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Role of Maternal Education in Promoting Antenatal Screening that Prevents Ophthalmia Neonatorum

Muhammad Akbar Rashid[1] ✉
Sajjad Hussain[2]
Areeba Shahab[3]
Ehtisham ul Haq[4]
Muhammad Sibtain Fareed[5]

[1]*NAEC Pakistan, and FGCL China (Remote), Pakistan.*
[2]*Glasgow Caledonian University, Glasgow Scotland*
[3]*Department of Optometry, TUF University, Faisalabad, Pakistan.*
[4]*PIRS, ISRA University Islamabad Campus, Pakistan.*
[5]*Amer Eye Hospital Rawalpindi, Pakistan.*
(✉ Corresponding Author)

Abstract

Ophthalmia neonatorum (ON) is a serious avoidable cause of neonatal blindness, which is primarily caused by vertical transmission of Chlamydia trachomatis and Neisseria gonorrhoeae. This narrative review highlights the importance of maternal education on the promotion of antenatal screening and prevention of ON. In literature since 2020, maternal education has been shown to improve awareness, screening adherence and compliance with prophylaxis, and low education levels are associated with delayed care seeking and high-incidence of ON. Thematic synthesis determined that four concepts were of main significance: maternal education is a determinant of screening use, health literacy is a behavioral intermediary, socioeconomic and cultural moderators, and integration of educational programs in the antenatal care system. There is evidence to support the fact that the integration of maternal education into the process of antenatal care enhances the quality of neonatal eye health and reduces the rate of infection. Policy and practice implications include the need to implement educational interventions at the community level, need to incorporate the use of education in maternal health and need to include preventive counseling as part of the national guidelines. Increasing maternal education is therefore a long-term approach to lessening preventable neonatal blindness and improving equitable maternal-infant health worldwide.

Keywords: Antenatal screening, Health literacy, Maternal education, Maternal health policy, Neonatal blindness, Neonatal conjunctivitis, Ophthalmia neonatorum, Preventive care.

1. Introduction

Ophthalmia neonatorum (ON), a purulent conjunctivitis, which appears in the first month of life, is a cause of avoidable cases of neonatal blindness worldwide. Its coexistence with modern advances in perinatal and maternal care highlights the inequalities in maternal education, antenatal screening, and health-related interventions of the population (Farooqui et al., 2025). Pathogens most likely to cause the condition include Neisseria gonorrhoeae and Chlamydia trachomatis, both of which may be transferred vertically during delivery and hence the need to ensure maternal screening programs are comprehensive (Tzialla et al., 2024). Timely antenatal screening and maternal education can significantly decrease the risk of transmission, but preventive steps are often not applied in low-resource countries due to low maternal literacy levels and inadequate health literacy (Moore, 2023).

According to the World Health Organization (WHO), maternal education is one of the determinants in the utilization of antenatal screening and preventive measures in neonatal infections (World Health Organization, 2022). Well-educated mothers have higher chances of early prenatal care, adherence to screening schedules, and awareness of the need to provide neonatal eye prophylaxis (Kassa et al., 2020). Conversely, low maternal educational levels are associated with delayed antenatal check-ups and lack of sexually transmitted infections (STIs) awareness, which is one of the primary etiological factors in ON (Thakur et al., 2021). This underscores the relationship that exists among women's education, health literacy, and neonatal health outcomes.

Recent literature has found that maternal education is strongly related to the use of antenatal screening for Chlamydia trachomatis and Neisseria gonorrhoeae, two major pathogens in the pathogenesis of ON (Masha et al., 2023). Additionally, educational interventions centered on communities have been shown to enhance maternal awareness of neonatal eye infections, which then results in early diagnosis and treatment of the disease (Adesuyi et al., 2023). Under conditions of low health literacy, maternal education deficiency frequently leads to lack of knowledge about the risks of neonatal symptoms, such as ocular discharge or redness (Worku et al., 2021). Thus, maternal education is a protective factor and an enabler in the prevention of ON by raising screening uptake levels.

According to global health reports, areas with low literacy levels among women have a disproportionately high occurrence of morbidity linked to ON (McBride et al., 2023). Enhancing maternal education, especially in the antenatal care (ANC) process, is therefore part and parcel of the neonatal equity initiative for attaining eye health. It empowers mothers to request screening services, follow treatment, and identify early symptoms that require medical care (Boadi-Kusi et al., 2021). Thus, this narrative review examines the crucial role of maternal education in strengthening antenatal screening that will prevent neonatal ophthalmia based on recent data and evidence across the world.

2. Background and Rationale

Ophthalmia neonatorum remains a problem of public health especially in the developing nations where the coverage of antenatal care and health education is not optimal (Omoyajowo et al., 2024). Although effective prophylaxis have been implemented, ON is still widespread because of the lapses in maternal knowledge and the absence of regular antenatal screening procedures (Mehraj et al., 2024). Mothers with STIs are the most common causes of neonatal conjunctivitis, and maternal infection is a serious risk factor contributing to the occurrence of neonatal ocular complications (Cates et al., 2022). The weight of these infections accentuate the necessity of screening of mothers in pregnancy to avoid death of newborns and possible blindness (Farooqui et al., 2025).

Maternal involvement is the key to the success of antenatal screening programs, and it depends on the educational level and awareness (Kassa et al., 2020). Females who have second or higher education are better positioned to visit ANCs, test their STIs, and give their infants prophylactic treatments to the eyes (Worku et al., 2021). Conversely, a lack of access to educational opportunities may reinforce the false beliefs about neonatal infections and lower the trust level towards health services, as well as impede adherence to preventive interventions (Thakur et al., 2021). These trends highlight the connection between maternal education, health-seeking behaviour and health outcomes of neonates.

The WHO (2022) recommends the use of integrated maternal health initiatives involving a mixture of educational counseling and routine ANC services, wherein informed mothers will be involved in the early detection and treatment of neonatal infections. Maternal health education programs were proved to have a measurable impact on raising awareness regarding eye infection prevention and advancing timely care-seeking behaviors (Adesuyi et al., 2023). This fact justifies the reason behind the investigation of the impact of maternal education on the antenatal screening practices and outcomes associated with ON. This relationship is important to understand to be able to design context-specific interventions, which could help to prevent preventable neonatal blindness, particularly in low- and middle-income countries (McBride et al., 2023).

3. Methodology

The current narrative review summarizes the recent research conducted as of 202025 to determine the role of maternal education in the practice of antenatal screening that prevents ophthalmia neonatorum. The search was limited to peer-reviewed journals that were found in PubMed, Scopus, and Google Scholar. Major keywords were applied to the research of maternal education, antenatal screening, ophthalmia neonatorum, and prevention of neonatal conjunctivitis. The studies were identified according to relevance, the quality of the methods, and the conformity to the objectives of the review. Quantitative and qualitative studies were incorporated in order to have various views. They were extracted on maternal knowledge, screening uptake, and neonatal outcomes in terms of ON. The results were conceptualized in themes to point out the trends as well as gaps in literature which offer a complete picture of how maternal education helps in prevention.

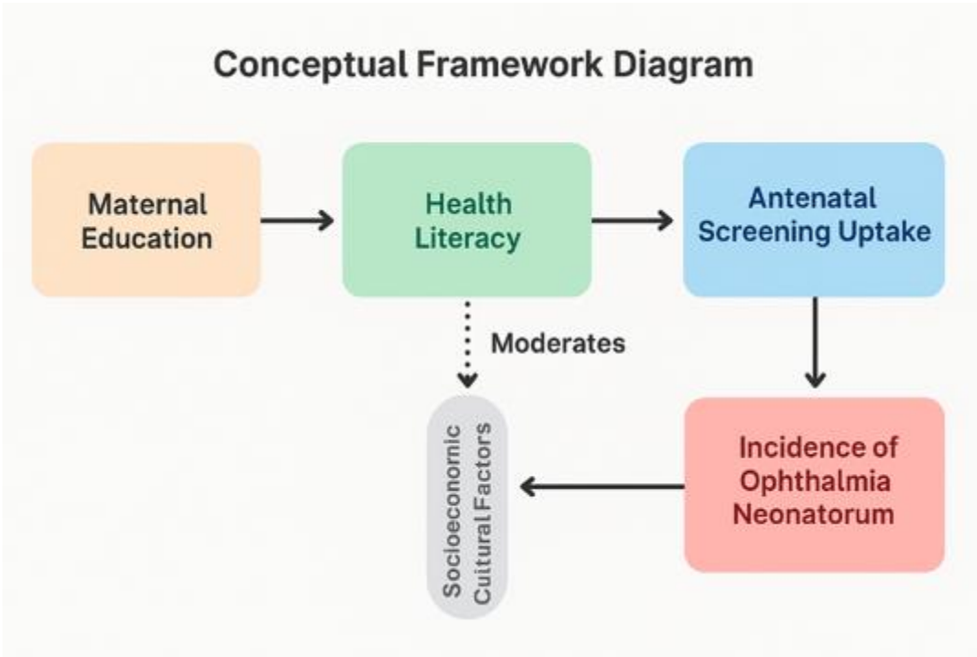

Figure 1. conceptual Framework Diagram

Thematic Synthesis

Theme 1: Maternal Education as a Determinant of Antenatal Screening Uptake

In all the current research, maternal education is consistently one of the key factors that influence the use of antenatal screening. Mothers with higher education have better opportunities to understand the importance of

early STI testing and adhere to proposed prophylactic interventions during pregnancy (Masha et al., 2023). Maternal autonomy and decision-making empower women with the ability to attend regular ante-natal care during which maternal screening of Chlamydia trachomatis and Neisseria gonorrhoeae is performed (Kassa et al., 2020). On the other hand, mothers who are less educated often postpone or even neglect antenatal services because of misconceptions or lack of awareness regarding neonatal infections such as ophthalmia neonatorum (Thakur et al., 2021).

3.1. Theme 2: Knowledge Translation and Health Literacy

Health literacy acts as an intermediary between maternal education and behavioral outcomes. The same study showed that mothers who have undergone specific education during antenatal care have a stronger understanding of the prevention of newborn eye infection and symptoms (Adesuyi et al., 2023). The WHO (2022) has emphasized health education as one of the critical methods in enhancing maternal adherence to screening guidelines and prophylactic eye treatments. Moreover, health literacy fosters improved communication between medical practitioners and mothers, which strengthens the culture of safe delivery and postnatal care (Worku et al., 2021). Formal education without effective translation of knowledge will not necessarily lead to tangible improvements in neonatal outcomes.

3.2. Theme 3: The Moderators of Socioeconomic and Cultural

Maternal education is mediated to result in preventive health behavior through socioeconomic and cultural contexts. Research conducted in sub-Saharan Africa and South Asia showed that even when women have formal education, screening adherence is compromised by socio-cultural practices and barriers to accessing healthcare (Omoyajowo et al., 2024). It is possible that traditional beliefs about childbirth and infections discourage mothers from applying biomedical preventive measures (Boadi-Kusi et al., 2021). Thus, maternal education can be effective in ON prevention not only based on literacy levels but also within the broader social environment that facilitates or restricts health-seeking behavior (McBride et al., 2023).

3.3. Theme 4: Incorporation of Education in the Antenatal Care Systems

The need to incorporate educational elements into routine antenatal care has been demonstrated to improve the eye health of newborns. Educational interventions (group counseling, visual health demonstrations, culturally-specific information materials, etc.) enhance maternal knowledge and participation in screening programs (Adesuyi et al., 2023). According to WHO (2022) guidelines, maternal health education should be integrated into ANC protocols with a particular focus on preventive measures against infections leading to ophthalmia neonatorum. Countries that have adopted such integrated models have reported higher levels of awareness, increased screening coverage, and a reduction in neonatal infections (Farooqui et al., 2025).

4. Discussion

This review shows that there is a steady trend of maternal education in terms of improved use of antenatal screening and reduced occurrence of ophthalmia neonatorum. Education is both a protective factor and an enabling process that empowers the female population to be proactive in health-seeking practices (Farooqui et al., 2025). These mechanisms can be explained by three primary channels: increased knowledge acquisition, stronger health literacy, and greater autonomy in decision-making within a healthcare setup (Moore, 2023). Mothers with higher education have a stronger ability to learn about the importance of screening against Chlamydia and Neisseria infections and demand such services during antenatal check-ups (Masha et al., 2023).

Nevertheless, educational inequality continues to affect inequitable outcomes of neonatal health. Research in South Asia and the sub-Saharan African region shows that maternal education levels are low and associated with poor attendance at antenatal testing and high prevalence of ON (Omoyajowo et al., 2024). These results support the existing literature that demonstrates maternal literacy is an important social predictor of infant health across all regions of the world (McBride et al., 2023). In addition, less-educated women often rely on informal health systems or cultural practices, which might not align with biomedical guidelines for preventing infections (Boadi-Kusi et al., 2021).

Interventions focusing only on prophylaxis while ignoring the existing obstacles to education are therefore inadequate in the context of public health. Maternal education as part of ANC programs not only improves screening levels but also helps mothers maintain hygiene for their children and detect possible infection symptoms (Adesuyi et al., 2023). Notably, the WHO (2022) model suggests integrating preventive treatment with systematic maternal education classes to address preventable neonatal blindness. As implied in this synthesis, prevention of ON requires an intersectoral approach, involving healthcare delivery and educational empowerment.

Moreover, there is a need to focus on social determinants, including maternal knowledge and perception, while biological and clinical interventions (such as ocular prophylaxis) remain crucial. The persistence of ON in some areas, even with prophylaxis measures, indicates socio-behavioral gaps in awareness and compliance (Mehraj et al., 2024). This supports the rationale of considering maternal education as a continuous process—one that does not only occur in school settings but also in community environments through community-based learning and ongoing antenatal counselling.

5. Implications

These findings have several implications that can be observed in clinical practice, public health policy, and community-based health promotion. First, there are clinical implications where structured educational interventions during routine antenatal screening may significantly contribute to expanding coverage and maternal involvement. To manage the mentioned case, healthcare providers must, therefore, emphasize the elements of health literacy during visits to ANCs, ensuring that mothers are aware of the cause of ophthalmia neonatorum and the preventive measures used against it.

Secondly, the implication of the study on general health concerns the population in that maternal education should be prioritized in national strategies regarding prevention of neonatal infection. Policy frameworks should focus on creating educational opportunities for women, especially in rural and underserved regions, as a sustainable investment in maternal and child health. Governments and health organizations might collaborate to incorporate ON prevention education into maternal health services, in line with WHO (2022) recommendations of integrating care models between mothers and infants.

Finally, implications at the community level are highlighted by the need for culturally sensitive outreach and health education. Maternal knowledge on antenatal screening and neonatal eye care can be enhanced in low-literate communities using visual aids, peer educators, and local health champions. Such approaches can help reduce the knowledge gap and enable mothers to pursue timely preventive care (McBride et al., 2023). Strengthening maternal education is not merely a health program, but a social development agenda—capable of eliminating preventable neonatal blindness and improving long-term child health outcomes.

6. Policy

The prevention of ophthalmia neonatorum requires that maternal education be included as a priority policy agenda within national maternal and child health systems. Governments are advised to emphasize literacy and health education for women as strategic measures to enhance antenatal screening coverage (World Health Organization, 2022). This can be operationalized by policymakers through the inclusion of health education modules in ANC programs, as well as ensuring that every antenatal visit includes a structured session on infection prevention and newborn eye care (Adesuyi et al., 2023).

Policies in low-resource environments should endorse the use of community-based strategies, which may train local midwives and community health workers to provide maternal education in culturally acceptable ways (Omoyajowo et al., 2024). Education and health ministries should collaborate across sectors to align reproductive health-related issues in school curricula, equipping future mothers with essential preventive information (Kassa et al., 2020). Additionally, policies must guarantee a consistent supply of STI screening kits and prophylactic agents while promoting awareness campaigns about maternal responsibility in preventing neonatal infections (McBride et al., 2023).

6.1. Future Directions

Further studies should be aimed at measuring the specific mechanisms by which maternal education shapes the behavior of antenatal screening and the outcomes of neonates. Stronger causal evidence would be provided by longitudinal studies investigating the dose-response relationship between the level of education and ON incidence (Masha et al., 2023). In addition, research on interventions is required to evaluate the most effective educational delivery models (digital, community-based, or clinic-based) in terms of their impact across diverse cultural settings (Adesuyi et al., 2023).

There is a growing body of research indicating that digital health tools can be used to support maternal education and engagement in pregnancy. Therefore, the literature gap requiring future research should be to investigate how mobile health (mHealth) interventions (SMS messages and mobile-based antenatal learning modules) can be applied to enhance screening uptake and ON prevention (McBride et al., 2023). Lastly, considering gender and socioeconomic equity in maternal education studies may provide solutions to design intervention plans that address the most vulnerable in terms of neonatal infection risks.

7. Conclusion

This review confirms the fact that maternal education is central to the promotion of prenatal screening and prevention of ophthalmia neonatorum. Education not only increases knowledge and awareness, it also reshapes the behavior of mothers so that women become active participants in preventive health care. It has been demonstrated that maternal education has a substantial impact on screening compliance, early diagnosis, and prevention of neonatal eye infection when incorporated within the framework of antenatal services (Farooqui et al., 2025).

Nonetheless, the effect of education is mediated by health literacy, socioeconomic factors, and cultural acceptance, which shows that context-sensitive interventions should be equity-based (Boadi-Kusi et al., 2021). Policymakers and practitioners should therefore move beyond conventional clinical methods by integrating educational empowerment as the mainstream approach to achieving neonatal eye health. By embedding maternal education into antenatal services and broader public health systems, the global community will gain an opportunity to progress toward the eradication of preventable neonatal blindness and ensure the advancement of maternal and child health outcomes.

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