

## Impact of Women's Education on Maternal Health Outcomes: Evidence from NFHS Data in Delhi

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### Main conclusion

The analysis of National Family Health Survey data from Delhi shows significant improvement in NFHS- 5 as compare to NFHS-4. Women's education plays significant role in improving women maternal health, Evidence from NFHS data in Delhi reveals that education positively influences maternal health, nutritional status, antenatal care visits and consumption of iron folic acid supplements during pregnancy.

### Abstract

**Background:** Women education plays significant role in improving maternal health and child health care. The aim of this study is to investigate the impact of women's education on maternal health outcomes in Delhi, India.

**Methods:** Descriptive statistics and comparative analysis across between the two rounds of National Family Health Survey (NFHS)-4 (2015-16) and NFHS- 5 (2019-2021) data were used for the analysis. The study is based on Delhi women (15-49 years age group) education and maternal health care. The data analysed on excel sheet by applying t- test on women education and maternity care indicators in Delhi extracted from NFHS-4 and NFHS-5.

**Results:** The analysis reveals that there is significant improvement in NFHS-5 survey as compare to NFHS-4 on educational, maternal health and child health indicators percentage. Education among women positively influences key maternal health indicators, including nutritional status, antenatal care visits, and consumption of iron-folic acid supplements during pregnancy. Women with more than 10 years of schooling consistently demonstrate superior maternal health outcomes compared to those with no or primary education.

**Conclusion:** The findings underscore the critical role of women's education in improving health awareness and practices, contributing to better maternal and child health.

**Keywords:** Women's Education, Maternal Health, NFHS-4, NFHS-5, Delhi, Health Awareness, Antenatal Care

### Introduction

Education is very crucial for growth and development of a person, family, society and the nation. Equipping individuals with skills, creative thinking, values, moral and ethics fostering economic development in society. Education improving health, health awareness, reduce poverty and create a stable equitable informed community. Quality education and good health both are vital for nation's economic development.

It provides lifelong learning, boost knowledge, build confidence, financial stability, shaping the future of the nation. Health education plays a vital role to improve health and wellness in community. Education increase hygiene, awareness about nutrition and care. Education helps individual to

understand treatments, healthcare system, importance of health care.

Education leads to better job opportunities, higher income, higher standard of living and improve living condition and awareness about health and nutrition. Health education fostering awareness about stress management, self- health care and family health. Importance of yoga, meditation and spiritual health. Education is important to eliminate harmful social taboos such as menstrual hygiene from the society. Education support health literacy, health awareness and drives for good health. Good health bring prosperity to nation.

Health education during pregnancy can improve maternal health and child health. The continuous health education strategies improve health after child birth. In the words of WHO, Maternal health

known as the health of women during pregnancy, childbirth and postnatal period. Maternal health remains a significant public health challenge in India, with implications for both women and newborns. Despite advancements, many women neglect their health due to busy schedules, whether managing household responsibilities or professional work.

Mother and child health care is very essential for well-being of family in view of emotional and economical aspects.

- To ensure healthy maternal and child well-being access to quality care in essential. Pre and postnatal care, regular check-ups and in-take of essential supplements like folic acid, and medical attention to prevent complications.
- Proper nutrition, vitamins and healthy eating keep mother healthy and proper breastfeeding significantly improve child health as well as mother's health.
- It is recommended to visit antenatal health care provider to prevent complications, skilled birth attendants to ensure healthy delivery of children.
- During pregnancy promoting immunization and vaccination to children is important for healthy maternal and child care.
- It is vital to ensure good mental health of mother during and after pregnancy. Postpartum anxiety and depression need counselling for better support to mother and child.
- Education and information about family planning help women to make choices about contraceptives, planning and spaced as well as birth control. It reduces risk for mother and child and ensure healthy growth.
- Healthy mother and healthy children leads to happy and developing family that hopes for bright future. To ensure this Indian government takes many steps for development of nation regarding maternal health and child health.

The National Family Health Survey (NFHS) is a survey conducted in multiphase throughout the India. The survey of NFHS provides state- wise and India information on education, fertility, infant and child mortality, maternal health and child health, family planning, reproductive health, nutrition, anaemia and quality of health services.

The main purpose of this survey is –

- To provide necessary data on health and family welfare required by Ministry of Health and Family Welfare and other agencies for policy making and programmes purpose.
- To provide detailed information on important arising health and family welfare issues.

Sustainable Development Goal 3 (SDG 3) ensure equitable healthcare and the goal of health for all. It emphasizes ensuring healthy lives and promoting well-being for all ages, focusing on maternal health, child health, and vaccine coverage. The goal to ensure universal access to health care including family planning, maternal health and information and education.

The Ministry of Health & Family Welfare, Government of India has launched SUMAN – (Surakshit Matritva Aashwasan) a transformative initiative name to provide assured, dignified, respectful and Quality healthcare at free of cost and zero tolerance for denial of services for every woman and newborn visiting the public health facility in order to end all preventable maternal and newborn deaths and morbidities and provide a safe, positive and secure birthing experience. The ultimate vision of this new initiative is "Zero Preventable Maternal and Newborn Deaths and high quality of maternity care delivered with dignity and respect."

Government of India has taken initiatives to improve maternal health and child health such as Janani Suraksha Yojana, Poshan Abhiyaan and many more to provide nutrition and care to child and mother. Many programs involve health education and counselling for maternal and child health care. (Kaur, et.al 2024)<sup>8</sup>. The National Health Mission initiatives to reduce mortality by providing cash to BPL mothers for institutional deliveries through Janani Suraksha Yojana ( JSY), Janani Shishu Suraksha Karyakram (JSSK) programme to provide free of cost service to pregnant women and newborn, Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA) to ensure antenatal care, Rashtriya Bal Swasthya Karyakram (RBSK) to care children and intervention for birth disabilities or diseases, LaQshya (Labour Room Quality Improvement Initiative) to improve quality of labour rooms and

maternity wards, and Mothers' Absolute Affection (MAA) for promotion of breast feeding.

Education plays a pivotal role in achieving these goals by empowering women to make informed health decisions, improving nutritional practices, and increasing access to healthcare services. This study explores the relationship between women's education and maternal health outcomes in Delhi, leveraging NFHS data to provide evidence-based insights.

## Review of Literature

Previous studies have established a strong link between women's education and health outcomes. Educated women are more likely to participate in economic activities, make autonomous decisions, and access healthcare services (Joan S & Singh P. 2017)<sup>6</sup>. Education also positively influences mental health by enabling women to seek accurate information and professional support (Bhattacharyya M. 2024)<sup>3</sup>. Higher educational attainment correlates with better maternal and child healthcare utilization. Girl education is essential for strengthening maternal health. (Jayasawal N & Saha S. 2022)<sup>11</sup>. Furthermore, education delays marriage and fertility, contributing to improved maternal health. However, disparities persist, especially in rural areas, where early marriage and school dropout rates remain high (Singh N. 2008)<sup>9</sup>. Education also fosters empowerment, leadership, and social networking, enhancing women's ability to navigate healthcare systems effectively (Molla H.A& Vijayvargiya D. 2021)<sup>2</sup>. Local university is responsible for increasing higher education fostering long last positive impact on labour market (Ahmed E & Shirshikova A. 2023)<sup>1</sup>. All type of maternal health such as child and maternal mortality, communicable diseases issues awareness are influenced by women education. (Jyoti, & Rani, A. 2024)<sup>7</sup>. A study prevailed that both parents education effect maternal health care. (Arvind,et.al. 2021)<sup>12</sup>. Obstetric morbidities are main reasons for maternal mortality and disease in women under reproductive age group. The study shows lack of proper toilet facilities, socio-economic differences, educational levels are the causes of increasing obstetric mobility among women. (Gupta, N., & Raj, P. 2024).<sup>4</sup>

## Objectives

1. To determine the female enrolment undergraduate in different years from 2017-18 to 2021-22 in Delhi.
2. To compare the women with 10 or more years of schooling and maternity care indicators between NFHS-4 and NFHS-5.
3. To evaluate the association between women education and maternal health outcomes in NFHS-4 and NFHS-5.

## Data and Methodology

The main objective of this study is to analysis the maternal health care among women in Delhi region and their analysis comparison with educational attainment (years of schooling %). The National Family Health Survey (NFHS)

This study used secondary data from NFHS-4 (2015-16)<sup>9</sup> and NFHS-5 (2019-21)<sup>8</sup>, focusing on women in Delhi. Key variables include educational attainment (years of schooling), maternal health indicators such as number of antenatal care visits, mothers whose last birth was protected against neonatal tetanus, iron-folic acid consumption during pregnancy and registered pregnancies for which the mother received a mother and child protection card.

Descriptive statistics and comparative analysis across between the two NFHS rounds are employed to assess trends and associations. The data analysed on excel sheet by applying t- test on women education and maternity care indicators in Delhi extracted from NFHS-4 and NFHS-5.

## Results and Findings

In Delhi data suggest there is significant increase in female enrolment from 2017-18 to 2021-22. Women with more than 10 years of schooling showed significantly better maternal health outcomes: higher rates of at least four antenatal care visits, increased consumption of iron-folic acid supplements for 180 days or more, improved nutritional status with reduced underweight prevalence, and better management of overweight/obesity risks. These improvements are consistent across both NFHS rounds, highlighting the positive influence of education on maternal health awareness and practices.

No. of female enrolment undergraduate in Delhi

**Table 1: Showing female undergraduate in different years in Delhi**

YEARS	No. of Female enrolment Undergraduate (Delhi)
2021-22	425006
2020-21	409832
2019-20	419284
2018-19	405107
2017-18	394715

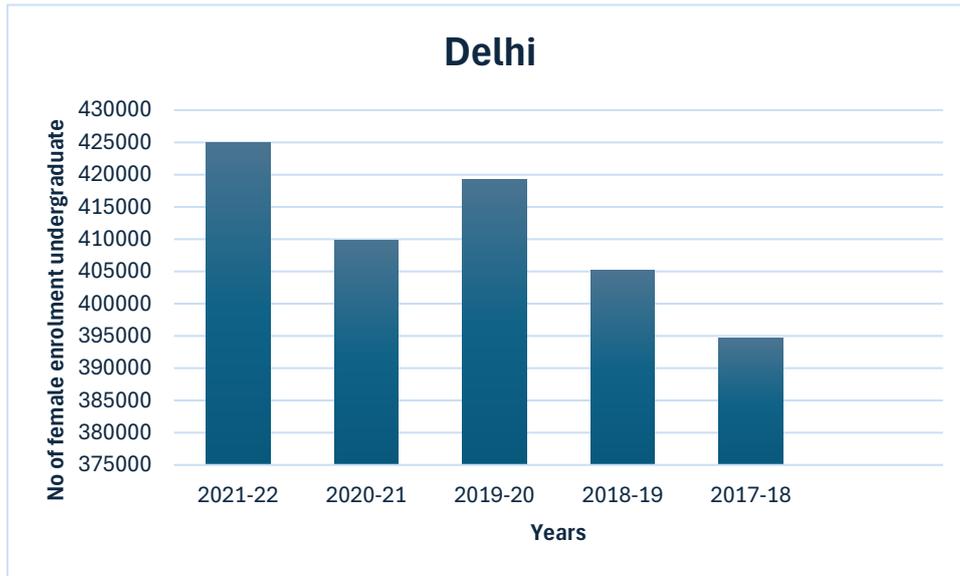


Fig -01

Source- NFHS- 5

The graph showing number of female enrolment undergraduate in different years. From year 2017-18 to year 2021-22, female enrolment number increases in Delhi.

National Family Health Surveys (NFHS-4 and NFHS-5) on Maternal Health Care in Delhi:

**Table 2: NFHS-4 and NFHS-5 data on maternal health in Delhi**

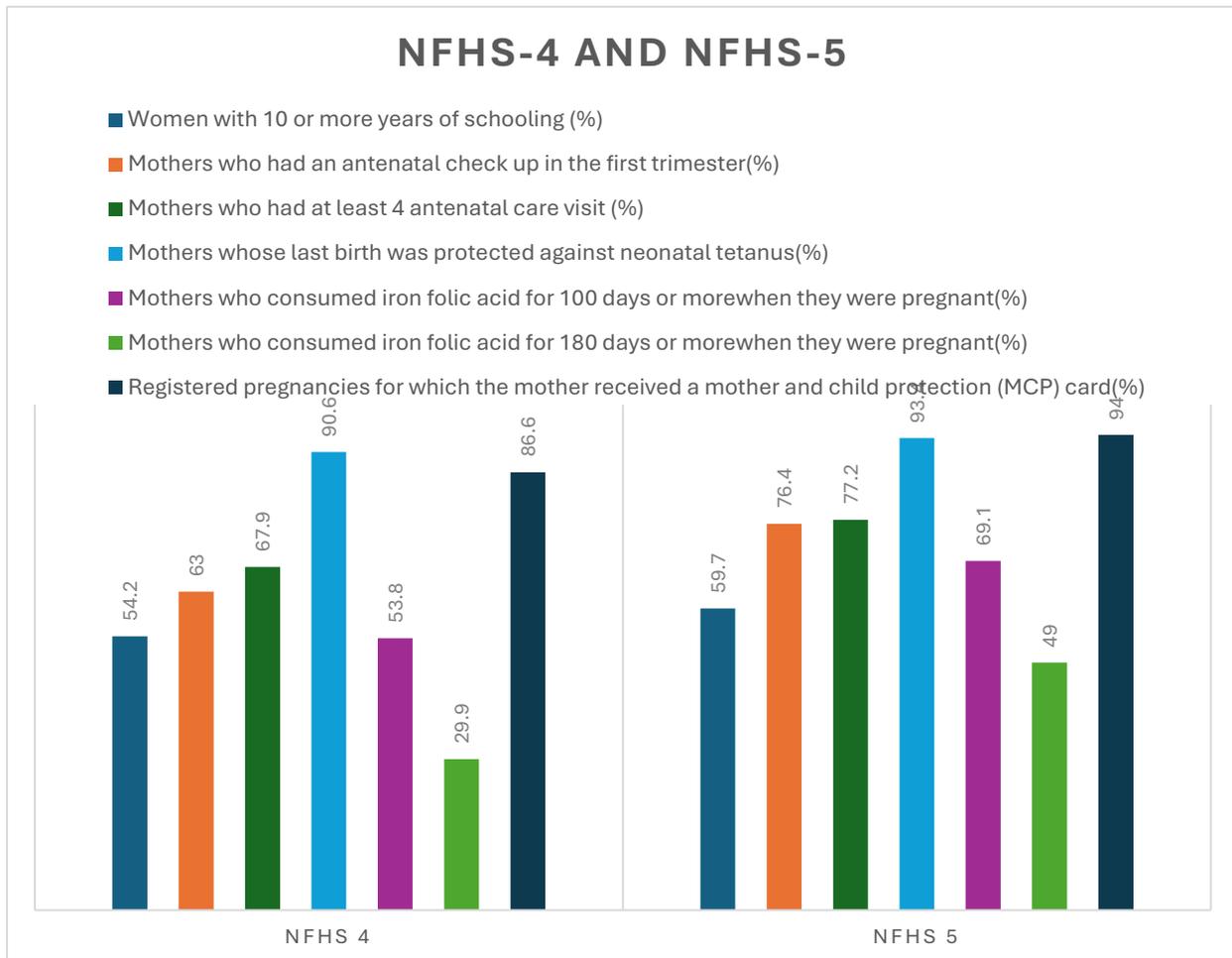
INDICATORS	NFHS 4	NFHS 5
Women with 10 or more years of schooling (%)	54.2	59.7
Mothers who had an antenatal check up in the first trimester(%)	63	76.4
Mothers who had at least 4 antenatal care visit (%)	67.9	77.2
Mothers whose last birth was protected against neonatal tetanus(%)	90.6	93.4
Mothers who consumed iron folic acid for 100 days or more when they were pregnant(%)	53.8	69.1
Mothers who consumed iron folic acid for 180 days or more when they were pregnant(%)	29.9	49
Registered pregnancies for which the mother received a mother and child protection (MCP) card(%)	86.6	94

**Table -3: Showing NFHS-4 and NFHS-5 data.**

INDICATORS	NFHS 5	NFHS 4
Mean	74.11428571	63.71428571
Variance	274.2947619	432.8080952
Observations	7	7
Pearson Correlation	0.977579002	
Hypothesized Mean Difference	0	
df	6	
t Stat	4.757797331	
P(T<=t) one-tail	0.001566738	
t Critical one-tail	1.943180281	
P(T<=t) two-tail	0.003133477	
t Critical two-tail	2.446911851	

The data analysis interpretation shows P(T<=t) one tail 0.001566 and P(T<=t) two tail 0.0031 which

signifies, positive improvement on maternal health care and education in NFHS-5 compare to NFHS-4 in Delhi.



**Fig -02**

In this graph, percentage of women with 10 or more years of schooling, percentage of mothers who had at least 4 antenatal care visit and percentage of

mother) who consumed iron folic acid for more than 180 days during pregnancy, data from NFHS 4 and NFHS 5 are taken.

In transition from NFHS-4 and NFHS-5 within Delhi indicates positive changes. There is increase in women with 10 or more years of schooling (54.2%-59.7%) and improved antenatal checkup in first trimester (63%- 76.4%) as well as improved in antenatal check visits (67.9%- 77.2%). Mother become more conscious about protected against neonatal tetanus (90.6%- 93.4%). Folic acid consumption during pregnancy for 100 days has significant positive increase (53.8%- 69.1%) also consumption of folic acid for 180days and more (29.9%- 49%) show remarkable progress in NFHS-5. Registered pregnancies in Delhi received mother and child Protection (MCP) Card in NFHS-5 (94%) higher than (86.6%) in NFHS-4.

A one tailed p-value is 0.001566 which indicates significant improvement in NFHS-5 compare to NFHS-4.

## Discussion

The discussion here outlines the NFHS-4 and NFHS-5 data to concern about women education and maternal health. There is significant improvement is maternal health in Delhi. The NCT(Delhi) shows progress and improvement with time from 2015 to 2021. The NFHS data witnessed increase in antenatal care visits, maternal care and intake of folic acid consumption. The increase in women schooling and education has positive impact on their health care and awareness.

The findings affirm that education equips women with knowledge and resources to prioritize their health and that of their children. Educated women's autonomy and social status facilitate better health-seeking behaviour and utilization of maternal health services. This aligns with prior research emphasizing education's role in economic empowerment and social networking, which further supports health outcomes. However, challenges remain in ensuring equitable access to education, particularly in rural areas where dropout rates and early marriages are prevalent.

## Conclusion

Women's education is a vital determinant of improved maternal health outcomes in Delhi. Comparative analysis of NFHS-4 and NFHS-5 shows that with increasing women educational attainment their health got improved and they are more aware about maternal health care. Increasing

educational attainment among women correlates with enhanced health awareness, better nutrition, and greater utilization of antenatal care services. Policies aimed at promoting female education can thus contribute significantly to maternal and child health improvements, supporting broader public health and development goals.

## Recommendations

- Strengthen initiatives to increase female enrolment and retention in higher education, especially in underserved areas.
- Integrate maternal health education into school curricula to reinforce health awareness from an early age.
- Promote community outreach programs targeting health education for women with lower educational attainment.
- Enhance collaboration between educational institutions and healthcare providers to facilitate access to maternal health services.

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## Conflicts of interest-

There is no conflicts of interest

## Authors' contribution

Minakshi Mishra drafted the manuscript, carried all data analysis and drafted the paper. Dr Nidhi Chowdhry participated in research coordination. The authors read and approved the final manuscript.

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