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Maternal Education and the Utilization of Antenatal Care Services in Uttar Pradesh, India

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Global Epidemiology

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Abstract

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Background

Antenatal care services are the first steps towards ensuring the health of mothers and the newborn. In 2015, the global maternal mortality ratio was estimated to be 216 deaths per 100,000 live births while in India maternal mortality ratio was 174 per 100,000 live births (1-2). Nigeria and India contributed to over one third of all maternal deaths worldwide in 2015 (2). ANC can be defined as the care provided to pregnant women by skilled healthcare professionals to ensure best health conditions for both mother and baby during pregnancy (3). ANC classically includes risk identification, prevention and management of pregnancy-related or existing diseases and health education and health promotion (3). ANC helps in reducing maternal and perinatal morbidity and mortality by detecting and treating pregnancy-related complications and identifying women who are at increased risk of developing complications during labor and delivery (3). Further, ANC provides an opportunity to communicate with and support women, families and communities at a critical time in a woman's life (3). Maternal education has been shown to enhance pregnant mothers' self-care and is regarded as a key factor for safe and healthy delivery. Hence, there is a need for both maternal education and ANC to enhance the knowledge of expectant women and provide them with the necessary information to proactively, seek health care resources and resolve pregnancy complications effectively.

Methods

The relationship between maternal education and utilization of antenatal care was explored using the national family health survey 2015-16 (NFHS-4) data. Bivariate analyses were conducted between maternal healthcare indicators including Tetanus toxoid vaccinations, iron and folic-acid supplementation, institutional and professional delivery care, and education level of the women (illiterate, literate-less than middle school and above middle school). These analyses were compared between the state of Uttar Pradesh and all of India.

Multivariate analyses were completed for receiving maternal healthcare services for births during the four years preceding the survey (outcome of interest) and maternal education (exposure of interest), controlling for socioeconomic and demographic variables.

Results

In analyses, there is striking disparity in the utilization of the antenatal care in Uttar Pradesh. The women in Uttar Pradesh were less likely to seek antenatal care (10.7%) compared to all of India (60%). Across India, multivariate analysis confirmed the positive and significant influence of women schooling on the utilization of antenatal care. Education emerges as the single most important determinant of antenatal care service utilization in India after controlling for covariates. Women who are educated at least up to middle school were likely to receive eight times more services that the illiterate women.

Conclusion

In summary, our findings suggest that education seems to be strong and significant predictor or utilization of the antenatal care services when all of India and Uttar Pradesh were considered separately. Across India, multivariate analysis demonstrated that positive and significant influence of women's schooling on the utilization of antenatal care. Education emerges as the single most important determinant of antenatal care service utilization in India after controlling for covariates. Women with an education of at least middle school were eight times more likely to receive healthcare services than the illiterate women. This pattern was also similar for the other antenatal care services. Births to women who had completed middle school were five to eight times more likely to receive maternal care as births to literate women. From these analyses we can conclude education had the strongest impact on antenatal service utilization than any other socio-economic factor considered.

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CHAPTER 1: BACKGROUND AND LITERATURE REVIEW

Antenatal care (ANC) is one of the major healthcare interventions with the primary goal of providing safe pregnancy outcomes (4). Whereas, maternal education is regarded as a major indicator of positive pregnancy outcome that is responsible for enhancing the learning of the mothers regarding self and childcare during the pregnancy. Hence, it can be said that both maternal education and ANC are necessary for healthy women and healthy baby. The current research study will provide an introduction on maternal psychosocial risk factors, benefits of maternal health education during antenatal care and determinants of utilization of antenatal care services. This study will evaluate the association between maternal education and utilization of antenatal care in state of Uttar Pradesh, India and compare the results with national statistics in context of healthy pregnancy outcomes. In addition, the study will include a complete review of the literature on existing antenatal care services, techniques and strategies to improve pregnancy outcomes for women in India.

OVERVIEW OF ANTENATAL CARE SERVICES

Antenatal care is the medical care that is given to expecting women by healthcare professionals during pregnancy (3). WHO recommends minimum of eight ANC contacts for pregnant women with healthcare providers (3). Globally, only 50% women receive recommended antenatal care during pregnancy, 86% of the pregnant women receive only

one antenatal service and 62% of women receive at least four antenatal services during their pregnancy (5). Percentage of women receiving at least four antenatal visits is even lower in regions with highest maternal mortality like sub -Saharan Africa (52%) and south Asia (46%) (5). A study examining the factors associated with the number and timing of ANC visits for poor women in Guatemala, Honduras, Mexico, Nicaragua, Panama, and El Salvador showed that women who were unmarried, less-educated, adolescent, had not wanted to conceive, and lacked media exposure were less likely to receive ANC as per international guidelines (6). World Health Organization (WHO) has introduced a new antenatal care model which mainly focused on ANC that aims to meet the health care requirements of low- and middle-income countries (3). The model provides information about standard medical care that is to be given to pregnant women and recommends increased antenatal care to 8 contacts during pregnancy (3). This model provides new guidelines for the antenatal care of the women by initiating WHO Department of Reproductive Health and Research (RHR) model which recommends that antenatal care must be given through healthcare systems and include counseling on healthy eating and physical activities during pregnancy (3). The model also recommended the Tetanus toxoid vaccination for all expecting women to prevent neonatal mortality, as well as one ultrasound scan before 24 weeks of gestation to help identify fetal anomalies (3). To reduce maternal mortality rates and ensure safe delivery, increasing use of antenatal care must be promoted among pregnant women to help ensure the safety and wellbeing of the woman and newborn.

BENEFITS OF MATERNAL HEALTH EDUCATION DURING ANTENATAL CARE

While studying the cultural factors associated with utilization of ANC services in rural India, it was found that, lack of education results in low utilization of antenatal and neonatal care services and is a critical driver of poor health-care (7). There are many unscientific cultural practices prevalent in India, which pose risk for pregnant mothers and newborn. Education of young, uneducated and unemployed, lower caste, women before they get pregnant can encourage use of available health care resources. Education and deep understanding of embedded cultural factors can help in formulation of effective policies and utilization of healthcare for reducing maternal and neonatal mortality rates, especially in rural parts of India (7).

Understanding the importance of education, several community-based health education programs were initiated in various states of India, including Uttar Pradesh. These were scheme for promotion of menstrual hygiene under which young women were provided adequate education on menstrual hygiene, weekly Iron and Folic Acid supplementation (WIFS) was introduced in Uttar Pradesh, India to provide counseling on dietary needs, prevention against intestinal worm infestation, and reduction in intergenerational cycling of anemia (8). Other programs that have been introduced in various states of India to enhance the education of pregnant women and to promote the use of antenatal services during pregnancy include: Web Enabled Mother and Child Tracking System (MCTS) and Janani Shishu Suraksha Karyakaram (JSSK) (8). The introduction of health-care programs such as Pradhan Mantri Surakshit Matritva Abhiyan demonstrated an impact on maternal mortality rate, with a 30% reduction in maternal mortality rate from 359 in 2007-2009 to

201 in 2014-2016 in the state of Uttar Pradesh, India (9). This reduction indicates that organized educational activities introduction of maternal education programs can be highly useful in reducing maternal mortality rate in India.

In Uttar Pradesh, the governing bodies introduced National Rural Health Mission (NRHM), Auxillary Nurse Midwives (ANM) services, Anganwadi workers (AWW) and Accredited Social Health Activists (ASHAs) to enhance utilization of antenatal care services among 33.3% of the population living in rural areas of the state (10). A study, was done in rural areas of Lucknow, the capital city of Uttar Pradesh from August 2009 to July 2010 where total of 352 recently delivered women (RDW) were studied, it was found that 85.5% of these women received at least three antenatal visits with more utilization of ANC services among women who were registered early with a tendency of more ANC visits among educated RDWs (though statistically insignificant but worth noting) (10).

A cross-sectional survey was conducted in rural Uttar Pradesh with 13,167 women who had a livebirth at home during the two years preceding data collection, it was found that women who received counseling from health workers or other sources on newborn care practices during pregnancy were more likely to report the newborn care practices, but the level of counselling among these women was low (11). These findings indicate that if women are educated about healthcare, they are more likely to pay attention to selfcare and newborn care. Various studies indicate that social groups, years of schooling, wealth index and place of residence show significant relationship with utilization of maternal healthcare services (12). These studies provide an insight that efforts should be made to educate women and create awareness among socially and economically disadvantaged women of the society about the benefits of utilization of ANC services.

Maternal Psychosocial Risk Factors and Knowledge of Antenatal Care

Psychological risk factors like anxiety, stress, depression, marital dissatisfaction, social support, attitude, self-efficacy and knowledge greatly affect pregnancy outcomes, women who adopt unhealthy eating habits and gain weight are at a higher risk of acquiring child delivery complications, women who did not perform any physical activity with low level of social support suffer from anxiety, which negatively impacts a pregnant women (13). A study on examining the quality of antenatal care services utilized by 286 recently delivered women (RDWs) in Shivrajpur area of Uttar Pradesh was conducted from August 2012 to July 2013, it showed that 91.9% of these women received at least one antenatal visit, 73.1% of women received this care from public facility, out of 263 RDWs who received ANC-74.9% had weight measurement, 76.4% had abdomen examination, 69.6% had hemoglobin estimation, 60.8% had height measurement, 66.2% had blood pressure measured 66.2%, 50.2% had urine examination and were informed about pregnancy complications and danger signs, only 14.8% RDWs consumed 100 IFA tablet, 79.5% received Tetanus Toxoid injection, complete ANC was received by only 16.3% of RDWs (14). The above study gives a clear picture of the poor quality of antenatal care services received by pregnant women in Uttar Pradesh, India, in such scenarios it is hard to imagine that these women will receive any psychological risk evaluation when they do not even receive basic ANC. This study indicates that lack of ANC service utilization by pregnant women in Uttar Pradesh contributes to its high mortality rates.

If women's physical, emotional wellbeing and perceptions are well addressed during ANC, women show enhanced self-efficacy and confidence during birthing that promotes smooth labor and delivery process (15). Hence, it can be said that if psychological

risk factors are also taken care of during antenatal care, they positively impact the birth-giving experience of a pregnant woman.

DETERMINANTS OF UTILISATION OF ANTENATAL CARE SERVICES

Antenatal care is the key factor for reducing maternal mortality, there are various factors that affect the antenatal care services such as maternal age, number of living children, education, place of residence, occupation, religion, and ethnicity (16). Focusing on maternal age, the age of a woman highly impacts the adoption of antenatal care services, the increasing age is highly associated with more utilization of ANC services (16). In Bihar, India, women aged between 25-30 years and older than 30 utilize antenatal care services as compared to women who are younger (16). Education and unscientific religion practices have a negative impact on utilization of ANC services, majority of people in Uttar Pradesh living in the rural areas are highly illiterate and adhere strongly to religious practices that are sometimes unscientific and risky for pregnancy and newborn care, therefore these women do not gain fully from ANC services provided (17).

The National Rural Health Mission (NRHM) was launched in 2005 to provide quality health care to the rural population of India, especially the vulnerable groups (18). Under NRHM the reproductive, maternal, newborn, child and adolescent health (RMNCH+A) concentrates on continuum of care concept and focuses on designing interventions that aim at reproductive, maternal, newborn, child, and adolescent health under a broad umbrella, improving the whole life cycle starting from beginning (18). This program aims at reducing the maternal mortality ratio in India from 130 to 100 by year 2020 and to 70 by year 2030. The National Rural Health Mission provides a trained female

community health activist - 'ASHA' or Accredited Social Health Activist to every village in India, ASHA helps in connecting community and the public health system (18).

RELATIONSHIP BETWEEN MOTHER'S EDUCATION LEVEL AND MATERNAL HEALTH-CARE

Globally, about 800 women die every day because of preventable causes related to pregnancy and childbirth, 20 per cent of these women are from India which estimates to around 44,000 deaths of women due to preventable pregnancy-related causes. (19). Due to lack of proper education and inadequate healthcare services, under-five mortality rate in India was 39.4 per 1,000 live births in the year 2019 (20). In a baseline survey conducted between July 2010 and March 2011 with the main aim of checking the outcomes of initiatives taken under the National Rural Health Mission since 2005, Uttar Pradesh emerged as one of the worst performing states with infant mortality rate of 71 per 1,000 live births, 94 under-five mortality rate per 1,000 live births (21). It appears that various initiatives undertaken by NRHM were not successful in improving the maternal and child health in Uttar Pradesh. More emphasis needs to be given to educate women and increase awareness about utilization of antenatal health-care so that necessary improvements can be brought in this segment. In respect to this, due to the provision of Continuum Care Approach, Lifecycle policies like Janani Suraksha Yojana and Integrated Management of Newborn and Childhood Illness program by UNICEF, quality education is provided to the pregnant women. These programs will help improve awareness about modern means of safeguarding health, ensure better utilization of resources and empower women to make decisions. As a result, educated expecting women will be able to use preventive care methods, including adopting healthy diets because of knowledge of nutritional value and

investing quality time and money for their health. 79% of the pregnant women who have acquired middle school education used antenatal care services while only 50% of illiterate women used ANC services. 75% of middle school educated women consulted health professionals in comparison to 20% illiterate women. Due to better provision of educational services, young women have delayed their sexual activity, learned information on sexually transmitted infections, and acquired better knowledge about child well-being and care (22). Due to education, the women showed increased levels of healthcare seeking behavior resulting in early detection of pregnancy complications and lowering the frequency of maternal mortality attributed to these complications (22). Moreover, maternal education also supports economic and employment opportunities for women, as a result, women will have more autonomy to take care of their health and that of their children (22). For example, Miracles Mediclinic in Uttar Pradesh provides antenatal educative services to expecting women along with preventive health checks, consultation, and a pharmacy, this helps to increase the confidence and emotional insight in pregnant women. These services have directly impacted the health of expecting women, leading to healthy pregnancies and safe deliveries.

OPPORTUNITIES TO IMPROVE MATERNAL HEALTH LITERACY THROUGH ANTENATAL EDUCATION

The concept of maternal health literacy is referred to as the cognitive and social skills acquired by women to gain understanding and learning on the health of self and of children (23). Health literacy directly provides health-related information, helps mothers identify and treat child health-care problems, and promotes the correct use of medication (24). Maternal education helps in enhancing utilization of maternal and child health

services by providing safe drinking water and nutritious food (25). In a study, various method like face to face interaction, prenatal, perinatal or postpartum course were incorporated to enhance women's education on maternal health, that will help in improving social health, childcare and self-care (26).

When antenatal education was provided to women, health literacy was found to increase the confidence and emotional stability of pregnant women. In addition, the antenatal classes also provided information about the birthing process, health-care relevant to pregnancy, preparations for parenthood, and basic infant care skills. For example, antenatal classes at Sitaram Bhartia Hospital in Uttar Pradesh educated women about the entire pregnancy and delivery process, which enhanced the confidence and emotional level of the expecting woman, as a result, women were able to promote a positive childbirth experience. A study found that antenatal care components also helped in preventing a wide range of pregnancy complications and led to a reduction in maternal mortality (27). A study revealed that antenatal classes helped pregnant women manage breastfeeding, plan for newborn arrival, acquire more information related to the birthing milieu and provide advice regarding home management immediately after childbirth, this enhanced the confidence and emotional levels of the pregnant women (28).

MATERNAL EDUCATION AND CHILD HEALTH

Maternal education plays an important role in child health-care parameters, this education along with awareness on family planning helps in reducing infant mortality (29). Socio-economic and demographic conditions like maternal education played a major role in the infant mortality rate in Uttar Pradesh (30). The education level of women in the state

is very poor, which leads to most women not being aware of the immunizations that are required for infants leading to poor childcare (30). Conversely, educated women are well informed on infant vaccinations and ensure that children are provided clean and hygienic living spaces, lack of education on proper care practices, vaccination, and health–care practices, high infant mortality was recorded in Uttar Pradesh (30). For example, mothers having middle school level education or higher experienced a lower level of infant mortality relative to mothers with no education (30). A mother plays a key role in monitoring various markers of child growth, such as children's height-for-age, the level of mother's education highly impacts this monitoring process, educated mother tends to pay more attention to child's nutrition and dietary requirements of their children (30). Mothers possessing adequate learning about the health and food provide healthy food to their children and save them from malnutrition and other possible chronic imbalances of protein and energy in the body (30). Taken together, maternal education plays a major role in the growth and development of children by monitoring growth, providing adequate nutrition, timely vaccinations and hygienic surroundings.

RESEARCH GAP

It was necessary to carry a research to better characterize the association between maternal education and the utilization of antenatal care services in Uttar Pradesh, India. Many factors likely impact maternal health and utilization of ANC services, including: maternal education, husband's education, marital status, availability, living cost, household income, women's employment, parity and cultural beliefs impact (16). The proposed research will further investigate these factors with respect to infant mortality, child-care, self-care and maternal health. A gap was identified in the previous and existing literature

regarding maternal education and the utilization of antenatal care Services in Uttar Pradesh. Thus, the current study will help to fill the gap and provide relevant information about maternal health, education and ANC practices in Uttar Pradesh. This research will also provide a platform for future work in this area and help in formulating targeted ANC and maternal education intervention campaigns.

CHAPTER 2: MANUSCRIPT

INTRODUCTION

Antenatal Care (ANC) is defined as the care given to an expectant woman prior to giving birth and involves all the services prior to delivery, including provision of pregnancy, birthing, and postnatal information, counseling, medical treatment, and vaccination (3-32). Within this, maternal education of antenatal care is necessary to ensure safe infant delivery and care. While making focus on maternal education, Maternal education is referred to as the level of formal education received by the mother (33). Maternal education plays a major role in the child's growth and learning process along with taking good care of self. The purpose of this study is to investigate the association between maternal education and the utilization of antenatal care services in Uttar Pradesh, India.

RESEARCH BACKGROUND

Importance of maternal education and antenatal care to improve maternal and infant health

Antenatal care is the care that is made available to pregnant women to ensure a safe pregnancy and a healthy newborn. Antenatal care contributes to reducing high maternal mortality rates and forms the basis of maternal care on which the life of the mother and baby depend. Hence, it can be said that antenatal care is a key strategy to improve maternal and newborn health (34). In a survey conducted by Maternal Death Surveillance and Response in Uttar Pradesh, there are 36 maternal deaths daily, which accounts for 13,200 deaths each year, accounting for 30% of the total maternal deaths in India (35). In order to

reduce maternal mortality, it is necessary for expectant women to have at least four antenatal care visits (ANC) so that complications, pregnancy stages, infant growth and other related medical concerns can be identified and addressed. Prevention through ANC is an important strategy to ensure the care of both pregnant women and their infants.

The maternal education level highly influences the health-care seeking behavior of the mothers, with mothers with higher education levels using healthcare services to a greater extent in comparison to the mothers with lower education levels. The education levels among women makes them aware of the harmful implications of poor health and enhances their ability to have knowledge about utilization of health care services (36). As a result, educated, expecting women will be more informed of their own health and using antenatal care services. Pregnant women will make regular antenatal care visits and screening, monitoring and treatment facilities necessary for mother and infant growth. The antenatal care provider also provides the best nutrition and healthy diet plans which will ensure the proper care of the mother and infant. In order to improve the condition of expectant women, Mother and Child Tracking System (MCTS) was launched by the Indian government to provide antenatal care, immunization and family practice (FP) to pregnant women. Additionally, there are various programs such as Janani Shishu Suraksha Karyakaram (JSSK) in various states of India, which has been launched to eliminate the out of pocket expenditures for families and provides free deliveries.

Factors affecting the utilization of antenatal care among pregnant women

Antenatal care is regarded to be one of the key components of maternal health which is necessary to be utilized in a proper way to provide safe motherhood (37). Several

factors have been identified to impact the utilization of antenatal care among pregnant women, which include socio-demographic characteristics such as age, marital status, level of education, and spousal support. For example, among women with limited education only 23.7% are aware of antenatal care but have never used these services, whereas 82.4% of well-educated women have used antenatal care services and are informed on health access opportunities in Uttar Pradesh. In addition to this, age appears to be an important factor impacting whether a pregnant woman received ANC. Lucknow, Aligarh, and Bihar demonstrated that 55.7% women in their 30's utilized ANC care service but most women are still deprived of all these services. (34-38).

The socio-cultural factors such as customs, beliefs, trends, and rituals also affect the women's care benefits that highly impact the utilization of antenatal care among pregnant women. It was found that in Uttar Pradesh, especially in rural areas, the caste affects 33% of women for receiving good health care services because the literacy rate in a rural area is low (34-39). In addition, obstetric factors like Gravida, parity, complications during pregnancy and economic factors like poverty, income level, inflation, and recession condition and high antenatal care fees highly impact the utilization of antenatal care among pregnant women in this region (40). For example, in Bihar, approximately 80% of maternal deaths and 98% of stillbirths have been due to direct obstetric complications, primarily hemorrhage, sepsis, complications of abortion, preeclampsia, and eclampsia, and prolonged/obstructed labor (all of which are associated with insufficient antenatal care). In the state of Uttar Pradesh, low income levels significantly impact antenatal care utilization, with only 34.6% of women using any type of ANC services during pregnancy, suggesting that most pregnancy complications go undetected and untreated (41).

Furthermore, facility factors such as distance to health–care centers, delay in attending to clients, and quality of care parameters also impact the utilization of antenatal care among pregnant women. Rural regions are particularly difficult to provide efficient health-care services to pregnant women and their adequate care gets hindered. For example, a cross-sectional survey of 7005 pregnant women was carried out in the sampled areas of 28 districts in Uttar Pradesh and found that distance to the health center highly affect the ANC treatment and care facility of pregnant women (42). Hence, the socio-demographic, cultural, obstetric, economic and facility factors highly impact the utilization of antenatal care services among pregnant women (34).

Effect of maternal education on antenatal care utilization and maternal outcome in hospitals of Uttar Pradesh

While focusing on the effect of maternal education on antenatal care utilization and maternal health outcome in hospitals of Uttar Pradesh, provision of proper antenatal care service is required to be taken into consideration. Antenatal care provides preventive interventions during pregnancy like provision of tetanus toxoid vaccinations, educating women about nutrition, safe delivery, and postpartum care. The maximum number of maternal deaths occur among pregnant women at the time of labor, delivery or within a few days of delivery. Access to antenatal care prevents maternal death and ensures that the proper care of the mother and infant are taken. Women who have received antenatal education possess greater tendency to identify pregnancy complications, to seek medical care and report pregnancy issues to healthcare providers. As per the National Family Health Survey Reports, among all the expectant women present in Uttar Pradesh, 44.4% of the pregnant women have been recorded to be receiving antenatal care in a hospital. Of these

women, 37.4% received two doses of tetanus toxoid vaccination as part of antenatal care and 29.5% received iron and folic acid tablets (prevents neural tube defects and anemia) in order to take care of their pregnancies. One in five deliveries are attended by a trained healthcare professional, with only 11.2% of women delivering births in medical hospitals, and 17.2% of women delivering with the assistance of healthcare professionals. Furthermore, due to the low social status of women in this region, there are few opportunities for basic education, low decision-making power for adequate antenatal care, and low participation in the delivery in hospitals, together leading to high maternal mortality and insecure pregnancies. Due to lack of antenatal care, acute respiratory infection (ARI) was found among 7.2% infants, whereas, 8.9% of the newborns suffered from diarrhea (43). Hence, maternal education on antenatal care is necessary to promote the safe deliveries and good health of newborns. For example, Obstetrics and Gynecology Department, Era's Lucknow Medical College and Hospital, Lucknow, Uttar Pradesh analyzed the situation of expecting women belonging to the beyond 40 weeks pregnancy category and received antenatal care during 37 to 40 years. It was found that 17.6% of the deliveries were postdated, and 5.69% of the deliveries have been post-term. The lower segment Cesarean section (LSCS) women accounted for 56.50% and the strength of in-term patients was recorded to be 34.18%. Additionally, 6.09% were admitted to neonatal intensive care unit (NICU) after birth during 37-40 weeks pregnancy and 17.6% of the pregnancies were recorded to be post-dated (44). Hence, antenatal care helps in identifying high-risk pregnancy, monitoring pregnancy and ensuring safe deliveries.

RESEARCH PROBLEM

The delivery of maternal health care services like antenatal care among all women is a major challenge in developing countries like India. In respect to this the states Uttar Pradesh, Bihar, Lucknow, and others have been identified to have high rates of maternal health issues and require Empowered Action to control its harmful implications (45). Additionally, due to low literacy rates among the women in Uttar Pradesh, the women face more difficulties in understanding their symptoms, taking care of infants. As a result, low educated women tend to lack information on available antenatal care and do not utilize these services. Furthermore, high mortality rates are exacerbated by lack of economic resources, shortage of health-care facilities, and difficulty accessing antenatal care. Hence, it is necessary to empower and educate women so that they will be able to ensure healthy pregnancies and infant care.

SIGNIFICANCE OF STUDY

Antenatal care services are regarded to be primary in health care delivery system. It is a vital component of the care and is responsible for exercising control over maternal mortality and morbidity. ANC educates women regarding their pregnancies and ensures that they have safe deliveries and a healthy infant. In this respect, education plays an important role in impacting women's health-conscious levels and develops an understanding of antenatal care services. Maternal education empowers women to delay their marriages, get pregnant at the right age and reduce the risk of dying during the childbirth (46). Findings from this study will help in bringing significant improvements in maternal mortality in Uttar Pradesh.

RESEARCH QUESTIONS

1. What is the importance of maternal education on maternal antenatal care utilization?
2. What is the role of maternal education on maternal utilization of antenatal care?
3. What are the factors that determine maternal utilization of antenatal care?
4. Is antenatal education beneficial to maternal health literacy?
5. How is maternal education related to child health?

2.6 OBJECTIVES

1. To study the importance of maternal education in antenatal care
2. To examine whether the level of maternal education influences antenatal care
3. To identify various factors influencing antenatal care
4. To determine the impact of antenatal education on maternal health literacy
5. To examine the relationship between maternal education and child health

2.7 RESEARCH HYPOTHESIS

H01: There is no significant impact of maternal education on antenatal care

Ha1: There is a significant impact of maternal education on antenatal care

H02: There is no significant impact on the level of maternal education on antenatal care

Ha2: There is a significant impact on the level of maternal education on antenatal care

H03: There is no significant impact of antenatal education on maternal health literacy

Ha3: There is a significant impact of antenatal education on maternal health literacy

H04: Maternal education has no significant impact on the outcome of child health

Ha4: Maternal education has a significant impact on the outcome of child health

CHAPTER 3: RESEARCH METHODOLOGY

RESEARCH APPROACH

In the current study, previously collected National Family Health Survey 2015-2016 (NFHS-4) data from Uttar Pradesh was used to evaluate the relationship between maternal education and utilization of antenatal care services in Uttar Pradesh (31). This survey provides information on population, health and nutrition for India and each State and Union territory (31). The Indian Ministry of Health and Family Welfare designated International Institute for Population Sciences, Mumbai, India as the nodal agency to conduct NFHS-4. The main objective of NFHS has been to collect essential data on health and family welfare and emerging issues in this area (31).

DATA COLLECTION

In the current study, National Family Health Survey 2015-2016 (NFHS-4) data from Uttar Pradesh was used to evaluate the relationship between maternal education and utilization of antenatal care services in Uttar Pradesh. In Uttar Pradesh four survey questionnaires were used that focused on household, women, men, and biomarker, the survey was conducted in local language using computer assisted personal interviewing (CAPI) (31). In Uttar Pradesh, NFHS-4 fieldwork was conducted from 3 February 2016 to 17 September 2016 by Goa Institute of Management (GIM), Development & Research Services Pvt. Ltd. (DRS) & Population Research Center, Department of Economics, University of Lucknow, the survey gathered information from 76,233 households, 97,661 women, and 12,939 men. Fact sheets for each district of Uttar Pradesh were prepared (31). All women aged 15-49 and men aged 15-54 in the selected households were eligible for to

be interviewed, two survey versions were mainly used, the first version collected information on women's characteristics, marriage, fertility, contraception, reproductive health, children's immunizations, and treatment of childhood illnesses and the second version of the questionnaire had four additional topics, namely, sexual behavior, HIV/AIDS, husband's background and women's work, and domestic violence. This version was fielded in a subsample of NFHS-4 households designed to provide information only at the state and national levels. The men's questionnaire covered male characteristics, marriage, and number of children, contraception, fertility preferences, nutrition, and sexual behavior, attitudes towards gender roles, HIV/AIDS, and lifestyle (31). In addition to this, complete estimation of all key indicators at the national and state levels, as well as estimates for most key indicators at the district level (for all 640 districts in India, as of the 2011 Census) were prepared (31).

The present study also adopts secondary data collection method which includes referring the data and information from the various websites, journals, magazines and other authenticate resources so that the researcher will be able to ensure the reliability and validity of the data effectively.

STATISTICAL ANALYSIS

Percentage of live births, by various maternal healthcare indicators, for all India and Uttar Pradesh were compared, descriptive statistics were reported as percentages. Crude associations between categorical variables were assessed by bivariate regressions and Bivariate relationship between the mother's schooling and antenatal care was noted, analytic statistics were reported as percentage of live births in the four years preceding the

survey by various maternal health care indicators and mother's education, for all India and Uttar Pradesh. Multivariate relationship between the mother's education level and maternal health care was calculated. It was represented as odds ratios of receiving maternal health-care services for births during the four years preceding the survey, by maternal education, controlling for selected socioeconomic and demographic variables for all India an Uttar Pradesh.

ETHICAL CONSIDERATION

An informed consent was obtained before the collection of data in without making any harm to the respondent. In the current study to answering the specific research question which defines Maternal Education and the Utilization of Antenatal Care Services in Uttar Pradesh, India, the researcher ensured that the de-identified data was used. In addition to this, permission was obtained from the authorities, the authorization letter is attached in Appendix A. All these efforts indicate that all the consideration and process that have been applied to conduct the study were reliable and valid in nature.

RESULTS

Table 1 shows that, there is striking disparity in the utilization of the antenatal care in Uttar Pradesh. The women in Uttar Pradesh were less likely to seek antenatal care (10.7%) compared to all of India (60%). With respect to tetanus toxoid vaccinations, the women in Uttar Pradesh were more likely to receive two doses compared to all of India, 81.4% compared to 53.9%, respectively. The iron folic acid tablets to combat anemia were less likely to be received among Uttar Pradesh women. An interesting finding is that among

Uttar Pradesh women, most births were delivered in medical facilities (67.8%) and a high proportion of deliveries were conducted with a trained healthcare provider (99.7%).

Table 2 shows that there is a consistent relationship between the utilization of the ante-natal care services and mother's education. In India, only half of the births to illiterate women received antenatal care, compared with the 79% of births to literate women with less than middle school education. Similar differentials were also observed with respect to the tetanus toxoid injections. The differentials were most marked between illiterate women and educated women all over India. In Uttar Pradesh, the utilization of the antenatal care, receiving the iron and folic acid tablets and institutional delivery were higher in educated women than illiterate women. However, the tetanus toxoid injection and advice from the health professionals during delivery were similar across all education levels in Uttar Pradesh.

Education appears to be significantly associated with utilization of the antenatal care services when whole India and Uttar Pradesh were considered separately. Across India, multivariate analysis confirmed the positive and significant influence of women schooling on the utilization of antenatal care. Education emerges as the single most important determinant of ante-natal care service utilization in India after controlling for covariates. Women who are educated at least up to middle school were likely to utilize eight times more services as compared to illiterate women. This pattern was also similar for the other antenatal care services.

In Uttar Pradesh, education was found to be strongly associated with antenatal care services utilization. Higher eduction had shown higher utilization of antenatal care services.

Residence, work status and scheduled caste and tribe likely to have higher utilization of the tetanus toxoid injections. The utilization of the iron and folic acid tablets had shown association with the education, residence and caste. With respect to delivery in medical instiutions, greater than middle school education had signifcant association, urban residence also had significant association.

Table 1: Percentage of live births, by various maternal health-care indicators, for all India and Uttar Pradesh

	Received antenatal care[a]	Received two doses of tetanus toxoid vaccine[b]	Received iron/folic- acid tablets	Births delivered in medical institutions	Deliveries assisted by health professionals
All India	60.0	53.9	50.5	25.5	34.3
Uttar Pradesh	10.7	81.4	12.9	67.8	99.7

Table 2: Bivariate relationship between the mother's schooling and ante-natal care

Percentage of live births in the four years preceding the survey by various maternal health care indicators and mother's education, for all India and Uttar Pradesh.

	Mother's education			
Maternal healthcare indicators	**Illiterate**	**Literate, < middle**	**Middle +**	**Total**
All India				
Antenatal care[a]	50.5	79.1	92.3	62.0
Tetanus toxoid injections[b]	40.5	72.1	88.7	53.9
Iron/folic-acid tablets	38.3	66.6	82.1	50.5
Institutional delivery[c]	11.8	37.9	67.0	25.5
Professional delivery care[d]	20.1	48.6	75.7	34.3
Uttar Pradesh				
Antenatal care	66.7	78.8	87.5	77.8
Tetanus toxoid injections	97.5	97.0	97.0	97.3
Iron/folic-acid tablets	52.6	60.7	73.7	63.3
Institutional delivery	56.7	65.2	80.6	68.2
Professional delivery care	99.7	99.7	99.9	99.7

Table 3: Multivariate relationship between the mother's education level and maternal health care

Odds ratios of receiving maternal healthcare services for births during the four years preceding the survey, by maternal education, controlling for selected socioeconomic and demographic variables: all India

	Antenatal care[a]	Tetanus toxoid vaccine[b]	Iron/folic-acid tablets	Delivered in a medical institution[c]	Deliveries assisted by a health professional[d]
Education (rc: illiterate) Literate, <middle complete	3.26***	3.18***	2.90***	3.47***	2.99***
Middle school +	7.82***	7.38***	5.26***	7.81***	6.79***
Residence (rc: rural) Urban	2.15***	2.05***	1.86***	5.04***	4.10***
Work status (rc: not working) Working	1.29***	1.09***	1.41***	Ns	1.10***
Caste (rc: non-SC/ST) Scheduled caste/tribe	0.76***	0.73***	0.83***	0.56***	0.65***
Religion (rc: Hindu) Muslim	0.84***	0.89***	0.76***	0.73***	0.68***
Other	1.73***	1.56***	1.51***	1.45***	1.64***
Birth order (rc: one) 2–3	0.81***	0.80***	0.85***	0.63***	0.65***
4+	0.51***	0.48***	0.54***	0.37***	0.40***
–2 log likelihood	56,634	58,000	60,374	40,575	49,383
Number of births	48,368	48,368	48,368	48,368	48,368

***p<0.001 for two-tailed test rc: reference category ns: not significant [a]Refers to pregnancy-related health care provided by a doctor or a health worker in a medical facility or at home.

[b]Refers to women who received two or more doses. [c]Refers to deliveries in a government/municipal hospital, private hospital/clinic, primary health center, subcenter, or maternity home.

[d]Refers to deliveries assisted by health professionals including allopathic, homoeopathic, and ayurvedic doctors, nurse/midwives, and other health professionals.

Table 4: Odds ratios of receiving maternal healthcare services for births during the four years preceding the survey, by maternal education, controlling for selected socioeconomic and demographic variables: Uttar Pradesh

	Antenatal care[a]	Tetanus toxoid vaccine[b]	Iron/folic-acid tablets	Delivered in a medical institution[c]	Deliveries assisted by a health professional[d]
Education (rc: illiterate) Literate, <middle complete	1.651***	0.73***	1.185***	1.616	1.279***
Middle school +	2.683***	0.589***	1.715***	1.907**	2.029***
Residence (rc: rural) Urban	1.968***	1.507***	1.173***	1.82*	1.068*
Work status (rc: not working) Working	1.045	1.567***	1.05	3.054	0.912
Caste (rc: non-SC/ST) Scheduled caste/tribe		3.13***	3.206**	0.162	2.103**
Religion (rc: Hindu) Muslim	1.17*	0.675**	0.814***	0.717	0.73***
Other					
Birth order (rc: one) 2–3	0.696***	0.531***	0.937*	0.873	0.754***
4+	0.472***	0.338***	0.736***	0.626*	0.507***
–2 log likelihood	28182.641	46209.286	36992.771	1543.607	50087.359
Number of births	28717	28717	28657	28567	28567

***p<0.001 for two-tailed test rc: reference category ns: not significant [a]Refers to pregnancy-related health care provided by a doctor or a health worker in a medical facility or at home. [b]Refers to women who received two or more doses.

[c]Refers to deliveries in a government/municipal hospital, private hospital/clinic, primary health center, subcenter, or maternity home.

[d]Refers to deliveries assisted by health professionals including allopathic, homoeopathic, and ayurvedic doctors, nurse/midwives, and other health professionals.

REFERENCES

1. UNICEF. (2017, February). Maternal mortality. Retrieved July 20, 2019, from https://data.unicef.org/topic/maternal-health/maternal-mortality/

2. World Health Organization. (2018, September 28). Trends in maternal mortality: 1990 to 2015. Retrieved July 20, 2019, from https://www.who.int/reproductivehealth/publications/monitoring/maternal-mortality-2015/en/

3. Aksoy, M. U., & Gürsoy, E. (2018). World Health Organization Recommendations On Antenatal Care For A Positive Pregnancy Experience (2016). International Refereed Journal of Gynaecology And Maternal Child Health, 0(14), 0-0. doi:10.17367/jacsd.2018.3.6

4. Adewuyi, E. O., Auta, A., Khanal, V., Bamidele, O. D., Akuoko, C. P., Adefemi, K., ... & Zhao, Y. (2018). Prevalence and factors associated with underutilization of antenatal care services in Nigeria: A comparative study of rural and urban residences based on the 2013 Nigeria demographic and health survey. PloS one, 13(5), e0197324.

5. UNICEF. (2018, June). Antenatal care. Retrieved July 20, 2019, from https://data.unicef.org/topic/maternal-health/antenatal-care/

6. Dansereau, E., Mcnellan, C. R., Gagnier, M. C., Desai, S. S., Haakenstad, A., Johanns, C. K., . . . Mokdad, A. H. (2016). Coverage and timing of antenatal care among poor women in 6 Mesoamerican countries. *BMC Pregnancy and Childbirth, 16*(1). doi:10.1186/s12884-016-1018-5

7. Om, A. (2015). Cultural Factors Associated with Utilization of Antenatal Care Services in Rural India: A Literature Review of Predisposing Characteristics, Enabling Variables, and Perceived Need of Care, Proceedings of The National Conference On Undergraduate Research (NCUR).
8. Business Standard, (2018). UP reports maximum decline in Maternal Mortality Ratio
9. Sharda, S. (2018). Uttar Pradesh behind India's remarkable improvement in maternity mortality.
10. Roy, M. P., Mohan, U., Singh, S. K., Singh, V. K., & Srivastava, A. K. (2013). Determinants of utilization of antenatal care services in rural Lucknow, India. *Journal of family medicine and primary care*, *2*(1), 55.
11. Baqui, A. H., Williams, E. K., Darmstadt, G. L., Kumar, V., Kiran, T. U., Panwar, D., ... & Santosham, M. (2007). Newborn care in rural Uttar Pradesh. *The Indian Journal of Pediatrics*, *74*(3), 241-247.
12. Bhatia, J. C., & Cleland, J. (1995). Determinants of maternal care in a region of South India.
13. Omidvar, S., Faramarzi, M., Hajian-Tilak, K., & Amiri, F. N. (2018). Associations of psychosocial factors with pregnancy healthy life Bhatstyles. *PloS one*, *13*(1), e0191723.
14. Tiwari, H. C., & Mishra, R. (2014). The quality of antenatal care services in Shivrajpur block of district Kanpur: a community-based Schwartz

15. Schwartz, L., Toohill, J., Creedy, D. K., Baird, K., Gamble, J., & Fenwick, J. (2015). Factors associated with childbirth self-efficacy in Australian childbearing women. *BMC pregnancy and childbirth*, *15*(1), 29.

16. Simkhada, B., Teijlingen, E. R. V., Porter, M., & Simkhada, P. (2008). Factors affecting the utilization of antenatal care in developing countries: systematic review of the literature. *Journal of advanced nursing*, *61*(3), 244-260.

17. Pell, C., Meñaca, A., Were, F., Afrah, N. A., Chatio, S., Manda-Taylor, L., ... & Ouma, P. (2013). Factors affecting antenatal care attendance: results from qualitative studies in Ghana, Kenya and Malawi. *PloS one*, *8*(1), e53747.

18. Ministry of Health & Family Welfare-Government of India. (n.d.). National Rural Health Mission. Retrieved July 20, 2019, from https://nhm.gov.in/index1.php?lang=1&level=1&sublinkid=969&lid=49

19. UNICEF. (n.d.). Maternal Health. Retrieved July 20, 2019, from http://www.unicef.in/Whatwedo/1/Maternal-Health

20. UNICEF. (2017). India (IND) - Demographics, Health & Infant Mortality. Retrieved July 21, 2019, from https://data.unicef.org/country/ind/

21. The Indian Express. (2011, August 11). UP mortality rates among highest: Report. Retrieved July 20, 2019, from https://indianexpress.com/article/cities/lucknow/up-mortality-rates-among-highest-report/Witzman

22. Weitzman, A. (2017). The effects of women's education on maternal health: Evidence from Peru. *Social Science & Medicine*, *180*, 1-9.

23. Renkert, S., & Nutbeam, D. (2001). Opportunities to improve maternal health literacy through antenatal education: an exploratory study. *Health Promotion International*, *16*(4), 381-388.

24. Frost, M. B., Forste, R., & Haas, D. W. (2005). Maternal education and child nutritional status in Bolivia: finding the links. *Social science & medicine*, *60*(2), 395-407.

25. Rajna, P. N., Mishra, A. K., & Krishnamoorthy, S. (1998). Impact of maternal education and health services on child mortality in Uttar Pradesh, India. *Asia-Pacific Population Journal*, *13*(2), 27-38.

26. Najarzadeh, M. (2011, May). Maternal health literacy: promotion and its effects on mother and child health. In *The First International & 4th National Congress on health Education & Promotion, 2011*. Tabtiz university of medical sciences.

27. Pallikadavath, S., Foss, M., & Stones, R. W. (2004). Antenatal care: provision and inequality in rural north India. *Social science & medicine*, *59*(6), 1147-1158.

28. Barimani, M., Frykedal, K. F., Rosander, M., & Berlin, A. (2018). Childbirth and parenting preparation in antenatal classes. *Midwifery*, *57*, 1-7.

29. Rocco, T. S., & Plakhotnik, M. S. (2009). Literature reviews, conceptual frameworks, and theoretical frameworks: Terms, functions, and distinctions. *Human Resource Development Review*, *8*(1), 120-130.

30. Singh, B. P., & Maheshwari, S. (2014). Infant Mortality and its Determinates in Uttar Pradesh, India.

31. International Institute for Population Sciences (IIPS) and ICF. 2017. National Family Health Survey (NFHS-4), India, 2015-16: Uttar Pradesh. Mumbai: IIPS.

32. Akowuah, J. A., Agyei-Baffour, P., & Awunyo-Vitor, D. (2018). Determinants of antenatal healthcare utilisation by pregnant women in third trimester in peri-urban Ghana. *Journal of tropical medicine*, *2018*.

33. Wang, X. (2009). *Maternal education, maternal language acculturation, parental involvement, and maternal social support as predictors of the academic achievement and socioemotional development of Asian American children* (Doctoral dissertation).

34. Nisar, N., & White, F. (2003). Factors affecting utilization of antenatal care among reproductive age group women (15-49 years) in an urban squatter settlement of Karachi. *Journal-Pakistan Medical Association*, *53*(2), 47-53.

35. Gupta, P. (2018). UP Accounts For 36 Maternal Deaths Every Day; 13200 In A Year

36. Mohammad, K. A., Zahura, F. T., & Rahman, M. M. (2017). Importance of maternal education on antenatal care visits in Bangladesh. *Bangladesh Journal of Scientific Research*, *30*(1-2), 23-33.

37. Awasthi, M. S., Awasthi, K. R., Thapa, H. S., Saud, B., Pradhan, S., & Khatry, R. A. (2018). Utilization of Antenatal Care Services in Dalit Communities in Gorkha, Nepal: A Cross-Sectional Study. *Journal of pregnancy*, *2018*.

38. Sridharan, S., Pereira, A., Hay, K., Dey, A., Chandurkar, D., Veldhuizen, S., & Nakaima, A. (2018). Heterogeneities in utilization of antenatal care in Uttar Pradesh, India: the need to contextualize interventions to individual contexts. *Global health action*, *11*(1), 1517929

39. Devasenapathy, N., Neogi, S. B., Soundararajan, S., Ahmad, D., Hazra, A., Ahmad, J., ... & Mavalankar, D. (2017). Association of antenatal care and place of delivery with newborn care practices: evidence from a cross-sectional survey in rural Uttar Pradesh, India. *Journal of Health, Population and Nutrition*, *36*(1), 30.

40. Raj, P. (2005). Pregnancy complications and health-seeking behavior among Married women in Uttar Pradesh, India. *Res Practice Social Sci*, *1*, 48-63.

41. Adhikari, T., Sahu, D., Nair, S., Saha, K. B., Sharma, R. K., & Pandey, A. (2016). Factors associated with utilization of antenatal care services among tribal women: A study of selected States. *The Indian journal of medical research*, *144*(1), 58.

42. Chandhiok, N., Dhillon, B. S., Kambo, I., & Saxena, N. C. (2006). Determinants of antenatal care utilization in rural areas of India: A cross-sectional study from 28 districts (An ICMR task force study). *J Obstet Gynecol India*, *56*(1), 47-52.

43. Govindasamy, P., & Ramesh, B. M. (1997). Maternal education and the utilization of maternal and child health services in India.

44. Sibai, B. M., Taslimi, M. M., El-Nazer, A., Amon, E., Mabie, B. C., & Ryan, G. M. (1986). Maternal-perinatal outcome associated with the syndrome of hemolysis,

elevated liver enzymes, and low platelets in severe preeclampsia-eclampsia. *American journal of obstetrics and gynecology*, *155*(3), 501-507.

45. Ponna, S. N., Upadrasta, V. P., Geddam, J. B., Dudala, S. R., Sadasivuni, R., & Bathina, H. (2017). Regional variation in utilization of Antenatal care services in the state of Andhra Pradesh. *Journal of family medicine and primary care*, *6*(2), 231.

46. Shrim, A., Ates, S., Mallozzi, A., Brown, R., Ponette, V., Levin, I., ... & Almog, B. (2011). Is young maternal age really a risk factor for adverse pregnancy outcome in a canadian tertiary referral hospital? *Journal of pediatric and adolescent gynecology*, *24*(4), 218-222.

47. Aslam, S., & Emmanuel, P. (2010). Formulating a researchable question: A critical step for facilitating good clinical research. *Indian journal of sexually transmitted diseases*, *31*(1), 47.

48. Kearns, A. D., Caglia, J. M., ten Hoope-Bender, P., & Langer, A. (2016). Antenatal and postnatal care: a review of innovative models for improving availability, accessibility, acceptability and quality of services in low-resource settings. *BJOG: An International Journal of Obstetrics & Gynaecology*, *123*(4), 540-548.

49. Singh, P. K., Rai, R. K., Alagarajan, M., & Singh, L. (2012). Determinants of maternity care services utilization among married adolescents in rural India. *PloS one*, *7*(2), e31666.

50. Ronsmans C, Graham WJ. Maternal mortality: who, when, where, and why. Lancet 2006;368(9542):1189-200.

51. Paul VK, Singh M. Regionalized perinatal care in developing countries. Semin Neonatol 2004;9(2):117-24.

52. Lawn JE, Cousens S, Zupan J. 4 million neonatal deaths: when? Where? Why? Lancet 2005;365(9462):891-900.

CHAPTER 4: PUBLIC HEALTH IMPLICATIONS

Maternal mortality represents the single largest cause of death among women aged 15-49 years and has significant implications for child mortality (50). Furthermore, over 4 million newborn deaths occur globally each year, and comprise the single largest portion of all under-5 child deaths (51). Maternal and newborn mortality are highly preventable, which is indicative of deep disparities occurring almost exclusively in developing countries (99%) (52). Yet, progress on reducing these deaths has been slow.

Strategies aimed to reduce maternal and child mortality include early initiation into antenatal care, as ANC visits provide a key time to share knowledge on recognition of danger signs and the importance of birth preparation and complication readiness.

Furthermore, factors which can promote a continuum of care from ANC to delivery and postnatal care must be promoted. This includes involving spouses, as key household decision makers, in the ANC messaging that pregnant women receive. By involving spouses, a shared appreciation for care seeking behaviors and complication preparedness can ensure a continuum of care into the postnatal period.

Future Directions

This current study identified several key areas to explore for future research. These include examining: 1) issues related to how women's decision-making power and autonomy are constructed; 2) the influence of personal and spousal factors; and 3) the inclusion of spouses and family members in ANC on increasing women's decision-making power. A critical future direction will also be to explore the robustness and inter-relationships between the various knowledge, attitude and beliefs indices constructed.

APPENDIX

Appendix A

Feb 14, 2019

Nidhi Shukla
Rollins School of Public Health
United States
Phone: 4704555949
Email: nidhishuklaemory@gmail.com
Request Date: 02/14/2019

Dear Nidhi Shukla:

This is to confirm that you are approved to use the following Survey Datasets for your registered research paper titled: "Antenatal checkups quality and number during pregnancy and delivery outcomes in India":

India

To access the datasets, please login at: https://www.dhsprogram.com/data/dataset_admin/login_main.cfm. The user name is the registered email address, and the password is the one selected during registration.

The IRB-approved procedures for DHS public-use datasets do not in any way allow respondents, households, or sample communities to be identified. There are no names of individuals or household addresses in the data files. The geographic identifiers only go down to the regional level (where regions are typically very large geographical areas encompassing several states/provinces). Each enumeration area (Primary Sampling Unit) has a PSU number in the data file, but the PSU numbers do not have any labels to indicate their names or locations. In surveys that collect GIS coordinates in the field, the coordinates are only for the enumeration area (EA) as a whole, and not for individual households, and the measured coordinates are randomly displaced within a large geographic area so that specific enumeration areas cannot be identified.

The DHS Data may be used only for the purpose of statistical reporting and analysis, and only for your registered research. To use the data for another purpose, a new research project must be registered. All DHS data should be treated as confidential, and no effort should be made to identify any household or individual respondent interviewed in the survey. Please reference the complete terms of use at: https://dhsprogram.com/Data/terms-of-use.cfm.

The data must not be passed on to other researchers without the written consent of DHS. Users are required to submit an electronic copy (pdf) of any reports/publications resulting from using the DHS data files to: archive@dhsprogram.com.

Sincerely,

Bridgette Wellington
Data Archivist
The Demographic and Health Surveys (DHS) Program