 2016). Nine percent of women surveyed reported experiencing intimate partner violence (Abdullah et al., 2016).

The report's qualitative section reported that women are wary of seeking healthcare from skilled attendants and professionals for many reasons, including fear of cesarean-sections; cost; desire to maintain traditional practices, such as consuming warm food and tea, at the birth; and pressure from their husbands and in-laws to utilize traditional birth attendants at home (Abdullah et al., 2016). There are many myths surround pregnancy and delivery, such as that increased sleep during pregnancy will cause the baby to grow up to be lazy and that increased caloric intake during pregnancy will lead to a larger baby, increasing the likelihood of a cesarean-section (Abdullah et al., 2016).

It is important to note that this baseline evaluation only included women who gave birth to a live baby, meaning the practices and perspectives of women who died were excluded. Therefore, knowledge about the major causes of maternal death are not covered in this survey, but information about care-seeking, misinformation, and general maternal health conditions from this evaluation have been used to inform interventions in the tea gardens aimed at improving maternal health and decreasing the rate of maternal mortality.

Bagan Mayer Jonno Intervention

The Bagan Mayer Jonno Intervention (BMJI) is a collaborative care approach to improve reproductive, maternal and neonatal health in the Tea Gardens of Moulvibazar, Bangladesh. The goal of this intervention, as stated on their program brochures, is to implement an "integrated program to address child marriage, adolescent pregnancy, maternal and neonatal health, unmet need of family planning, sexual-reproductive health rights including violence against women for indigenous population of Tea Gardens of Bangladesh" (A. Biswas, personal communication, April 29, 2019). Their efforts include

training midwives, distributing folic acid and iron tablets, and community education. BMJI is led by the Center for Injury Prevention Bangladesh (CIPRB), funded by the United Nations Population Fund Bangladesh (UNFPA), with technical assistance from the U.S. Centers for Disease Control and Prevention (CDC) and other partners. The BMJI conducts various evaluation-related research projects to improve the quality of its programs, with its baseline evaluation report published in 2016, but research has not primarily focused on mental health and experience of violence as related to maternal health and healthcare service utilization.

Outcome of Interest: Maternal Healthcare Service Utilization

Maternal healthcare service utilization in Bangladesh has increased in recent years, but remains low. Only 36% of women receive postnatal care within two days of giving birth, 31% receive at least 4 ANC visits, 37% gave birth in a health facility, 42-50% of births are attended by a skilled health professional, and service utilization is lower in rural areas of the country (Bangladesh, 2018 ; Goldenberg & Stephenson, 2017; UNICEF, 2018).

There are many factors that contribute to low maternal healthcare service utilization. Generally, utilization of health services is related to service availability, quality, and cost, as well as social determinants, cultural norms, and individual beliefs surrounding healthcare (Chakraborty, Islam, Chowdhury, Bari, & Akhter, 2003; Stephenson & Elfstrom, 2012). Utilization of skilled birth attendants in rural Bangladesh has been reported as significantly related to maternal age, education, literacy, and knowledge of healthcare rights (Chakraborty et al., 2003; Goldenberg & Stephenson, 2017; Perkins et al., 2019; Walton & Schbley, 2013). Women with lower literacy levels in the Sylhet division of

Bangladesh, where many of the tea gardens are located, report using skilled attendants less often than women with higher literacy levels (Kalim et al., 2009).

One of the most important factors to explain maternal healthcare utilization is the need or severity of disease, where mothers in rural Bangladesh experiencing severe complications were more than twice as likely to seek care from a doctor, nurse, or midwife than mothers who did not experience complications (Chakraborty et al., 2003). As women with the most severe complications are often the most likely to utilize care, especially when maternal health services were recently made more accessible, maternal mortality in facilities may actually increase, as those with the greatest needs may not seek care until their complications and illnesses are too severe to effectively treat (Rajia et al., 2019). For these reasons, it is necessary to focus on management and detection of problems during pregnancy, in addition to increasing community trust, service accessibility, deliveries conducted by trained birth attendants, and lowering costs to improve maternal health (Rajia et al., 2019)

Finally, a woman's perceived level of autonomy is a factor in utilization of health services. In many low- and middle-income countries, including Bangladesh, women do not have control over their finances which means they have to rely on financial support and transportation from their in-laws, male relatives, and husbands to access health services (Heise et al., 2019). Results from a study in Pakistan showed that a 1% increase in a woman's decision-making power coincided with a 10% increase in maternal health service utilization (Heise et al., 2019; Hou & Ma, 2013). Studies in Bangladesh attribute low levels of maternal care-seeking and service utilization to religious and social expectations that

restrict women's autonomy, privileging husbands and in-laws decision making over the pregnant woman's (Stephenson & Elfstrom, 2012; Walton & Schbley, 2013).

Exposures of Interest

Experiences of Violence and Maternal Health

Women in the tea gardens are susceptible to violence. Though women in Bangladesh experience violence in many forms, including violence by family members (Khan et al., 2017), intimate partner violence (IPV) among women in Bangladesh is particularly high compared to other countries, estimated between 55% and 95% of ever-married women (Esie, Osypuk, Schuler, & Bates, 2019). Intimate partner and other forms of violence, both physical and emotional, lead to poor maternal health outcomes including physical injury; depression, anxiety, and post-traumatic stress disorder; increased risk of malnutrition and substance use; and maternal death from complications, homicide, or suicide (Alhusen, Ray, Sharps, & Bullock, 2015; Esie et al., 2019; Velonis et al., 2017).

Violence not only affects the immediate physical and mental health of the pregnant woman but can also negatively impact the health of her fetus, including lower birth weight, preterm delivery, and perinatal death (Alhusen et al., 2015; Ferdos, Rahman, Jesmin, Rahman, & Sasagawa, 2018). Experiences of violence are also associated with lower rates of healthcare utilization during pregnancy and post-partum (Alhusen et al., 2015; Mohammed et al., 2017).

Maternal Mental Health

The mental health burden among pregnant women and mothers in rural Bangladesh is also of concern (Monawar Hosain, Chatterjee, Ara, & Islam, 2007). Mental health outcomes are complex for pregnant women and new mothers, as poor mental health can increase the onset and severity of physical health outcomes and lead to poor birth outcomes (Ziaei, Frith, Ekström, & Naved, 2016). Psychological distress during pregnancy can impact a mother's ability to adhere to perinatal care (Ziaei et al., 2016); lower a woman's likelihood to seek healthcare and increase her likelihood to miss health appointments (Farr et al., 2013); negatively affect fetal growth, immune and metabolic functions (Heise et al., 2019; Ziaei et al., 2016); and increase susceptibility to disease (Ziaei et al., 2016). Unwanted and mistimed pregnancies in rural Bangladesh, where there is limited access to family planning, are significantly related to maternal depressive symptoms both during and after the pregnancy (Surkan et al., 2018). The suicide rate among married women and adolescents in Bangladesh is increasing with suicide as the main cause of death among adolescent females (Sharmin Salam et al., 2017). Suicide rates in Bangladesh are highest among women working in agriculture and living in rural areas of the country where pesticides were most often used as the means of suicide (Sharmin Salam et al., 2017).

While there are reasons to believe that poor mental health could decrease care-seeking, there is evidence that antenatal depression can actually lead to increased care-seeking, though in the form of emergency visits and inappropriately scheduled ANC visits (Bitew, Hanlon, Kebede, Medhin, & Fekadu, 2016). Though this is an increase in service utilization, the fact that these visits are not scheduled in accordance with WHO guidance

still risk non-detection and non-treatment of complications, and can burden healthcare systems and clinics that are already strained (Bitew et al., 2016).

Conclusion

Women in the tea gardens are at increased risk of maternal complications, low maternal health service utilization, and maternal death. While interventions, such as BMJI, have increased access to maternal health services, there is reason to believe that many factors, including poor mental health and experiences of violence, could be related to low service utilization even if services are more easily accessible. This research will help the BMJI to better understand barriers to maternal health service utilization to best serve women in the tea gardens of Bangladesh.

Manuscript

Introduction

Women living and working in the tea gardens of Bangladesh have particularly high rates of maternal mortality and morbidity due, in part to, poverty, gender inequality, and gender-based violence (Biswas et al., 2016). Most mothers who work in the tea gardens deliver their babies at home without a trained birth attendant and few seek skilled antenatal (ANC) or postnatal care (PNC), increasing their risk of complications (Biswas et al., 2016).

According to a 2016 report created by the Center for Injury Prevention Bangladesh (CIPRB), the United Nations Population Fund Bangladesh (UNFPA Bangladesh), and Bangladesh's Ministry of Health and Family Welfare (MHFW), in 2014, 39.1% of maternal deaths reported in Moulvibazar district of Sylhet occurred in the tea gardens, though the proportion of people in the district (1.9 million) who live in the tea gardens (320,000) is much smaller (16.8%) (Abdullah et al., 2016). In 2016, among women surveyed in 25 tea gardens of Moulvibazar who had a live birth in the past year, 4% of women 19 and under and 5% of women over 19 reported received at least 4 ANC visits and only 17% of women received PNC (Abdullah et al., 2016). Over three quarters (77%) of women gave birth at home and only 56% of women gave birth with the help of a skilled birth attendant (Abdullah et al., 2016). Knowledge of sexual and reproductive health topics, including ANC care, maternal complications, and family planning were low (Abdullah et al., 2016). Nine percent of women surveyed reported experiencing intimate partner violence (Abdullah et al., 2016).

The mental health burden and experiences of violence among pregnant women and mothers in rural Bangladesh are of particular concern (Monawar Hosain et al., 2007). Psychological distress during pregnancy can impact a mother's ability to adhere to perinatal care (Ziaei et al., 2016), lower a woman's likelihood to seek healthcare and increase her likelihood to miss health appointments (Farr et al., 2013), negatively affect fetal growth, immune and metabolic functions (Ziaei et al., 2016) and increase susceptibility to disease (Ziaei et al., 2016). Unwanted and mistimed pregnancies in rural Bangladesh where there is limited access to family planning are significantly related to maternal depressive symptoms both during and after pregnancy (Surkan et al., 2018). The suicide rate among married women and adolescents in Bangladesh is the main cause of death among adolescent females (Sharmin Salam et al., 2017).

Though women in Bangladesh experience violence in many forms, including violence by family members (Khan et al., 2017), intimate partner violence (IPV) among women in Bangladesh is particularly high compared to other countries, estimated between 55% and 95% of ever-married women (Esie et al., 2019). Intimate partner and other forms of violence, both physical and emotional, lead to poor maternal health outcomes including physical injury; depression, anxiety, and post-traumatic stress disorder; increased risk of malnutrition and substance use; and maternal death from complications, homicide, or suicide (Alhusen et al., 2015; Esie et al., 2019; Velonis et al., 2017). Violence not only affects the immediate physical and mental health of the pregnant woman but can also negatively impact the health of her fetus, including lower birth weight, preterm delivery, and perinatal death (Alhusen et al., 2015; Ferdos et al., 2018). Experiences of violence are also associated

with lower rates of healthcare utilization during pregnancy and post-partum (Alhusen et al., 2015; Mohammed et al., 2017).

The Bagan Mayer Jonno Intervention (BMJI) is a collaborative care approach to improve reproductive, maternal, and neonatal health in the tea gardens of Moulvibazar, Bangladesh. The goal of this intervention is to "address child marriage, adolescent pregnancy, maternal and neonatal health, unmet need of family planning, sexual-reproductive health rights including violence against women for indigenous population of Tea Gardens of Bangladesh" (A. Biswas, personal communication, April 29, 2019). Their efforts include training midwives, distributing folic acid and iron tablets, and community education. BMJI is led by the Center for Injury Prevention Bangladesh (CIPRB), funded by United Nations Population Fund (UNFPA), with technical assistance from the U.S. Centers for Disease Control and Prevention (CDC) and other partners (A. Biswas, personal communication, April 29, 2019).

There has been little research focused on women in the tea gardens, who comprise a unique and neglected minority population in Bangladesh. While data about maternal health service utilization and experience of violence were collected from BMJI's baseline survey in 2016, until this study, no data about mental health nor perceived autonomy were collected or analyzed. Additionally, there was no previous analysis to explore whether mental health and violence were barriers to seeking care in the tea gardens.

The purpose of this study was to determine the relationship between maternal health service utilization, experiences of violence, and mental health in the tea gardens participating in the Bagan Mayer Jonno Initiative (BMJI). The results of this study aim to inform future interventions to promote the health of women in the tea gardens.

Methodology and Data

Survey Development

The data for this cross-sectional study were gathered using a survey as part of the Bagan Mayer Jonno Initiative's (BMJ) Supplemental Evaluation in the summer of 2019. The survey tool created for this evaluation was adapted from USAID and CDC's Reproductive Health Assessment Toolkit for Conflict Affected Women (2007). This adapted assessment also incorporated questions about maternal health modified from the BMJI's baseline survey, "The Government of the People's Republic of Bangladesh Ministry of Health and Family Welfare Baseline Survey for Reproductive and Maternal Health Care Intervention at Selected Tea Gardens in Moulvibazar" (2016). Adaptations and initial content edits were completed in English by Sarah Anderson, Dr. Endang Handzel, CIPRB staff, and UNFPA staff. The survey was then translated into Bangla by two CIPRB consultants and pilot tested with two tea garden mothers to ensure design and translation accuracy.

Data Collection

Recruitment

Five tea gardens (Phulbari, Amrailchara, Madhabpur, Shamshernagar, and Satgao) in the Sylhet Division of Bangladesh were selected by CIPRB staff for the BMJI Supplemental Evaluation. These five tea gardens were chosen by convenience sampling from the ten tea gardens that participated in BMJI from its inception in 2016. Twenty women were recruited from each of the five sites, resulting in a sample of 100 participants. Women in the selected tea gardens were eligible to participate if they had a child under age two years, meaning that they gave birth to a child while the BMJI was active in the tea

garden and BMJI services were available to them. BMJI health volunteers, identified women for participation through convenience sampling, as they had worked in the gardens and were familiar with the women who had a child aged under two years of age.

Procedures

Three local CIPRB consultants collected data between June 30-July 12, 2019. The researchers were briefed about BMJI and trained to use the survey tool by UNFPA and CIPRB staff. In each of the five tea gardens, BMJ health volunteers led the researchers to the homes of mothers who were recruited to participate in the survey. The first author entered survey data into a Microsoft Excel database and led the data analysis.

Data Analysis

Though the Supplemental Evaluation survey had seven sections in total, this sub-study only focuses on four sections: Background Information, Safe Motherhood, Gender-Based Violence, and Emotional Health. Figure 1 shows the relationship between covariates, exposures, and the outcome depicted in a Directed Acyclic Graph (DAG). Though data from this survey could not be directly compared to the aforementioned 2016 baseline survey nor generalized to all women who had a child under two in the tea gardens, as neither had representative samples and the survey tools were not identical, the findings from these two surveys and groups were broadly compared to inform programmatic work (Abdullah et al., 2016).

Variables of Interest (Tables 1, 2, and 3)

The survey included 6 questions about the outcome of interest, maternal healthcare service utilization, such as "Have you seen anyone for antenatal care for your most recent pregnancy, including a current pregnancy?" and "During the 6 weeks after birth, did a health worker come to your home to check on you or did you go to the health center to check your health?"

The survey included three sections about experiences of violence, one of the exposures of interest, where participants were asked to report violence that they had experienced in the last three months from non-family members, family members (non-spouse), and spouses. Questions about both physical (e.g. "Physically hurt, such as slapped, hit, choked, beaten or kicked?") and emotional violence (e.g. "Forbid you from participating in activities in the community such as seeing friends or family, educational opportunities, women's groups, or employment opportunities") were included.

Mental health, the second exposure of interest, was assessed using the Self-Reporting Questionnaire (SRQ20) to screen participants for potential common mental health disorders. The SRQ20 has been validated with a cutoff score of 8 in Bangla (Netsereab et al., 2018).

Demographic data were collected, including self-reported age and education level. Other information, such as autonomy in decision-making (e.g. "Currently, who in your family usually has the final say on the following decisions? A. Your own healthcare?") was also recorded.

Statistical Analysis

Descriptive analysis was performed to explore participant characteristics (Table 1) and the frequencies of variables of interest: care-seeking, experiences of violence, and answers to individual mental health questions (Tables 2 and 3). Cross-tabulations and odds ratios were calculated to assess the relationship between service utilization and covariates of interest (Table 4) as well as by exposures of interest (Tables 6 and 7). Further comparisons between exposures and covariates of interest were conducted (Table 5). Statistical analysis was completed using SAS 9.4 Software (Cary, NC).

Ethical Considerations

This project was found to be exempt by the Emory's Institutional Review Board since it did not qualify as human subject research, as it was an extension of existing programmatic evaluation work. The survey aimed to compare maternal health and knowledge from BMJI's baseline evaluation as well as gather new maternal health-related baseline data to improve the existing program.

Results

Demographic Information (Table 1)

The women surveyed ranged in age, the majority of whom were between 20 and 25 years old (55%). Most women surveyed had less than a high school education (77%) with many receiving one year or less of schooling (20%). The majority were Hindu (81%) and the sample also included Muslims (18%) and Christian respondents (1%). All of the respondents were married, though one response was not recorded due to interviewer error.

Major Findings

High Maternal Healthcare Service Utilization (Table 2)

Maternal healthcare service utilization was high among participants. Though outcomes in this survey cannot be directly compared to BMJI's baseline survey data and attributed to BMJI's work, as the survey design and sampling were different, women in this sample utilized maternal healthcare services more than the women surveyed at baseline in 2016 before the BMJI was implemented (Abdullah et al., 2016). Almost all of the women received antenatal care (99% compared to 42% at baseline). The majority of women surveyed gave birth in a facility (61% compared to 23% at baseline), gave birth with the assistance of a trained provider, (73% compared to 56% at baseline), and received PNC care within 6 weeks of giving birth (58% compared to 28% who received PNC care within 4 weeks at baseline). Finally, among women who experienced complications, over three-quarters of them sought care from a skilled provider (77.8% during pregnancy and 91% for postnatal complications compared to 53% who sought care for any complication during pregnancy, delivery, or postnatal). There were no clear patterns of service utilization by age, education, or perceived autonomy (Table 4).

Poor Mental Health Related to Experiences of Violence (Tables 2 and 5)

Approximately one in four (26%) women experienced emotional or physical violence, most of whom from their spouse (22%). Few women who experienced violence sought care for injuries (18%) and only half spoke to anyone about their experience of violence (53%). The questions asked about violence at baseline were different than for this study, so the groups are not directly comparable, but broadly rates of violence in this study

were higher than reported at baseline (9% of women at baseline) but lower than overall estimated rates of violence in Bangladesh reported in the literature (Esie et al., 2019).

Many women reported poor mental health (Tables 2 and 3). Over a fifth (22%) of women who completed the full SRQ20 scored positively at the cutoff score of eight, likely indicating a common mental health disorder; two women scored 20 out of 20 on the SRQ20, indicating severe distress. Nearly one in five women (18%) expressed thoughts of suicide and ten women indicated that they may have had experienced postpartum depression after their last birth.

Violence appears to be related to poor mental health (Table 5). Over a third of women of women who had recently experienced spousal violence had positive SRQ20 scores (36%) and the majority indicated that they may have had postpartum depression (90%). Women who experienced violence from a non-spouse family member had high odds of suicidal ideation (odds ratio =16.20) and postpartum depression (odds ratio=11.00) that were statistically significant. Spousal and non-familial violence also appeared to be related to poor mental health, though the odds ratios were not statistically significant. All (100%) of women who experienced familial violence (non-spouse) had a positive SRQ20 score and 75% had thoughts of suicide.

There were two surprising findings comparing violence and mental health. First, a statistically significant odds ratio indicated that spousal violence was slightly protective for postpartum depression (odds ratio = 0.88). However, the timeframe for these two questions are different and may not overlap, as women were asked about violence they experienced in the last 3 months and the postpartum depression question asked if they had "more emotional difficulties than usual" within 6 months after giving birth. Second, the

relative risk calculated for the risk of a positive SRQ score among those who experienced familial violence appears to be protective (relative risk=0.18). However, an odds ratio was not calculated because there was a cell with a zero value, as all women who experienced familial violence had a positive SRQ 20 score, so this calculation is misleading.

Low Levels of Perceived Autonomy (Table 2)

Women indicated little autonomy over decision-making, except for preparation of daily meals (81%). Few women indicated that they have a say in their personal healthcare decision-making (4% said they make these decisions alone and 5% said that these decisions were made alone or jointly).

Inconclusive Relationship Between Exposures and Outcome (Tables 6 and 7)

The relationship between violence and maternal healthcare service utilization was mixed. For example, women who experienced non-family/non-spousal violence were more likely to give birth in a facility, deliver with a skilled professional, and seek care for pregnancy complications while those who did not did not were more likely to receive PNC care and seek care for postnatal complications. Only one association was statistically significant (odds ratio of seeking care for complications during pregnancy among those who experienced familial violence = 0.77) after calculating the confidence intervals for odds ratios (Table 6).

Similarly, the relationship between mental health and service utilization was mixed. Generally, poor mental health was associated with not giving birth with a skilled provider nor at a hospital and poor mental health was protective for seeking care for complications

during pregnancy and receiving PNC care within 6 weeks. However, none of these associations were statistically significant (Table 7).

Discussion

Summary

Though direct comparisons cannot be drawn from the baseline survey and attributed to BMJI's work, utilization of maternal health services among women in this study was higher than women surveyed at baseline (Abdullah et al., 2016). Almost all women had received ANC care and there were fairly high levels of deliveries in facilities as well as births attended by trained providers compared to women surveyed in the tea gardens in 2016 (Abdullah et al., 2016). Though I hypothesized higher service utilization would occur among women who were younger, had higher levels of education, expressed high levels of perceived autonomy, did not experience violence, and did not indicate poor mental health, these trends were generally not found, so more research is needed to determine why some women utilized services while others did not.

About one in four women (26%) experienced violence of any kind, the majority of which was by their spouse (22%). Perceived levels of autonomy, especially around personal healthcare decision-making, was very low and there were high levels of mental distress. The number of women who report suicidal ideation (n=18) is particularly alarming. However, statistically significant relationships between mental health, experience of violence, and maternal healthcare service utilization were not found.

Strengths and Limitations

This study had strengths, including the reliability of the survey, as it was an adapted CDC and USAID sexual and reproductive health survey which included the SRQ20, a mental health screening tool that has been validated in Bangla. This study provides the first glimpse into mental health and perceived autonomy in the tea gardens and is the first direct study to focus on the relationships between mental health, experiences of violence, and maternal health service utilization in this population.

However, this study has numerous limitations. First, this survey had a small and unrepresentative sample size that was not randomly sampled. The BMJI health volunteers who conducted the convenience sampling knew the women that they selected for the survey, meaning that the women sampled were likely the most familiar with BMJI staff for utilizing services, potentially producing artificially high utilization numbers compared to other women in the tea gardens. Second, there was insufficient training for field staff which resulted in numerous interviewer errors, leading to different denominators for various questions in the survey. Third, social desirability bias and stigma may have led to underreporting of poor mental health and experiences violence. Fourth, many questions in this study's survey tool differed from baseline and the sampling was not the same, meaning that the findings from these studies cannot be directly compared. Finally, there were additional confounders that were not accounted for in the survey design, including alcohol consumption and child marriage. These two issues came up in focus group discussions with the women in the 2016 baseline and should be addressed in future research and program evaluation efforts.

Conclusion and Recommendations

While maternal healthcare service utilization among women in this study appears to be higher than among women surveyed in the tea gardens in 2016 before the BMJI was implemented, there is still room for improvement. The burdens of violence and poor mental health are high and women have little say in decision-making about their own healthcare. To improve health outcomes, future programming in the tea gardens should involve the families and spouses of pregnant women and mothers, as women's autonomy is low, and more resources should be devoted to addressing violence and poor mental health in the community, as there are currently no resources available.

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Public Health Implications

There are many ways that this study can inform future research and programming in the tea gardens. First, subsequent analysis of these data exploring the relationship between mental health, experiences of violence, and maternal healthcare service utilization should include a mediation analysis, as the DAG in Figure 1 indicates. This was out of the scope of this current research paper.

Second, future research in the tea gardens should collect additional data about violence in relation to maternal complications and care-seeking in the tea gardens. The association between violence and experience of complications is well-established in the literature, but was not the focus of this research. Additionally, information about participant and spousal alcohol use as well as the age at marriage will be important to include to address potential confounders.

Third, mental health and violence are clearly important health threats in the tea gardens, so I recommend that future BMJI work and partnerships aim to reduce violence and improve access to mental healthcare for participants. While mental health and violence weren't consistently associated with lower maternal health service utilization in this study, these factors still have negative impacts on women's health that need to be addressed.

Fourth, current BMJI programming, including health education, should increase the involvement of women's family members and spouses. This study indicated that women in the tea gardens have limited decision-making power over their own healthcare, so improved health service-utilization and health outcomes will require the collaboration of the women's family and community.

Fifth, there were significant limitations of this study that should be addressed in any future research and program evaluation in the tea gardens. As CIPRB has access to a list of women who have given birth in the tea gardens, quantitative data collection should be conducted with a random sample rather than convenience sampling. Field staff, including myself in the case of this study, should undergo more rigorous training from CIPRB and UNFPA staff to ensure that data are accurately gathered. Finally, all survey tools should be written in both English and Bangla and made available to all research staff during evaluation planning and tool development. This study would have improved significantly if the survey tool had been consistent with the baseline survey, but there were sections (e.g. questions about violence) that were not provided to all staff. These recommendations would have allowed for direct comparison between this study and the baseline evaluation.

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Tables and Figures

Figure 1: Focused Directed Aclyclic Graph (DAG) depicting the rationale for sub-study research question using variables measured in the primary survey data

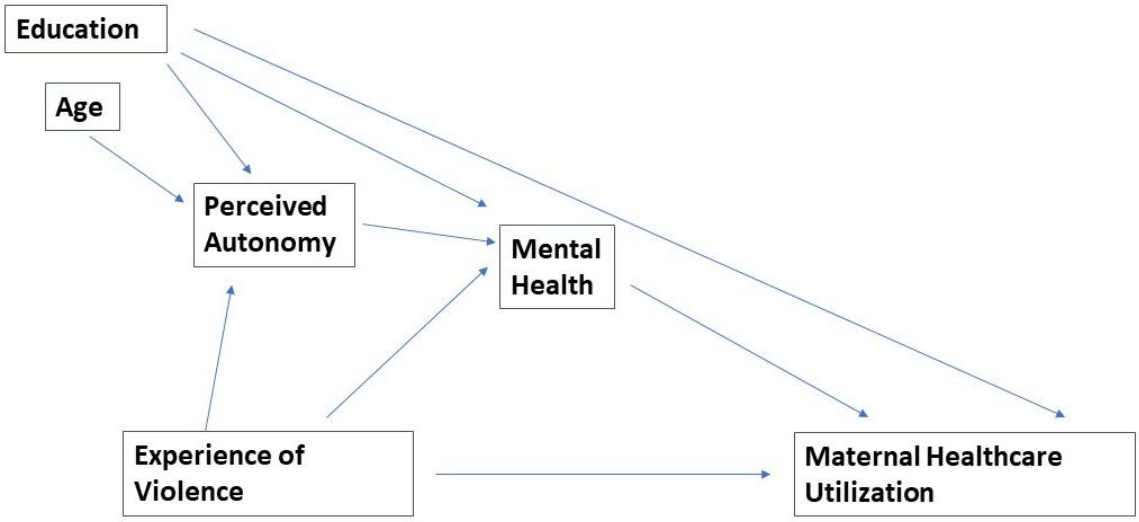

Table 1: Characteristics of Respondents

Variable *(self-reported)*	**Number** N(%)
Mother's education *(highest grade completed)* Less than one year of schooling	 20(20.00%)
Grade 1-4	13(13.00%)
Grade 5-8	44(44.00%)
Grade 9-12	20(20.00%)
Above grade 12	3(3.00%)
Age 19 and younger	 10(10.00%)
20-25	55(55.00%)
25-30	27(27.00%)
31 and older	7(7.00%)
Age unknown	1(1.00%)
Religion Islam	 18 (18.00%)
Christianity	1(1.00%)
Hinduism	81(81.00%)
Marital Status Married	 99(99.00%)
Missing data	1(1.00%)

Table 2: Frequencies of variables of Interest (maternal healthcare utilization, experience of violence, and perceived autonomy) Reported N(%)

Variable *(self-reported)*	**Number** *Total positive/affirmative responses*
Maternal Healthcare Service Utilization	
At Least one ANC visit	99(99%)
Sought care for complications during pregnancy[1]	35(77.8%)
Delivered in a hospital/clinic	61(61%)
Birth was assisted by trained provider	73(73%)
PNC visit within 6 weeks[2]	57(58%)
Sought care for postnatal complications from a skilled professional[3]	10(91%)
Experience of Violence	
Experienced violence of any kind	26(26%)
Experienced any form of violence by non-family/spouse	6(6%)
Emotional	4(4%)
Physical	3(3%)
Experienced any form of violence by family (non-spouse)	4(4%)
Emotional	0(0%)
Physical	4(4%)
Experienced any form of violence by spouse	22(22%)
Emotional	15(15%)
Physical	14(14%)
Sought care for injuries after experiencing violence [4]	3(17.6%)
Spoke about the violence with someone[5]	9(52.9%)
Mental Health	
SRQ20 score 8 or greater[6]	21(21.6%)
SRQ20 score less than 8[7]	76(78.4%)
SRQ20 Score of 20[8]	2(2.1%)
Thoughts of suicide	18(18%)
Postpartum Depression	10(10%)
Perceived Autonomy	
Current head of household	
Herself alone	1(1%)
Herself and someone else jointly	0(0%)
Decision-maker for own healthcare	
Herself alone	4(4%)
Herself and someone else jointly	5(5%)
Decision-maker for children's healthcare	
Herself alone	2(2%)
Herself and someone else jointly	10(10%)
Decision-maker for large household purchases	
Herself alone	1(1%)
Herself and someone else jointly	7(7%)
Decision-maker for daily household purchases	
Herself alone	5(5%)
Herself and someone else jointly	5(5%)
Decision-maker for visiting family or relatives	
Herself alone	3(3%)
Herself and someone else jointly	7(7%)
Decision-maker for preparation of daily meals	
Herself alone	81(81%)
Herself and someone else jointly	9(9%)

[1] Denominator is 45, as 45 women reported complications during pregnancy
[2] Denominator is 99 as one woman didn't have a recorded answer due to interviewer error
[3] Denominator is 11, as 11 women reported postnatal complications
[4] Denominator is 17, as 17 women reported experiencing physical violence and answered follow-up questions
[5] Denominator is 17, as 17 women reported experiencing physical violence and answered follow-up questions
[6] Denominator is 97, as only 97 women completed the full SRQ
[7] Denominator is 97, as only 97 women completed the full SRQ
[8] Denominator is 97, as only 97 women completed the full SRQ

Table 3: SRQ20 Score

	Min	Max	Mean	Standard Deviation
SRQ20 Score	0	20	4.85	4.87

Table 4: Frequencies of maternal healthcare utilization by age, education, and perceived autonomy. *Cross tabulation frequencies reported as N(row %)*

	At Least one ANC visit	Sought care for complications during pregnancy	Birth was assisted by trained provider	Delivery in a hospital or clinic	PNC visit within 6 weeks	Sought care for postnatal complications
Mother's education *(highest grade completed)* Less than one year of schooling	13(100%)	3(50%)	11(84.6%)	9(69.2%)	7(58.3%)	1(100%)
Grade 1-4	44(100%)	18 (78.3%)	32(72.7%)	26(59.1%)	28(63.64%)	5(100%)
Grade 5-8	19(95%)	8(88.9%)	15(75%)	13(65%)	13(65%)	2(66.7%)
Grade 9-12	3(100%)	0	2(66.7%)	2(66.7%)	1(33.3%)	0
Above grade 12	20(100%)	6(85.7%)	13(65%)	11(55%)	8(40%)	2(100%)
Age 19 and younger	10(100%)	4 (80%)	7(70%)	4(40%)	5(50%)	2(66.7%)
20-25	54 (98.2%)	18 (78.3%)	41(74.6%)	36(65.5%)	34(63%)	5(100%)
25-30	27(100%)	10 (71.4%)	20(74.1%)	16(59.3%)	14(51.9%)	2(100%)
31 and older	8 (100%)	3 (100%)	5(62.50%)	5(62.5%)	4(50%)	1(100%)
Perceived Autonomy: Decision-maker for own healthcare *Herself alone*	4 (100%)	2(66.7%)	3(75%)	1(25%)	2(50%)	2(100%)
Herself and someone else jointly	4(80%)	2(100%)	3(60%)	2(40%)	2(40%)	0
Not involved in her healthcare decision making	91(100%)	31(77.5%)	67(73.6%)	58(63.7%)	53(58%)	9(81%)

Table 5: The association between exposures, experience of violence and mental health *Cross-tabulation frequency N(row %), chi-square (p-value), and odds ratio (95% confidence intervals). Relative risk written in red. Odds ratios and relative risks are bolded if statistically significant.*

	Positive SRQ 20 Score	**Thoughts of Suicide**	**Postpartum Depression**
Experienced violence by non-family/spouse	3(50%)	2(33.3%)	2(33.3%)
Odds Ratio (95% Confidence Interval)	4.06 (0.75, 21.79)	2.44(0.41, 14.46)	5.38 (0.85, 34.03)
Experienced violence by family (non-spouse)	4(100%)	3(75%)	2(50%)
Odds Ratio (95% Confidence Interval)	**0.18 (0.12, 0.28)**[9]	**16.20(1.58, 166.38)**	**11.0(01.3615,88.87)**
Experienced violence by spouse	8(36.4%)	7(31.8%)	2(9.1%)
Odds Ratio (95% Confidence Interval)	2.73(0.95, 7.80)	2.84(0.95, 8.54)	0.88 (0.17, 4.45)

[9] All cells in red are reported as relative risks, as there were columns with zero values so odds ratios were not calculated.

Table 6: The association between experience of violence and maternal healthcare utilization[10] [11]*Cross-tabulation frequency N(row %), chi-square (p-value), and odds ratio (95% confidence intervals). Odds ratios and relative risks are bolded if statistically significant.*

	At Least one ANC visit	Sought care for complications during pregnancy	Birth was assisted by trained provider	Delivery in a hospital or clinic	PNC visit within 6 weeks	Sought care for postnatal complications
Experienced violence by non-family/spouse Frequency N(%)	6(100%)	3(100%)	5(83.3%)	4(66%)	3(50%)	2(66.7%)
Odds Ratio (95% Confidence Interval)	0.99 (0.97, 1.01)	0.76 (0.64, 0.90)	1.911 (0.21, 17.15)	1.30 (0.23, 7.45)	0.72 (0.14, 3.77)	1.50 (0.67, 3.34)
Experienced violence by family (non-spouse) Frequency N(%)	4 (100%)	2(100%)	2(50%)	1(25%)	3(75%)	2(66.7%)
Odds Ratio (95% Confidence Interval)	0.99 (0.97, 1.01)	**0.77 (0.65, 0.90)**	0.35 (0.05, 2.63)	0.20 (0.02, 2.00)	2.28 (0.23, 2.70)	1.50 (0.67, 3.34)
Experienced violence by spouse Frequency N(%)	22(100%)	9(75%)	17(77.3%)	13(59%)	11(50%)	4(100%)
Odds Ratio (95% Confidence Interval)	0.99 (0.96, 1.01)	0.81 (0.17, 3.81)	1.34 (0.44, 4.06)	0.90 (0.34, 2.37)	0.67 (0.26, 1.75)	0.86 (0.63, 1.16)

[10] Note that not all women who experienced violence answered each of the maternal care-seeking questions (e.g. only two of the four women who experienced violence by family members had pregnancy complications, and therefore only two women who experienced violence could have sought care for pregnancy complications). The frequencies and percentages are of the number of women who reported experiencing or not experiencing violence who answered the question about maternal healthcare utilization.

[11] All cells in red are reported as relative risks, as there were columns with zero values so odds ratios were not calculated.

Table 7: The association between mental health and maternal healthcare utilization[12] [13] *Cross-tabulation frequency N(row %) and odds ratio (95% confidence intervals) are listed*

	At Least one ANC visit	**Sought care for complications during pregnancy**	**Birth was assisted by trained provider**	**Delivery in a hospital or clinic**	**PNC visit within 6 weeks**	**Sought care for postnatal complications**
Positive SRQ 20 Score	21(100%)	10 (90.1%)	14 (66.6%)	9 (42.9%)	12 (57.1%)	4(80%)
Odds Ratio (95% Confidence Interval)	0.99 (0.96, 1.01)	3.47 (0.38, 31.63)	0.67 (0.23, 1.90)	0.39 (0.15, .05)	0.94 (0.35, 2.50)	1.25 (0.81, 1.94)
Thoughts of Suicide	18 (100%)	9 (75%)	12 (66.7%)	9 (50%)	11(61.1%)	5 (100%)
Odds Ratio (95% Confidence Interval)	0.99 (0.96, 1.01)	0.81 (0.17, 3.81)	0.69 (0.23, 2.06)	0.58 (0.21, 1.61)	1.20 (0.42, 3.40)	0.83 (0.58, 1.19)
Postpartum Depression (N=18)	10(100%)	7(87.5%)	6(60%)	6(60%)	7(70%)	4(100%)
Odds Ratio (95% Confidence Interval)	0.99 (0.97, 1.01)	2.25 (0.23, 20.84)	0.51 (0.13, 1.99)	0.95 (0.25, 3.62)	1.82 (0.44, 7.50)	0.86 (0.63, 1.16)

[12] Note that not all women who experienced mental health events, such as a positive SRQ20 score, answered each of the maternal care-seeking questions (e.g. only 11 of the 21 women who had a positive SRQ20 score experienced complications during pregnancy, meaning that only 11 of them answered the question about whether or not they sought care for complications during pregnancy). The frequencies and percentages are of the number of women with positive or negative mental health outcomes who answered the question about maternal healthcare utilization.

[13] All cells in red are reported as relative risks, as there were columns with zero values so odds ratios were not calculated.