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Impact of Antenatal Care on Maternal Mortality Among Women Aged 15-49 Years in Afghanistan

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Impact of Antenatal Care on Maternal Mortality Among Women Aged 15-49 Years in Afghanistan

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Abbreviations and acronyms

AFDHS	The Afghanistan Demographic and Health Survey
MMR	Maternal Mortality Ratio
ANC	Antenatal Care
WHO	World Health Organization
UNICEF	United Nations International Children's Emergency Fund
SDGs	Sustainable Development Goals
USAID	United States of America International Development
SBA	Skilled Birth Attendant
MCH	Maternal Health Care
PNC	Prenatal Care
NGOs	Non-Governmental Organizations
MOPH	Ministry of Public Health
LMICs	Low- and Middle-Income Countries
RMNCH	Reproductive Maternal, Newborn, Child, and Adolescent Health

Abstract

Background: Afghanistan is one of the countries with the highest maternal mortality worldwide. The inadequate utilization of antenatal care (ANC) services increases the risk of maternal mortality in Afghanistan.

Purpose: This study aimed to understand the key factors associated with antenatal care on maternal mortality in Afghanistan. Furthermore, this study elaborated on the impacts and utilization of antenatal care services among women in Afghanistan.

Methods: Data were obtained from the Afghanistan Demographic Health Survey 2015. The participants of this study were 18139 reproductive-aged women. The relevant variable was chosen, and data were analyzed for descriptive statistics. In addition, a chi-squared test and logistic regression were performed. All analyses were conducted using JAMOV version 2.2.5.

Results: Overall, 10040 (55.4%) women had ANC visits, and 8099 women (44.6%) never had ANC visits. Of these, 11.2% and 17% visited the ANC services once and twice, which was most frequent, respectively. Furthermore, 11.6%, 7.1%, and 4.3% of the women visited three, four, and more than four times, respectively.

In this study, we examined the socio-economic and demographic backgrounds of 18139 reproductive-aged women who attended ANC clinics. The highest age group (30-39 years) represented 32.3% (OR=0.947, 95%CI: 0.885-1.014), followed those over 40, which was 25.1% (OR=0.919, 95%CI: 0.854-0.990). According to residency, 77.2% and 22.8% were from urban and rural areas, respectively (OR=1.097, 95%CI: 1.023-1.177). Regarding education, 86%, 6.5% (OR=1.159, 95%CI: 1.020-1.316), 5.7% (OR=0.981, 95%CI: 0.828-1.163), and 1.8% (OR=0.917, 95%CI: 0.712-1.181) women had received no education, primary education, secondary education, and higher education, respectively.

Regarding ethnic groups, Pashtuns had the most frequent ANC visits (38.8%), followed by Tajiks with 35.1%. (OR=0.192, 95%CI: 0.852-0.977), Uzbek with 10% (OR=1.224,

95%CI: 0.869-1.068), Hazara with 6.6% (OR=0.963, 95%CI: 0.869-1.068), Turkmen with 5.4% (OR=2.571, 95%CI: 2.208-2.924), Aimaq with 1.2% (OR=1.574, 95%CI: 1.196-2.072), Baloch with 0% (OR=1.917, 95%CI: 0.320-11.4812.072), and others with 2.6% (OR=0.910, 95%CI: 0.753-1.099).

Regarding media exposure, 58.1% did not listen to the radio, followed by 16% (OR=0.974, 95%CI: 0.897-1.058), 25.8% (OR=0.854, 95%CI: 0.797-0.915), and 0.1% (OR=0.970, 95%CI: 0.402-2.343) who listened to the radio once, twice, or more than thrice a week, respectively.

In addition, 56% did not watch TV, followed by 11% (OR=0.888, 95%CI: 0.807-0.977), 32.6% (OR=0.913, 95%CI: 0.856-0.974), and 0.2% 9 OR=1.188, 95%CI: 0.617-2.286) who watched TV once, twice, or more than thrice a week, respectively.

Conclusion: The most important key factors associated with antenatal care were residency, education level, ethnic groups, and media exposure. We suggest that the Afghanistan government improve their health policy and increase accessibility to healthcare and equal distribution of health services in rural and urban areas. This can also be applied to the international community.

Keywords: Antenatal Care, Afghanistan, Maternal Mortality, Maternal and Child Health.

CHAPTER I

Introduction

1.1 Background

According to the 2015 demographic health survey in Afghanistan, the maternal mortality ratio (MMR) was 216 deaths per 100000 live births, a gradual decrease from 365 per 100000 in 1990. However, the Sustainable Development Goals (SDGs) have set a target for 70 per 100000 live births. A global goal of the United Nations' SDGs is to cover early antenatal care (ANC) to cut down on maternal and neonatal mortality by 2030. Statistics from the World Health Organization (WHO) showed that in 2015, the MMR was 239 and 12 per 100000 live births in developing and developed countries, respectively (Akseer et al., 2016; Azimi et al., 2015).

Based on the remarks from the Ministry of Public Health (MoPH) of Afghanistan, acts of violence, such as suicide bombings and armed conflicts, are now the third-leading cause of death and disability. This enables spending financial resources on the treatment of injuries and trauma rather than improving healthcare for women and children, a goal of the MoPH. Meanwhile, access to healthcare was 60% in 2018. Based on the WHO's recommendations, midwives are an evidence-based approach to reducing maternal mortality. However, Afghanistan suffers from a scarcity of female health workers. The issue is particularly severe in remote areas, such as Nuristan, Paktika, Zabul, and Uruzgan, where there are no female health providers (Afghanistan Health Survey, 2018).

In the last two decades, Afghanistan experienced significant improvements in maternal and child health. However, the utilization of healthcare services was affected by socio-economic and regional inequities, which postponed universal health coverage and further progress in maternal and child health. Some socio-economic inequities in maternal-child health (MCH) interventions have been explored at the national and regional levels (Akseer et al., 2016).

Maternal mortality refers to deaths due to complications during or after pregnancy. The most common complications include severe bleeding, infections, high blood pressure, unsafe abortions, drug overdose, and complications from delivery. Between 2003 and 2009, hemorrhage, hypertension, and sepsis were the causes of more than half of all maternal deaths worldwide. Based on a study, these factors were preventable in developing countries. However, the inequity makes it hard to access equal healthcare. Sub-Saharan, as well as South Asian and Middle Eastern countries, including Afghanistan, account for 87% of all maternal deaths. According to reports, the maternal death ratio declined by 35% worldwide from 2000 to 2017. ANC in women is a factor that can reduce the number of deaths (Geller et al., 2018).

ANC, skilled birth attendants (doctors, nurses, and midwives), and accessibility to emergency obstetric care are important components of basic MCH that can reduce maternal and child mortality and allow pregnant women to have a safe childbirth. Early and timely ANC visits ensure improved health results regarding MCH and provide the opportunity to

detect diseases associated with higher risk during pregnancy and delivery (e.g., anemia, eclampsia, and gestational diabetes) (Tekelab et al., 2019).

According to research, nearly 830 women lose their lives due to pregnancy and child-related causes every day worldwide, and 99% occur in developing countries. A study on the trend of maternal mortality in low and middle-income countries showed that minor implementation of ANC services approximately doubled the MMR (Sebghati and Chandraharan, 2017).

According to a quantitative analysis, there was an increase in the coverage of the majority of reproductive maternal, newborn, child, and adolescent health (RMNCAH) services, which included ANC, facility delivery, skilled birth attendant (SBA), and vaccinations (BCG, DPT3, and TT coverage), even during the conflict in Afghanistan (Mirzazada et al., 2020).

The reason I chose this topic is due to my interest in maternal and child health in my country. As shown by the quantitative impact, this has been an important health challenge in the previous decades. In addition, the importance of maternal and child health is a UN SDGs target for 2030. Therefore, I decided to study maternal health in Afghanistan and use experience and strategies from developed countries to efficiently reduce maternal mortality.

Previously studies have not explored this research question in Afghanistan. Hence, this study aimed to improve the future of families in Afghanistan.

1.2. Purpose of the study

The study aimed to examine ANC among women in Afghanistan and discover the usage and accessibility of health centers to complete ANC visits recommended by the WHO. Moreover, the study aimed to identify the factors associated with the implementation of antenatal care visits in Afghanistan and review policy changes and guidelines to reduce maternal mortality. The implementation of ANC visits may lead to an increase in women's and child's health that can positively affect families as well as communities in Afghanistan.

1.3. Research objectives

1.3.1. To determine the factors that were associated with antenatal care in women aged 15-49 years.

1.3.2. To determine the relationship between antenatal care and MM in women aged 15-49 years.

1.4. Research questions

1.4.1. What were the factors associated with antenatal care among women aged 15-49 years?

1.4.2. Was ANC associated with MM in Afghanistan?

CHAPTER II

Literature review

The MMR refers to the number of fatalities from pregnancy-related causes while pregnant or within 42 days of pregnancy termination per 100,000 live births. It represents the risk of MM relative to the number of live births and captures the risk of death in a single pregnancy or live birth. MM is influenced by causes related to or aggravated by the pregnancy or its management (excluding accidental or incidental causes). Its timespan includes pregnancy, childbirth, and the first 42 days after pregnancy, irrespective of the duration and residency during pregnancy, expressed per 100,000 live births for a specified period (see WHO [1](#)).

To prevent and reduce MM as well as to detect disorders, complications, and communicational problems with healthcare providers, the WHO recommends at least four and eight ANC visits for women in developed and high-income countries and low-income countries, respectively. The first visit may take place in the first trimester, followed by two to five visits during the second and third trimesters. Advancing maternal health is important in global health policymaking. Therefore, considerable efforts have been made to improve maternal health. However, the MMR remains high in many low- and middle-income countries, including Afghanistan. In 2002, the Afghan Ministry of Public Health (MoPH), US Centers for Disease Control and Prevention, and United Nations Child's Fund (UNICEF) commissioned a survey on maternal mortality in Afghanistan. The results were

published in *The Lancet* in 2005, and the MMR was 1600 deaths per 100 000 live births (95% CI: 1100–2000) (Azimi et al., 2019).

ANC services also provide health education, vaccines, diagnostic tests, and treatments. Moreover, ANC encourages women to have delivery at a healthcare facility, supported by skilled health workers. This reduces the risk of mortality and facilitates a healthy delivery. Thus, women benefit from the skillset of health workers and from enduring physical and socio-normality, self-confidence, and health autonomy (Adhikari et al., 2020).

A case study in Ghana in 2017 showed that 14% of all other female deaths were related to maternal mortality. Furthermore, 10% were direct maternal causes and 4% were of indirect origin. The most common direct causes included obstetric hemorrhage (30%), hypertension (14%), and sepsis (10%). Although these complications were non-medical, they were required to be managed by medical workers. However, Ghana lacks health workers in this field (Adu, Mulay and Owusu, 2021).

Based on the *Journal of Community Medicine & Health Education*, the utilization of ANC differs from country to country. The main causes of maternal mortality are well known in developing countries and include hemorrhage (antepartum and postpartum), sepsis, pre-eclampsia, eclampsia, obstructed labor, and induced abortion. Moreover, in some tropical African countries, Malaria and HIV contribute significantly to maternal mortality. The effectiveness of ANC depends on the presence of a detectable premorbid status in the above-mentioned seven conditions and the presence of acceptable, efficacious, and

effective interventions. Additionally, postpartum hemorrhage (PPH) contributes more to maternal mortality than antepartum hemorrhage-eclampsia/eclampsia, technically called toxemia of pregnancy, which is characterized by high blood pressure, proteinuria, and edema. Blood pressure monitoring, urine tests for proteinuria, weight monitoring for excessive weight gain, and physical examination for edema are all components of typical antenatal care programs (Oyerinde, 2013).

A study that examined late ANC visits and the associated factors in South Afghanistan outlined how ANC use differed among countries. They reported that 98% of women in developed countries used ANC services at least once and within the time recommended by medical personnel. While in developing countries, the percentage was only 68%. Furthermore, South Asia had the lowest level of at least one ANC visit (54%). This percentage was 56% in Afghanistan, according to the Afghanistan Demographic and Health Survey (AFDHS) 2015 (Edmond et al., 2018).

In 2015, the UNICEF and WHO released a joint report that found that 55% of pregnant women had received at least four ANC visits, and Afghanistan had the lowest baseline coverage with only 15%. Moreover, only 30% of pregnant women received ANC during the first trimester, and 40% and 30% of pregnant women underwent urine and blood tests, respectively. In addition, only 48% gave birth in a medical facility, and only 40% went for a postnatal checkup within the first two days after delivery. Participation of the male partner could increase the knowledge of MCH in families, which may improve reproductive health outcomes. In developing nations, such as Afghanistan, where maternal health is

traditionally thought to be solely the woman's responsibility, the idea of including the male partner in their pregnant partners' use of reproductive healthcare services is relatively new. Additionally, limited knowledge of ANC, a lack of financial support, and transportation issues were identified as potential barriers to using ANC services in Afghanistan (Alemi et al., 2021).

In a study in 2017, of the nearly 90% (6036 of 6780) of women who accessed ANC in Kabul, 348 (3398) said they had received more than the recommended number of visits. In contrast, only 662 (6%) of the 3231 (28%) women in Badakhshan, who received ANC, reported more than four visits. Women in Badakhshan reported transportation barriers (3407, or 42% of 8078) and believed that it was not important (1565, or 19%) when asked of their reasons for not seeking ANC. Most births in Kabul (5470 [81%] of 6789) took place in medical facilities. In contrast, in Badakhshan, most births took place at home (11001, or 97% of 11366). In Badakhshan, transportation barriers were cited as the primary reason for not seeking facility-based delivery. However, for women in Kabul, transportation did not seem to be an issue (Bartlett et al., 2017).

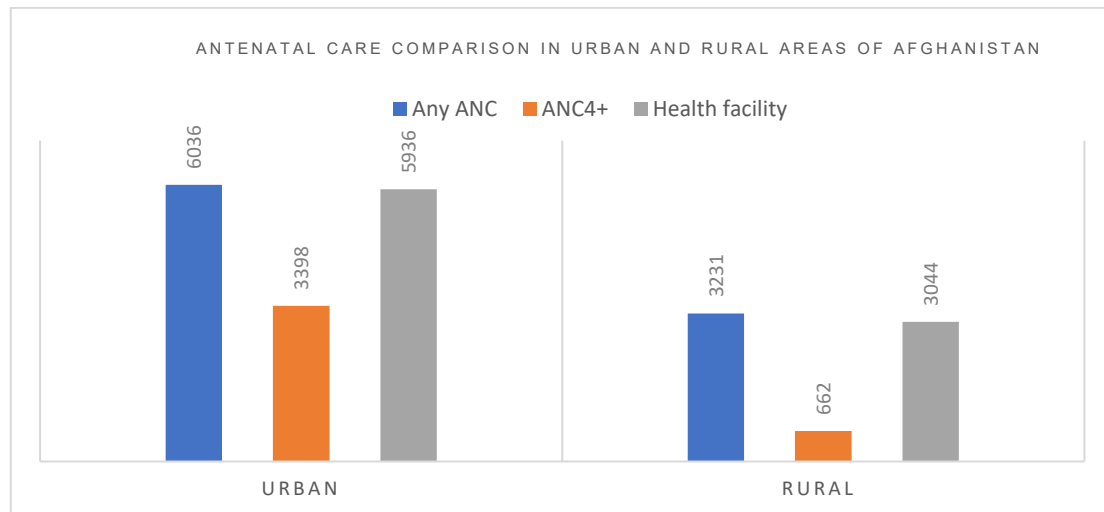


Figure 1. A comparison of ANC in the urban and rural areas in Afghanistan
 (Reproduced from: Barlett, 2017)

Table 1. Number of ANC visits in rural and urban areas

	Urban (Kabul city)	Rural (Ragh, Badakhshan)
Care during pregnancy	6780	11437
Antenatal care	6036 (89%)	3231 (28%)
Antenatal care 4+	3398 (50%)	662 (5.8%)
Source of antenatal care		
Private hospital	525 (9%)	1 (0%)
Governmental hospital	4652 (77%)	598 (19%)
Health center	727 (12%)	2445 (76%)
Health facility subtotal	5936 (98%)	3044 (94%)

(Source: Bartlett, 2017)

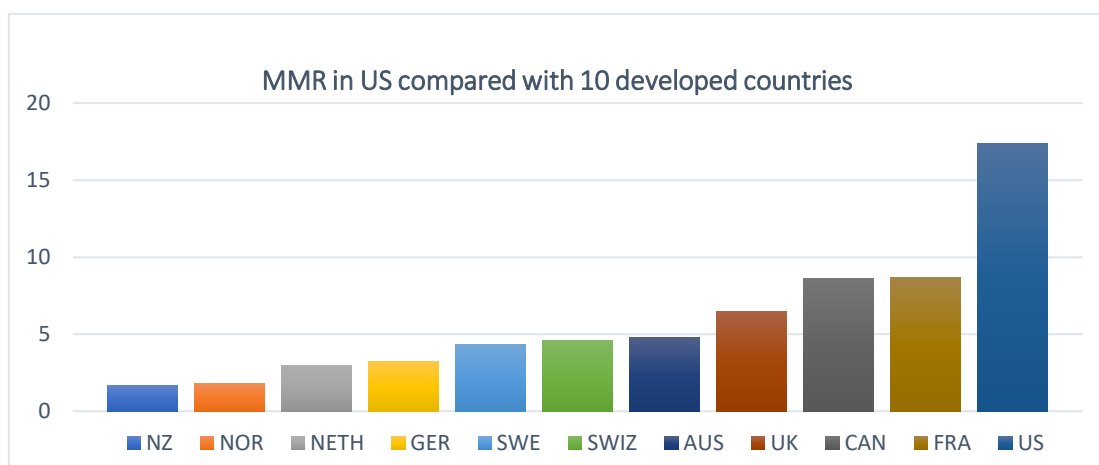
According to evidence, two-thirds of neonatal deaths (pregnant women and newborns) are avoidable with access to direct and cost-effective interventions and if the women received skilled care during pregnancy and childbirth. Although, there is insufficient evidence that antenatal care reduces newborn mortality, Indian and Indonesian studies reported the positive effects of ANC on preventing newborn deaths (Tekelab et al., 2019).

A study that regarded the impact of vouchers on ANC visits and prenatal care (PNC) in Pakistan showed that the voucher booklet, provided by some NGOs for pregnant women in 2009, had a five times higher odd of influencing women to undergo ANC visits. It was also found that longer travel time was associated with a lower use of ANC. For women who lived close to a health facility, the odds ratio was 1.81, which was statistically

significant. If the health facility was closer, the number of ANC visits were higher. Furthermore, females with three children and five or more children had a 0.49 and 0.34 lower odd of ANC use, respectively. The level of education was also associated with the use of ANC in Pakistan: Women with primary education and a higher level of education showed 1.73 and 3.97 times higher odds of ANC visits, respectively. Finally, wealth was associated with higher ANC utilization. Women with average economic means and higher wealth had 2.24 and 4.38 times higher odds of ANC use, respectively (Agha, 2011).

A maternal mortality study in six LMICs showed that in 2030, the MMR would be less than 70/100,000 live births, which was more than double the SDG target measured in this research. The lowest average MMRs were measured in Guatemala (97), Kenya (107), and Zambia (107) sites, while the highest were measured in the DRC (317) and Pakistan (327) (Bauserman et al., 2020).

A study in the United States by the commonwealth fund organization in 2018 reported that there were 17 MMR for each 100,000 live births, which was more than twice as much as



in most other high-income countries. In contrast, the MMR in the Netherlands, Norway, and New Zealand were less than three per 100,000 live births.

Figure 2. Maternal mortality ratio among developed countries

(Source: Tikken, 2020 MMR in USA compared with 10 developed countries)

In most developed countries, such as the UK and Netherlands, midwives provide most of the prenatal care and deliveries. The overall supply of midwives and OB-GYNs was lowest in the United States and Canada, with 12 and 15 providers per 1,000 live births, respectively. The supply in all other countries was between two six-times time higher (Tikkanen et al., 2020).

A study in five LMID countries (Guatemala, India, Kenya, Pakistan, and Zambia) between 2011 and 2017 showed that globally, the highest rates of MM, stillbirth, and neonatal mortality were found in sub-Saharan Africa and South Asia. Only 52% and 46% of pregnant women had at least four ANC contacts, respectively. Almost all women had at least one antenatal visit in 2011, and a significant increase was observed in the proportion of mothers who had at least four antenatal visits, except in Guatemala. This suggested that additional research was required to improve ANC utilization and the quality of MCH in these countries (Tikmani et al., 2019).

Based on a JMIR study published in 2020, the severe acute respiratory syndrome coronavirus-2 (COVID-19) highly affected the hospitalization and use of healthcare

services in hospitals for maternal and child health, as the ANC was part of MCH. Pregnant women tended to be more physiologically and psychologically susceptible to infectious diseases, which increased their vulnerability to maternal complications, such as miscarriage, gestational diabetes, preterm birth, and gestational hypertension. They may benefit from appropriate antenatal education in several ways, including a decrease in the number of cesarean sections performed and maternal and infant mortality and an improvement in their overall reproductive health outcomes. During the pandemic, in most developed countries, information and remote online consultations related to health and pregnancy were used as a safe choice for women. Thus, this was an opportunity to develop and expand ANC online. For instance, online antenatal care programs may direct pregnant women to conduct regular blood and urine glucose tests, particularly for those who have or are at a high risk for gestational diabetes mellitus (GDM).

However, there are still various challenges for online ANC. A study in China found that pregnant women were concerned regarding the reliability and quality of medical devices, online gestational information, and remote device basic monitoring indicators. In any case, for high-risk pregnant women who experienced or were at risk of vaginal bleeding, abdominal pain, or other serious discomforts, hospital antenatal care was essential (Wu et al., 2020)

A US article published in 2017 examined the state and federal coverage for pregnant immigrants regarding the increase of ANC. Approximately one-quarter of newborns in the US had mothers who were immigrants. Immigrant women experienced barriers to ANC

access that could put their labor and delivery outcomes and infants' health at an increased risk. The expansion of health insurance for pregnant women would facilitate the usage of healthcare. Majority of low-income women born in the United States are eligible for Medicaid or the Children's Health Insurance Program (CHIP) during pregnancy. However, these programs are more restrictive for immigrant women, particularly those who are undocumented or have just arrived in the country. Medicaid is not available to undocumented immigrants, who account for 26% of the total immigrant population. In 2002, a new policy option was expanded for immigrant women to access Medicare. Henceforth, the unborn child was eligible for federal funding. This option covered a woman's pregnancy and birth-related issues, regardless of her immigration or legal status. By 2015, this policy was adopted by more than 16 US states (Wherry et al., 2017).

Another systematic review study found that by 2022 there would be over 930 million people worldwide living in fragile and/or conflict situations. Countries or regions characterized by recurring conflicts or wars are called fragile and conflict-affected situations (FCAS). These states often have unstable and corrupt governments unwilling to provide basic resources and protect the human rights of their citizens. Afghanistan is at the top of the FCAS countries list, and this is also connected to a higher MMR in the country. In 2020, the World Bank classified 37 countries as vulnerable and conflict-affected on its annual FCAS list.

Table 2. List of the 37 fragile and conflict-affected countries by the World Bank in 2022.

High-intensity conflict	Medium-intensity conflict	High institutional and social fragility
Afghanistan	Burkina Faso	Chad
Central African Republic	Burundi	Congo, Rep
Libya	Cameroon	Eritrea
Somalia	Congo, Dem Rep	The Gambia
South Sudan	Iraq	Guinea-Bissau
Syrian Arab Rep	Mali	Haiti
Yemen, Rep	Niger	Kosovo
	Nigeria	Lebanon
	Sudan	Liberia
		Myanmar
		Papua New Guinea
		Venezuela
		Zimbabwe
		West Bank and Gaza
		Small states:
		Comoros

Kiribati
Marshall islands
Micronesia, fed, sts
Solomon Islands
Timor- Leste
Tuvalu

(Source : Kameela Miriam Alibhai, 2022)

Moreover, conflict is becoming a severe threat to world health. People living in FCAS suffer from various side effects, including injuries and trauma, infectious and chronic diseases, mental health problems, inferior child health, and malnutrition. Women are particularly affected by the ongoing conflict and violence due to their lower level of education, lack of autonomy in making health-related decisions, and experiences of gender-based violence. In FCAS, women face barriers in accessing sexual, reproductive, and maternal health services, including ANC (Alibhai et al., 2022)

A study in Burundi reported that the conflicts had a significant impact on increased maternal mortality rate due to the low utilization of ANC among pregnant women. Additionally, women who lived in Burundi faced structural barriers in accessing ANCs and SBAs. MCH was particularly at risk due to conflict. These interruptions worsened the mother's health and increased the risk of complications during pregnancy and childbirth.

Burundi's recurring conflict has severely damaged healthcare and infrastructure, impeding recovery and improvement. Results from a logistic regression showed that women in extremely high conflict regions were less likely to have four antenatal visits (odds ratio

[OR] = 0.79, $p < 0.05$). However, they were more likely to rely on a skilled birth attendant (OR = 2.31, $p < 0.001$) and deliver in a hospital (OR = 1.69, $p < 0.001$) than women in regions less affected by a conflict. In addition, gender equality, education, and watching television were associated with an increased likelihood toward the use of ANC. In contrast, unintended pregnancy and increased fertility were associated with lower ANC use. In addition, the resurgence of violence in 2015 could have halted or further reduced ANC (Ziegler et al., 2021).

According to findings in Afghanistan, the reception of ANC among pregnant women (59%) was quite low on a global level. Maternal and infant mortality rates were still among the highest worldwide, and it was a delicate and challenging environment for women seeking medical care. The reasons included persistent levels of violence and conflict, which limited the ability of mothers and families to leave their home for health and social well-being. Other important barriers included poverty, mountainous terrain, and the lack of women's decision-making capabilities.

Studies proved that female Community Health Workers home visits in South Asian and African countries were the key to improving demand for ANC and PNC, which was likely to reduce MM at least by 15-20%. CHWs are also trained to provide family planning, MCH, and prescriptions as well as usage of basic medications. However, CHWs were not qualified to provide medical or obstetric services. ANC and PNC home visits and behavior change communication skills training were associated with significant improvements in healthcare needs and facility delivery services and ANC utilization in rural Afghanistan.

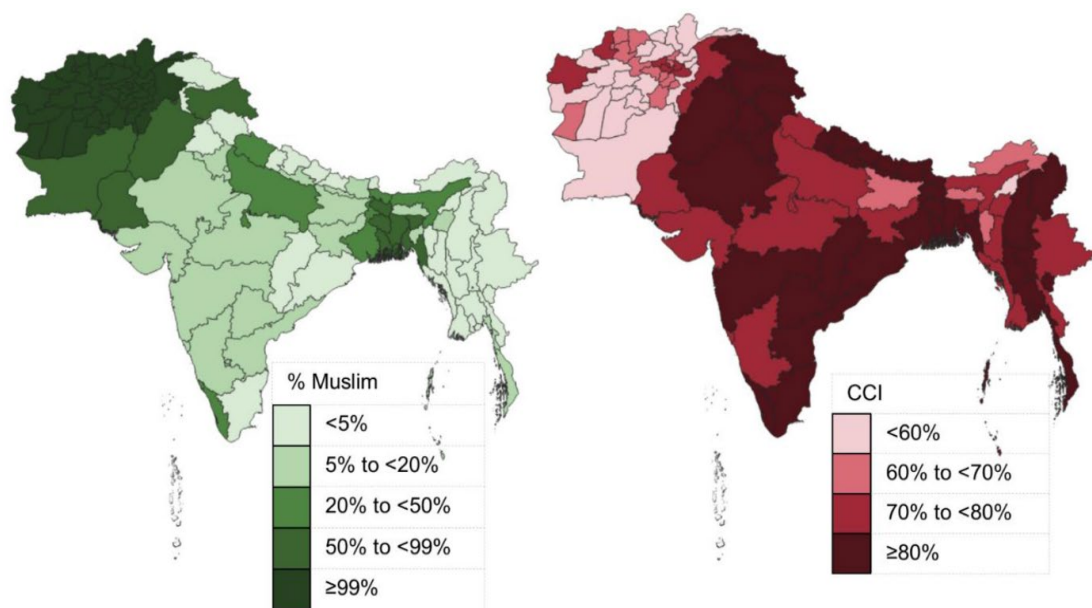
Compared to the control area, facility delivery increased by 11%, SBA delivery by 14%, ANC attendance by 10%, and ANC and PNC complications were lowered by 14%. Furthermore, 289 female CHWs visited ANC services in the intervention area, and facility delivery increased by 8.2% in the intervention village and decreased by 6.3% in the control village. CHWs reported that at least one antenatal visit improved ANC and PNC (AMD 10.5%, 95% CI 4.2–16.9%, $p = 0.001$) in fragile and conflict-affected countries (Edmond et al., 2018).

Based on an assessment in 2016, Afghanistan's health system was affected by ongoing conflict and terrorism, which have increased since 2010. Increasing people are now living in areas affected by high levels of insecurity. Furthermore, only 48% of births took place in public health centers and 51% were attended by qualified professionals. Lastly, conflict parties (Taliban, Daesh) should understand the importance of health coverage. It must be considered as a non-political and non-governmental issue (Currie et al., 2021).

A study in Ghana showed that wealth, education, age, number of living children, transportation, and health insurance were factors that had a positive and significant impact on ANC utilization (Arthur, 2012).

A cross-sectional study on the impacts of religion and culture in South Asian countries, with Hindus, Muslims, Buddhists, and Sikhs, showed that religion affected the health of MCH. For example, some Muslims emphasized vaccine importance, whereas other religious groups expressed concerns that some vaccines, particularly the measles vaccine,

may contain haram material. If a woman depended on a male partner to seek antenatal care and/or childcare, religion may have a negative impact. The utilization of ANC, having a skilled birth attendant and receiving of any type of vaccines were statistically significant in non-Muslim women ($p < 0.0001$) (Kachoria et al., 2022).



(Source: Kachoria, 2022)

Figure 3. Choropleth maps of the proportion Muslim and mean composite coverage index.

In 2020, another article published on the related factors associated with maternal and child health utilization in Afghanistan reported that 71.8% (95%CI: 68.61-74.77) of women gave birth in a health center. In this study, the provision of health services for men (AOR = 3.07, 95%CI: 1.50–6.31) and use of antenatal care (ANC) services (AOR = 17.84, 95%CI: 11.86–

26.8), as well as the presence of complications during a previous delivery (AOR = 3.65, 95%CI: 2.32-5.74) were examined. Factors, such as antenatal care visits, marital education, and history of complications during previous births, increased the frequency of births in health centers (Khan et al., 2022).

Table 3. ANC visits in Afghanistan, Kandahar.

Total number of ANC visits	N(%)
1	243(41.2)
2	218(37.1)
3+ and above	128(21.7)
Place for ANC visits	N(%)
Comprehensive health clinic	347(58.9)
Hospitals	231(39.3)
Private clinic	11(1.8)
ANC services awareness	N (%)
Health institutions	153(25.9)
Media	108(18.4)
Family and friends	328(55.7)

(Source: Khan Ahmad Stanikzai, 2022)

CHAPTER III

Research Methodology

3.1. Study design

This study used a cross-sectional study framework. The focus was on the secondary Afghanistan demographic health survey conducted in 2015, in which data were collected from approximately 29,000 participants. After the data were analyzed, 18,139 participants were eligible for inclusion.

3.2 Data Source

The Afghanistan demographic health survey was based on the Demographic and Health Surveys (DHS) ¹ Program. It collected, analyzed, and disseminated accurate and representative data on the population, health, HIV, and nutrition status through more than 400 surveys supported by the United States of America International Development (USAID) in over 90 countries. This study used data from the 2015 AFDHS, a nationally representative survey conducted by the Central Statistics Organization and Ministry of Public Health Afghanistan, publicly available at <https://dhsprogram.com>. Data were downloaded after permission was obtained from the Demographic and Health Survey (DHS) team. The AFDHS was one of many globally authorized and publicly available studies on the DHS program. These surveys were conducted, funded, and supported by the USAID. The AFDHS was the first standard demographic and health survey in the country.

¹ For more details refer to the link of the DHS program: <https://dhsprogram.com>

It collected information on a broad range of basic demographic and health indicators, such as family planning, maternal and child health, the nutritional status of women and children, as well as knowledge and attitudes regarding HIV/AIDS and domestic violence.

3.3 Variables

The following independent and dependent variables were defined to examine the research questions.

3.3.1 Dependent Variable

The outcome variable was antenatal care (ANC) visits during pregnancy among women of reproductive age (15-49 years). When they did not utilize ANC, they were coded as (0) and the rest was coded numeral (1.2.3.4+) as clarified in the descriptive table.

3.3.2 Independent Variables

The independent variables, which were socio-economic factors associated with the research topic, were based on previous studies. They included:

- A. Age (15-49 years)
- B. Education levels, which were categorized as no education, primary education, secondary education, and higher education
- C. Ethnicity groups, which were Pashtun, Tajiks, Uzbeks, Hazara, Turkmen, Aimaq, Baloch, and others
- D. Area of residence, which was urban or rural
- E. Times of watching television (per week)
- F. Times of listening to the Radio (per week)

3.4 Statistical Analysis

Analyses were conducted via the JAMOVI 2.2.5 version. In this study, a chi-squared test was used to analyze the categorical variables (age, birth, and number of ANC visits). To identify the p-value, we conducted a t-test to obtain a confidence interval. A binominal logistic regression test was used to examine the outcome variable.

3.5 Limitation of the data set

This dataset, from the 2015 AFDHS, had several limitations, which included a lack of variables as well as questions asked to the participants. Further future studies are required to allow for a more nuanced analysis.

There were many associated factors related to maternal and child health in Afghanistan. However, the access to the full data for analysis was limited due to unsophisticated explanations and definitions. Further studies are required to investigate the factors related to MM in Afghanistan.

CHAPTER IV

Results

4.1 Descriptive statistics

This study included 18139 participants from the AFDHS 2015. The general characteristics are shown in Table 4. This study had one dependent variable, which was ANC among pregnant women aged 15-49 years. In total, 10040 (55.4%) women had ANC visits, and 11.2% had at least one ANC visit. Most participants who used ANC services were aged 19 years and older (42.6%). The remaining (32.3%) were older than 30 years.

Table 4. General characteristics for ANC visits from the AFDHS			
	Variable	Number	Percentage
Residence			
	Rural	4,134	22.8
	Urban	14,005	77.2
Education level			
	No education	15,598	86
	Primary	1,181	6.5
	Secondary	1,031	5.7
	Higher education	329	1.8
Ethnicity group			
	Pashtun	7,044	38.8
	Tajik	6,370	35.1
	Uzbek	1,850	10.2
	Hazara	1,206	6.60
	Aimaq	212	1.20
	Turkmen	983	5.40
	Baloch	5	0
	Others	469	2.60
Number of times listening to radio (per week)			
	0	10,534	58.1
	1	2,904	16.0
	2	4,681	25.8
	3+	20	0.10

Table 4..... (Continued)

Variable	Number	Percentage
Number of times watching Tv (per week)		
0	10,154	56
1	2,041	11.3
2	5,908	32.6
3+	36	0.2
Antenatal care visits		
0	8,099	44.6
1	2,023	11.2
2	3,082	17.0
3	2,099	11.6
4	1,285	7.10
5	778	4.30
6	421	2.30
7	221	1.20
8	131	0.70

The participants' general characteristics are shown in Table 4. In total, 10040 (55.4%) women had ANC visits, and 11.2% had at least one ANC during pregnancy. Most participants who used ANC services were in the age group of >19 (42.6%). The remaining (32.3%) were older than 30 years (Table 5). Regarding residency, there were 4134 (22.8%) and 14005 (77.2%) participants from rural and urban areas, respectively. In addition, regarding education level, 86%, 6.5%, 5.7%, and 1.8% had no education, primary education, secondary education, and higher education, respectively (Table 5). Regarding ethnic groups, 7044 (38.8%) were Pashtun, 6370 (35.1%) were Tajik, 10.2% were Uzbeks, and 6.6% were Hazara, among others.

Following the result of Table 4 for media exposure, 10534 participants (58.1%) never listened to the radio, followed by 2904 (16%), 4681 (25.8%), 20 (0.1%), who listened to the radio once, twice, and more than thrice a week (Table 5). In addition, 10154 (56%) did not watch TV during an average week, while 2041 (11.3%) 5908 (32.6%), 36 (0.2%) watched TV once, twice, and more than thrice a week (Table 4).

In total, 8099 women (44.6%) never used ANC services. Furthermore, 2023 (11.2%) completed one ANC visit, and 3082 (17%) completed two ANC visits. Furthermore, only 2099 (11.6%), 1285 (7.1%), and 1551 (8.5%) completed three, four, and more than five ANC visits, respectively (Table 4).

Table 5. Results of the chi-squared test for ANC visits

Variable	Visits (Yes) N (%)	Visits (No) N (%)	X ²	P
Age group				
<19	0(0)	0(0)		
20-29	4,207(23.2)	3,527(19.4)	5.54	0.063
30-39	2,365(18)	2,593(14.3)		
>40	2,568(14.2)	1,979(10.9)		
Residence				
Rural	2,361(13)	1,773(9.8)	6.72	0.01
Urban	7,679(42.3)	6,326(34.9)		
Education level				
No education	8,544(47.1)	7,054(38.9)		
Primary	695(3.8)	486(2.7)	15.3	0.002
Secondary	602(3.3)	429(2.4)		
Higher	199(1.1)	130(0.7)		
Ethnicity groups				
Pashtun	3,952(21.8)	3,029(17)		
Tajiks	3,717(20.5)	2,653(14.6)		
Uzbek	1,055(5.8)	795(4.4)		
Hazara	616(3.4)	590(3.3)	238	<.001
Aimaq	95(0.5)	117(0.6)		
Turkmen	329(1.8)	654(3.6)		
Baloch	2,000(0)	3,000(0)		
Others	274(1.5)	195(1.1)		

Table 5 (Continued)

Variable	Visits (Yes) N (%)	Visits (No) N (%)	X2	P
Number of times listening to the Radio (per week)				
0	5,714(31.5)	4,820(26.6)	20.1	<.001
1	1,594(8.8)	310(7.2)		
2	2,721(15)	1,960(10.8)		
3 +	11.00(0.1)	9.000(0)		
Number of times watching TV (per week)				
0	5,513(30.4)	4,641(25.6)	11.4	0.01
1	1,168(6.4)	873(4.8)		
2	3,341(18.4)	2,567(14.2)		
3+	18(0.1)	18(0.1)		

Among the age groups, women aged 20-29 years had 4207 (23.2%) ANC visits followed by 3527 (19.4%) among women aged 30-39. Only 2568 women older than 39 years (14.2%) used ANC services (table 6). In contrast, 3527(19.4%) women aged 20-29 did not visit ANC services, followed by 2593 (14.3) and 1979 (10.9%) among women aged 30-39 and older than 39 years, respectively. The results of chi-squared (χ^2) test was 5.54 and $p = 0.063$ showed that age was not significantly associated with the utilization of antenatal care in Afghanistan (Table 5).

Following the results of the chi-squared test, the utilization of ANC visits between urban and rural had some differences as 2361(13%) and 1773 (9.8%) women received and did not received ANC in rural areas. Furthermore, 7679 (42.3%) utilized ANC in urban areas, while 6326 (34.9%) did not, with $\chi^2 = 6.72$ and $p = 0.01^*$. This was significantly associated with the use of antenatal care in Afghanistan (Table 5).

In addition, 8544 (47.1%) and 7054 (38.9%) non-educated women received and did not receive ANC, respectively. In those with primary education, 695 (3.85%) women received ANC and 486 (2.7%) did not. Furthermore, in secondary education, 602 (3.3%) and 429 (2.4%) women received and did not receive ANC. Lastly, in higher educated women, 199 (1.1%) received ANC and 130 (0.7%) did not. In total $\chi^2 = 15.3$ and $p = 0.002^*$, which was statistically significant. Thus, the level of education was identified as an important factor for receiving ANC among women of reproductive age in Afghanistan (Table 5).

According to Table 6, results of the logistic regression showed that among the ethnic groups, 3952 (21.8%) Pashtuns attended ANC visit, while 3029 (17%) did not. For Tajiks, the results were 3717(20.5%) and 2653(14.6%), the other ethnic groups accounted for 5.8, 3.4, 1.8, 1.5, 0%. The result of the chi-squared test = 238 and $p = <.001$ showed that belonging to an ethnic group was statistically significant for ANC use (Table 5).

In addition, listening to the radio was statistically significant ($X^2 = 20.1$ and $p = <.001$) and was associated as a that factor influenced the number of ANC visits. Moreover, watching TV was significantly associated ($X^2 = 11.4$ and $p = 0.01$) with the use of ANC among women. Hence, media consumption had the potential to improve MMR.

Table 6. Logistic regression analysis for ANC visits

Variable	Odd Ratio	95 % CI		p
		Lower	Upper	
Age group (Years)				
< 29	1.000	(Ref)		
30-39	0.947	0.885	1.014	0.120
> 40	0.919	0.854	0.990	0.025
Residence				
Urban	1.000	(Ref)		
Rural	1.097	1.023	1.177	<.001
Education level				
No education	1.000	(Ref)		
Primary	1.159	1.020	1.316	0.024
Secondary	0.981	0.828	1.163	0.827
Higher education	0.917	0.712	1.181	0.501
Ethnicity group				
Pashtun	1.000	(Ref)		
Tajik	0.192	0.852	0.977	0.009
Hazara	0.963	0.869	1.068	0.477
Uzbek	1.224	1.083	1.383	0.001

Variable	Odd Ratio	95 % CI		p
		Lower	Upper	
Aimaq	1.574	1.196	2.072	0.001
Turkmen	2.541	2.208	2.924	<.001
Baloch	1.917	0.320	11.481	0.476
Other	0.910	0.753	1.099	0.327

Table 6..... continued

Number of times listening to the radio (per week)	Odd Ratio	95 % CI		p
		Lower	Upper	
0	1.000	(Ref)		
1	0.974	0.897	1.058	0.536
2	0.854	0.797	0.915	<.001
3 +	0.970	0.402	2.343	0.946
Number of times watching TV (per week)				
0	1.000	(Ref)		
1	0.888	0.807	0.977	0.015
2	0.913	0.856	0.974	0.006
3+	1.188	0.617	2.286	0.606

Result of the logistic regression analysis from Table 6 for age group of 30-39 years showed (OR=0.947,95% CI: 0.885-1.014) compared to age group aged 29 and younger for ANC visits utilizations (Table 6).

According to logistic regression, the odd ratio of rural women was (OR=1.097, 95%CI: 1.023-1.177) compared to urban area for ANC visits in Afghanistan. Most participants were from large ethnic groups, such as Pashtun and Tajiks (OR=0.192, 95%CI: 0.852-0.977). However, some were from the Hazara (OR=0.963, 95%CI: 0.869-1.068) Uzbek

(OR=1.224, 95%CI: 1.083-1.383), Turkmen (OR=2.541, 95%CI: 2,208-2.924), Aimaq (OR=1.574, 95%CI: 2,208-2.072), and Baloch ethnicities (OR=2.541, 95%CI: 2,208-2.924) (Table 6). The result of listening to the radio one time per week among women (OR=0.974, 95%CI: 0.897-1.058), two times per week (OR=0.854, 95%CI: 0.797-0.915), and three times or more per week (OR=0.970, 95%CI: 0.402-2.343) compared to those who did not listen to the radio (Table 6).

Discussion

From the total sample of 18139, 10040 women had antenatal care during pregnancy and 8099 women did not. This study showed that the usage of ANC visits in urban areas was higher than that in rural areas. Various factors influenced ANC utilization, such as the distance to health centers, transportation fees, lack of female health workers or skilled birth attendants, and other socio-economic factors.

Studies from different countries addressed various factors associated with the impact on the reduction of MM and child health. In Ghana, 14% of deaths were related to MM due to a lack of skilled birth attendants and midwives. Moreover, the percentage of ANC utilization differed in developed (98%) and developing (68%) and in low-income countries (54%). Furthermore, women in low- and middle-income countries did not receive timely recommended prenatal care services (Arthur, 2012).

The result of vouchers and incentives from Pakistan showed five times higher odds for ANC visits. In addition, based on the result of this study, the travel time to find a health facility was also associated with the number of ANC visits. Women with primary education had 1.73 times higher odds, while those with higher education showed more than 3.97 times the odds regarding ANC utilization. Along with education, wealth had an impact on ANC intake, and women from the middle class showed 2.24 times the odds, while more affluent women showed 4.38 times higher odds for ANC utilization (Agha, 2011)

In India, despite a study with vouchers, the skilled attendance at all births was the most critical intervention for ensuring safe delivery. The percentage of institutional deliveries increased from 26% to 41% during this time, and the percentage of skilled birth attendants rose from 33% to 47%. Furthermore, the voucher and cash transfer program in various countries, such as Mexico, Nicaragua, Columbia, Brazil, and Nepal, had a positive impact on preventive care. (Randive, Diwan and De Costa, 2013).

A study also described the effect of pay for performance (P4P) in Afghanistan. The effect of the intervention was small, which was possibly a result of communication difficulties with healthcare professionals and neglect of demand-side factors. P4P interventions must consider governance issues, community needs, and the five indicators of maternal and child healthcare coverage (Engineer et al., 2016). Based on results from three remote provinces in Afghanistan, the study highlighted the barriers for women who sought facility-based births. Distance, cost of transport, and availability of transport were the main barriers (Higgins-Steele et al., 2018)

Strengths and limitations

Strength of the study

This study has many strengths as most studies were conducted in urban as well as rural environments, migration situations and displaced areas, followed the needs of public health, millennium, and SDGs in the country. It was suggested that the number of health workers, such as midwives and nurses, should increase in rural areas to reduce MM.

Limitations of the study

This study aimed to determine the impact of ANC on MM among Afghan women of reproductive age. Time was limited as the study covered a large population. Certainly, future studies are required in this field.

However, the findings of this study offer new, useful information and political implications for maternal health care in Afghanistan.

Conclusion

Based on the outcome of the research related to ANC utilization among women in Afghanistan, the most important key associated factors were residency, education level, ethnic groups, and media exposure. However, the government of Taliban banned women from schools and placed strict rules against them. Furthermore, the country still lacks health workers. Afghan maternal and child health will be negatively affected if these factors are not addressed.

We suggest that the Afghanistan government, with international community, improve their health policy and increase accessibility to healthcare and equal distribution of health services in rural and urban areas.

References

- Afghanistan Health Survey. 2018. Available from: <https://www.kit.nl/wp-content/uploads/2019/07/AHS-2018-report-FINAL-15-4-2019.pdf>.
- Adhikari M, Chalise B, Bista B, Pandey AR, Upadhyaya DP. Sociodemographic correlates of antenatal care visits in Nepal: results from Nepal Demographic and Health Survey 2016. *BMC Pregnancy Childbirth* 2020;20(1):513.
- Adu J, Mulay S, Owusu MF. Reducing maternal and child mortality in rural Ghana. *Pan Afr Med J* 2021;39:263.
- Agha S. Impact of a maternal health voucher scheme on institutional delivery among low income women in Pakistan. *Reprod Health* 2011;8(1):10.
- Akseer N, Bhatti Z, Rizvi A, Salehi AS, Mashal T, Bhutta ZA. Coverage and inequalities in maternal and child health interventions in Afghanistan. *BMC Public Health* 2016;16:797.
- Alemi S, Nakamura K, Rahman M, Seino K. Male participation in antenatal care and its influence on their pregnant partners' reproductive health care utilization: insight from the 2015 Afghanistan Demographic and Health Survey. *J Biosoc Sci* 2021;53(3):436-58.
- Alibhai KM, Ziegler BR, Meddings L, Batung E, Luginaah I. Factors impacting antenatal care utilization: a systematic review of 37 fragile and conflict-affected situations. *Confl Health* 2022;16(1):33.
- Arthur E. Wealth and antenatal care use: implications for maternal health care utilisation in Ghana. *Health Econ Rev* 2012;2(1):14.
- Azimi MD, Najafizada SA, Khaing IK, Hamajima N. Factors influencing non-institutional deliveries in Afghanistan: secondary analysis of the Afghanistan mortality survey 2010. *Nagoya J Med Sci* 2015;77(1-2):133-43.
- Azimi MW, Yamamoto E, Saw YM, Kariya T, Arab AS, Sadaat SI, Farzad F, Hamajima N. Factors associated with antenatal care visits in Afghanistan: secondary analysis of Afghanistan Demographic and Health Survey 2015. *Nagoya J Med Sci* 2019;81(1):121-31.
- Bartlett L, LeFevre A, Zimmerman L, Saeedzai SA, Turkmani S, Zabih W, Tappis H, Becker S, Winch P, Koblinsky M, Rahmanzai AJ. Progress and inequities in maternal mortality in Afghanistan (RAMOS-II): a retrospective observational study. *The Lancet Global Health* 2017;5(5):e545-e55.
- Bauserman M, Thorsten VR, Nolen TL, Patterson J, Lokangaka A, Tshetu A, Patel AB, Hibberd PL, Garces AL, Figueroa L, Krebs NF, Esamai F, Nyongesa P, Liechty EA, Carlo WA, Chomba E, Goudar SS, Kavi A, Derman RJ, Saleem S, Jessani S, Billah SM, Koso-Thomas M, McClure EM, Goldenberg RL, Bose C. Maternal mortality in six low and lower-middle income countries from 2010 to 2018: risk factors and trends. *Reproductive Health* 2020;17(3):173.

- Currie S, Natiq L, Anwari Z, Tappis H. Assessing respectful maternity care in a fragile, conflict-affected context: observations from a 2016 national assessment in Afghanistan. *Health Care Women Int* 2021;1-21.
- Edmond KM, Yousufi K, Anwari Z, Sadat SM, Staniczai SM, Higgins-Steele A, Bellows AL, Smith ER. Can community health worker home visiting improve care-seeking and maternal and newborn care practices in fragile states such as Afghanistan? A population-based intervention study. *BMC Med* 2018;16(1):106.
- Engineer CY, Dale E, Agarwal A, Agarwal A, Alonge O, Edward A, Gupta S, Schuh HB, Burnham G, Peters DH. Effectiveness of a pay-for-performance intervention to improve maternal and child health services in Afghanistan: a cluster-randomized trial. *Int J Epidemiol* 2016;45(2):451-9.
- Geller SE, Koch AR, Garland CE, MacDonald EJ, Storey F, Lawton B. A global view of severe maternal morbidity: moving beyond maternal mortality. *Reprod Health* 2018;15(1):98.
- Higgins-Steele A, Burke J, Foshanji AI, Farewar F, Naziri M, Seddiqi S, Edmond KM. Barriers associated with care-seeking for institutional delivery among rural women in three provinces in Afghanistan. *BMC Pregnancy Childbirth* 2018;18(1):246.
- Kachoria AG, Mubarak MY, Singh AK, Somers R, Shah S, Wagner AL. The association of religion with maternal and child health outcomes in South Asian countries. *PLoS One* 2022;17(7):e0271165.
- Khan A, Stanikzai MH, Wyar WM, Wasiq AW, Sayam H. Factors associated with health facility delivery in the 12th district of Kandahar city, Kandahar, Afghanistan: A community-based cross-sectional study. *Indian J Community Med* 2022;47(2):172-6.
- Mirzazada S, Padhani ZA, Jabeen S, Fatima M, Rizvi A, Ansari U, Das JK, Bhutta ZA. Impact of conflict on maternal and child health service delivery: a country case study of Afghanistan. *Confl Health* 2020;14(1):38.
- Oyerinde K. Can antenatal care result in significant maternal mortality reduction in developing countries. *J Community Med Health Educ* 2013;3(2):2-3.
- Randive B, Diwan V, De Costa A. India's conditional cash transfer programme (the JSY) to promote institutional birth: Is There an association between institutional birth proportion and maternal mortality? *PLoS One* 2013;8(6):e67452.
- Sebghati M, Chandraharan E. An update on the risk factors for and management of obstetric haemorrhage. *Womens Health (Lond)* 2017;13(2):34-40.
- Tekelab T, Chojenta C, Smith R, Loxton D. Factors affecting utilization of antenatal care in Ethiopia: A systematic review and meta-analysis. *PLoS One* 2019;14(4):e0214848.
- Tikkanen R, Gunja MZ, FitzGerald M, Zephyrin L. Maternal mortality and maternity care in the United States compared to 10 other developed countries. *The Commonwealth Fund* 2020;10.
- Tikmani SS, Ali SA, Saleem S, Bann CM, Mwenechanya M, Carlo WA, Figueroa L, Garces AL, Krebs NF, Patel A. Trends of antenatal care during pregnancy in low-

- and middle-income countries: Findings from the global network maternal and newborn health registry. *Semin Perinatol* 2019;43(5):297-307.
- Wherry LR, Fabi R, Schickedanz A, Saloner B. State And Federal Coverage For Pregnant Immigrants: Prenatal Care Increased, No Change Detected For Infant Health. *Health Affairs* 2017;36(4):607-15.
- World Health Organization. Afghanistan health indicator of Maternal mortality. Available from: <https://www.who.int/data/gho/indicator-metadata-registry/imr-details/26>
- Wu H, Sun W, Huang X, Yu S, Wang H, Bi X, Sheng J, Chen S, Akinwunmi B, Zhang CJP, Ming WK. Online Antenatal Care During the COVID-19 Pandemic: Opportunities and Challenges. *J Med Internet Res* 2020;22(7):e19916.
- Ziegler BR, Kansanga M, Sano Y, Kangmennaang J, Kpienbaareh D, Luginaah I. Antenatal care and skilled birth in the fragile and conflict-affected situation of Burundi. *The Int J Health Plann Manage* 2021;36(4):1081-106
- Adhikari M, Chalise B, Bista B, Pandey AR, Upadhyaya DP. Sociodemographic correlates of antenatal care visits in Nepal: results from Nepal Demographic and Health Survey 2016. *BMC Pregnancy Childbirth* 2020;20(1):513.
- Adu J, Mulay S, Owusu MF. Reducing maternal and child mortality in rural Ghana. *Pan Afr Med J* 2021;39:263.
- Agha S. Impact of a maternal health voucher scheme on institutional delivery among low income women in Pakistan. *Reproductive Health* 2011;8(1):10.
- Akseer N, Bhatti Z, Rizvi A, Salehi AS, Mashal T, Bhutta ZA. Coverage and inequalities in maternal and child health interventions in Afghanistan. *BMC Public Health* 2016;16 Suppl 2(Suppl 2):797.
- Alemi S, Nakamura K, Rahman M, Seino K. Male participation in antenatal care and its influence on their pregnant partners' reproductive health care utilization: insight from the 2015 Afghanistan Demographic and Health Survey. *Journal of Biosocial Science* 2021;53(3):436-58.
- Alibhai KM, Ziegler BR, Meddings L, Batung E, Luginaah I. Factors impacting antenatal care utilization: a systematic review of 37 fragile and conflict-affected situations. *Conflict and Health* 2022;16(1):33.
- Arthur E. Wealth and antenatal care use: implications for maternal health care utilisation in Ghana. *Health Economics Review* 2012;2(1):14.
- Azimi MD, Najafizada SA, Khaing IK, Hamajima N. Factors influencing non-institutional deliveries in afghanistan: secondary analysis of the afghanistan mortality survey 2010. *Nagoya J Med Sci* 2015;77(1-2):133-43.
- Azimi MW, Yamamoto E, Saw YM, Kariya T, Arab AS, Sadaat SI, Farzad F, Hamajima N. Factors associated with antenatal care visits in Afghanistan: secondary analysis of Afghanistan Demographic and Health Survey 2015. *Nagoya J Med Sci* 2019;81(1):121-31.

- Bartlett L, LeFevre A, Zimmerman L, Saeedzai SA, Turkmani S, Zabih W, Tappis H, Becker S, Winch P, Koblinsky M, Rahmanzai AJ. Progress and inequities in maternal mortality in Afghanistan (RAMOS-II): a retrospective observational study. *The Lancet Global Health* 2017;5(5):e545-e55.
- Bauserman M, Thorsten VR, Nolen TL, Patterson J, Lokangaka A, Tshefu A, Patel AB, Hibberd PL, Garces AL, Figueroa L, Krebs NF, Esamai F, Nyongesa P, Liechty EA, Carlo WA, Chomba E, Goudar SS, Kavi A, Derman RJ, Saleem S, Jessani S, Billah SM, Koso-Thomas M, McClure EM, Goldenberg RL, Bose C. Maternal mortality in six low and lower-middle income countries from 2010 to 2018: risk factors and trends. *Reproductive Health* 2020;17(3):173.
- Currie S, Natiq L, Anwari Z, Tappis H. Assessing respectful maternity care in a fragile, conflict-affected context: observations from a 2016 national assessment in Afghanistan. *Health Care for Women International* 2021:1-21.
- Edmond KM, Yousufi K, Anwari Z, Sadat SM, Staniczai SM, Higgins-Steele A, Bellows AL, Smith ER. Can community health worker home visiting improve care-seeking and maternal and newborn care practices in fragile states such as Afghanistan? A population-based intervention study. *BMC Med* 2018;16(1):106.
- Engineer CY, Dale E, Agarwal A, Agarwal A, Alonge O, Edward A, Gupta S, Schuh HB, Burnham G, Peters DH. Effectiveness of a pay-for-performance intervention to improve maternal and child health services in Afghanistan: a cluster-randomized trial. *Int J Epidemiol* 2016;45(2):451-9.
- Geller SE, Koch AR, Garland CE, MacDonald EJ, Storey F, Lawton B. A global view of severe maternal morbidity: moving beyond maternal mortality. *Reproductive Health* 2018;15(1):98.
- Higgins-Steele A, Burke J, Foshanji AI, Farewar F, Naziri M, Seddiqi S, Edmond KM. Barriers associated with care-seeking for institutional delivery among rural women in three provinces in Afghanistan. *BMC Pregnancy Childbirth* 2018;18(1):246.
- Kachoria AG, Mubarak MY, Singh AK, Somers R, Shah S, Wagner AL. The association of religion with maternal and child health outcomes in South Asian countries. *PLOS ONE* 2022;17(7):e0271165.
- Khan A, Staniczai MH, Wyar WM, Wasiq AW, Sayam H. Factors Associated with Health Facility Delivery in the 12th District of Kandahar City, Kandahar, Afghanistan: A community-Based Cross-Sectional Study. *Indian Journal of Community Medicine* 2022;47(2):172-6.
- Mirzazada S, Padhani ZA, Jabeen S, Fatima M, Rizvi A, Ansari U, Das JK, Bhutta ZA. Impact of conflict on maternal and child health service delivery: a country case study of Afghanistan. *Conflict and Health* 2020;14(1):38.
- Oyerinde K. Can antenatal care result in significant maternal mortality reduction in developing countries. *J Community Med Health Educ* 2013;3(2):2-3.
- Randive B, Diwan V, De Costa A. India's Conditional Cash Transfer Programme (the JSY) to Promote Institutional Birth: Is There an Association between Institutional Birth Proportion and Maternal Mortality? *PLOS ONE* 2013;8(6):e67452.

- Sebghati M, Chandraharan E. An update on the risk factors for and management of obstetric haemorrhage. *Women's Health* 2017;13(2):34-40.
- Tekelab T, Chojenta C, Smith R, Loxton D. Factors affecting utilization of antenatal care in Ethiopia: A systematic review and meta-analysis. *PLoS One* 2019;14(4):e0214848.
- Tikkanen R, Gunja MZ, FitzGerald M, Zephyrin L. Maternal mortality and maternity care in the United States compared to 10 other developed countries. *The Commonwealth Fund* 2020;10.
- Tikmani SS, Ali SA, Saleem S, Bann CM, Mwenechanya M, Carlo WA, Figueroa L, Garces AL, Krebs NF, Patel A. Trends of antenatal care during pregnancy in low- and middle-income countries: Findings from the global network maternal and newborn health registry Seminars in perinatology: Elsevier, 2019
- Wherry LR, Fabi R, Schickedanz A, Saloner B. State And Federal Coverage For Pregnant Immigrants: Prenatal Care Increased, No Change Detected For Infant Health. *Health Affairs* 2017;36(4):607-15.
- Wu H, Sun W, Huang X, Yu S, Wang H, Bi X, Sheng J, Chen S, Akinwunmi B, Zhang CJP, Ming W-K. Online Antenatal Care During the COVID-19 Pandemic: Opportunities and Challenges. *J Med Internet Res* 2020;22(7):e19916.
- Ziegler BR, Kansanga M, Sano Y, Kangmennaang J, Kpienbaareh D, Luginaah I. Antenatal care and skilled birth in the fragile and conflict-affected situation of Burundi. *The International Journal of Health Planning and Management* 2021;36(4):1081-106.
- Afghanistan health survey 2018, <https://www.kit.nl/wp-content/uploads/2019/07/AHS-2018-report-FINAL-15-4-2019.pdf>.
- WHO, Afghanistan health indicator of Maternal mortality,
<https://www.who.int/data/gho/indicator-metadata-registry/imr-details/26>