

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

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Abstract

Despite vast economic growth in developing countries in the past few years, infant mortality continues to plague underdeveloped regions, particularly rural regions of India. Many of these deaths are caused by a lack of education and motivation in regard to utilization of antenatal and neonatal care services to prevent and treat consequences of unhygienic umbilical cord care. For years, high incidences of neonatal tetanus have plagued rural areas of India as a result of cultural practices that encourage topical applications of cow dung to cut umbilical stumps either directly or by using ghee heated with cow dung to warm umbilical dressings. In order to increase public awareness of the practical ineffectiveness of tetanus toxoid vaccinations in treating the consequences of unhygienic umbilical cord care, cultural aspects that contribute to mothers' utilization of antenatal care services in rural India should be identified in order to understand sociological factors that affect neonatal mortality rates in rural India so that intervention efforts may be targeted appropriately to effectively eradicate neonatal tetanus. A variety of sociology and public health articles and journals that outline factors deeply engrained in Indian culture that inhibit mothers from accessing health care services hypothesize why legislations that promote availability of vaccines have proved rather ineffective in reducing mortality rates were reviewed. These sources generally attribute lack of utilization of health care services to predisposing variables (such as age, ethnicity, caste, education level, and occupation), enabling variations (distance to health facility, means of transport), and a lack of perceived need of care. An analysis of the reasons behind hesitation and reluctance to use antenatal and neonatal care services can help target intervention efforts to appropriately reach at-risk demographic groups. While immunization is understood as effective in treating the immediate effects of unhygienic umbilical cord care, education of young, uneducated and unemployed, lower caste, Hindu women before they get pregnant can encourage use of available health care resources. It is only by understanding embedded cultural factors that policies can be constructed to effectively reduce maternal and neonatal mortality rates in rural India.

Keywords: Public Health, Maternal and Neonatal Health, Umbilical Cord Care

1. Introduction

Despite vast economic growth in India in the past few years, infant mortality continues to plague underdeveloped regions as a result of a lack of education and motivation in regard to utilization of antenatal and neonatal care services to prevent and treat consequences of unhygienic umbilical cord care. In India, much of this mortality rate is a result of cultural practices that encourage topical applications of cow dung to cut umbilical stumps either directly or by using ghee heated with cow dung to warm umbilical dressings. In order to overcome the health threat of tetanus resulting from poor umbilical cord care, in recent years public health organizations have promoted availability of tetanus toxoid vaccines by decreasing cost and increasing number. The current system of simply promoting tetanus vaccines is not

wholly effective because this tactic does not consider certain predisposing characteristics, such as socioeconomic status/caste, education level, maternal age, and female autonomy, nor does it consider enabling variations (distance to health facility and geographic location) or a lack of perceived need of care that contribute to mothers' lack of utilization of available health resources. In order to effectively reduce infant and neonatal mortality rates in India, cultural aspects that contribute to mothers' utilization of antenatal care services should be identified in order to understand sociological factors that affect neonatal mortality rates in rural India so that intervention efforts may be targeted appropriately.

1.1. Ineffectiveness of Previous Vaccine Campaigns in Eliminating Tetanus Resulting From Unhygienic Neonatal Umbilical Cord Care

In 1990, John Bennett, Cindy Ma, Hector Traverso, Bano Agha, and John Boring completed a population-based study of neonatal tetanus (NNT) in Pakistan Province that linked NNT with application of topical ghee to cut umbilical stumps. While it was understood that direct application of hazardous materials rich in tetanus bacteria, such as cow dung, to cut umbilical cords was hazardous to neonates, the connection between ghee and NNT was unclear at this time¹. In 1995, John Bennet, Naila Azhar, Farhana Rahim, Sardar Kamil, Hector Traverso, George Killgore, and John Boring revisited this population to pinpoint the source of toxins in ghee that contributed to such high mortality rates, as ghee itself possesses no chemical properties that would be linked to tetanus bacteria. Bennet et al. found that mothers in rural areas often keep their household ghee in two separate pots, one central pot for general household use and one smaller pot for cooking and from which ghee is applied to the babies' umbilical cords. The second pot is often mixed with additional substances, such as turmeric, believed to be of some religious or medicinal value and heated with dried cow dung to a lukewarm temperature before application. Often, this pot is reheated several times over the course of the day to ensure it was not too cold for the baby upon application. This pot is also stirred and tested for temperature with hands unwashed after dealing with cow dung². Bennet et al. found that the second pot was positive for tetanus far more often than the central household pot, demonstrating that manipulation of the ghee by the mothers and "the covert role of cow dung" were responsible for increased risk of NNT. Bennet et. al also found that mothers who had previously been associated with cases of NNT were at a higher risk for subsequent cases, demonstrating that their traditional delivery and postnatal care practices put them at risk for infecting their children².

After epidemiologists like Bennett pinpointed the source of such high neonatal mortality rates in India, the solution seemed simple: provide mothers with routine tetanus toxoid vaccinations for themselves and their children to treat diseases that result from unhygienic delivery care practices. As vaccines are fairly affordable and effective treatments for the immediate consequences of poor neonatal umbilical cord care, particularly tetanus, public health organizations that promoted vaccines considered statistics reporting increased numbers of vaccines in rural areas indicative of their success in eliminating maternal and neonatal tetanus (MNT). However, this solution was more of a disguise than an elimination of the root of the problem. Despite vast efforts by the World Health Organization and other public health companies to implement vaccine policies in from the 1980s to the early 2000s, there is still a large group of mothers who are not reached by vaccines and are therefore contributing to high neonatal and infant mortality rates. As of June 2014, in North India there were still over 78,000 neonatal deaths per year due to tetanus, and many of these deaths are concentrated within a select group of mothers in particular regions of India³. Thwaite's study was funded by the World Health Organization and may be subject to some bias that even overestimates the effectiveness of their health interventions. In 2012, Sharon Owusu-Darko, Khady Diouf, and Nawal M. Nour completed a study on the progress of MNT elimination efforts, and they presented the below graphic (fig. 1)⁴:

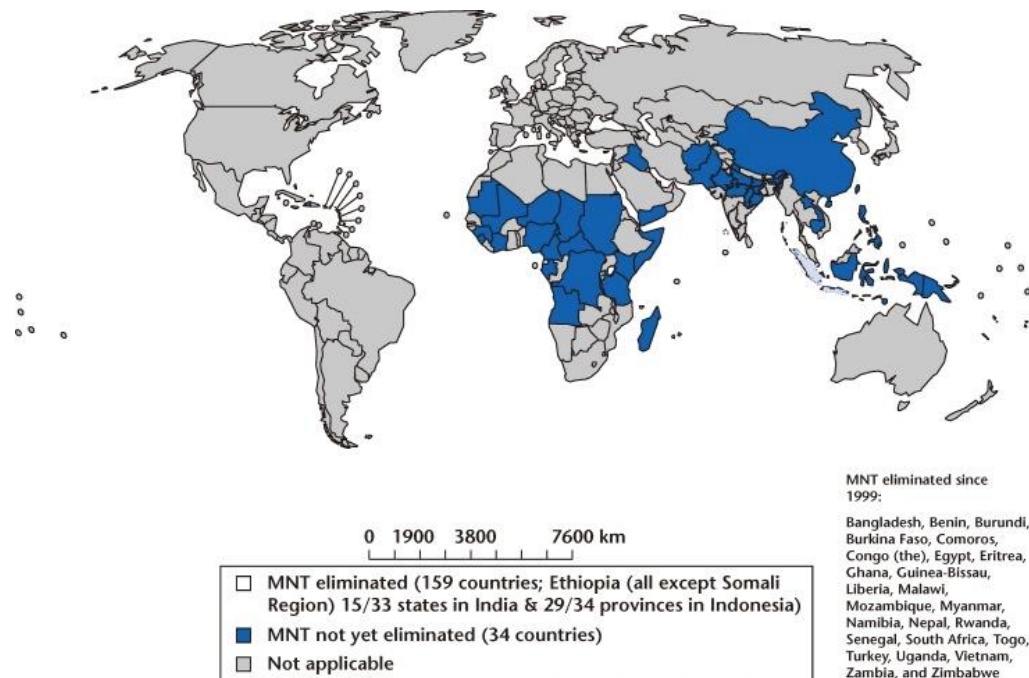


Figure 1. Elimination of Maternal Neonatal Tetanus (MNT)

This map accurately illustrates the failure of mass vaccine campaigns to reach rural areas of Northern India, resulting in a select group of mothers (a small portion of “blue”) accounting for a large proportion of the country’s overall mortality rates. Although ideal and most effective, supplying all mothers and children in these areas the three to five doses of the tetanus toxoid vaccine necessary to provide life-long immunity would be impractical and rather unrealistic. Thwaites acknowledges that supplying vaccinations to remote rural areas in every undeveloped country that still struggles to eliminate MNT and educating the public on how to use these resources would be unnecessarily expensive³. In developed countries, this cost is often justified because a reduction in disease brings immense savings in treatment costs that benefit the aggregate health care system. However, in most developing countries, including India, affected persons often go untreated and simply die from their illnesses; they often do not go to the hospital and incur such large government-absolved bills that justify preventive health costs. Even though a widespread administration of vaccinations would bring wealth to the country in other aspects, it would be an immediate expenditure for the government. Thus, Thwaites declares that effective elimination of MNT will be achieved only through a “combination of vaccination and improvement in perinatal care”³.

As public health organizations have identified the source of high infant and neonatal mortality rates in India, contributing mortality to a lack of utilization of available health care resources rather than a lack of health care services in general, sociologists have begun to look at cultural aspects that contribute to mothers’ utilization of health care services. In the 1960s, sociologists created a behavioral model to predict utilization of health care based on predisposing characteristics and enabling variables that affect access to medical care. In the late 1990s, Ronald Andersen revisited this model with the intent of designing policies that promote equal opportunities for access and utilization. In “Revisiting the Behavioral Model and Access to Medical Care: Does It Matter?”, Andersen explains that although the model was originally centered around the family as a variable to identify demographic, social, and socioeconomic characteristics, he has shifted focus to be centered around the ways in which family demographics influences the individual⁵.

2. Factors Affecting Maternal Utilization of Care

2.1 Predisposing Characteristics

2.1.1 *the influence of caste and socioeconomic status on access to health care*

According to Andersen, each family has certain predisposing characteristics that fall within the categories of demographic (age, gender), social structure (education, occupation, ethnicity, caste), and health beliefs (attitudes, values, and knowledge of health services) that make them more or less likely to use health services⁵. Since Andersen created his revised behavioral model, several sociologists and public health/medical humanity organizations have done studies in rural India to examine the specific predisposing characteristics that affect these populations' likelihood to utilize health care services. In "Antenatal Care: Provision and Inequality in Rural North India," Saseendran Pallikadavath, Mary Foss, and R William Stones acknowledge that antenatal care is an effective method of preventing maternal mortality; according to Pallikadavath et al., antenatal care has manifest functions of preventing pregnancy complications due to nutritional deficiencies, such as anemia, and latent functions in providing opportunities for health education and social support before and throughout the pregnancy⁶. The authors maintain that establishing a relationship with a health professional through antenatal care visits has facilitated access to medical care even in the postnatal periods, especially for women in rural areas. However, Pallikadavath et al. acknowledge that in India, mothers' utilization of antenatal care services has been disappointingly low as a result of "substantial limitations of the health services in overcoming socio-economic and cultural barriers to access"⁶. Among these factors associated with the use of antenatal care services in rural North India, Pallikadavath et al. claim that socio-economic status and caste are perhaps the most significant in determining whether or not mothers will utilize health care services and in determining what type of care mothers receive (i.e. clinics or home visits). According to Pallikadavath et al.'s study, mothers of high socioeconomic status are most likely to use antenatal care services. Ignoring the correlation between socioeconomic status and education level that acknowledges that families of higher socioeconomic are more educated and thus are more likely to know of the benefits of utilizing health care services, families of higher socioeconomic status have greater access to health care and are more able to afford transportation and valuable medical services⁶. In "Is Antenatal Care Effective in Improving Maternal Health in Rural Uttar Pradesh? Evidence from a District Level Household Survey," Faujdar Ram and Abhishek Singh concur that socioeconomic status plays a crucial role in mothers' likelihood to utilize antenatal care services. By grouping women into categories based on a standard of living index that evaluated the value of material household goods, Ram and Singh determined that women of a high standard of living were between 1.4 and 2.3 times more likely to delivery their children in established medical institutions than women of a lower standard of living⁷. To further substantiate this claim and its consequences, in "Determinants of Neonatal Mortality in Rural India, 2007-2008," Aditya Singh, Abhishek Kumar, and Amit Kumar claim that households classified as "poor" (based on an asset index using principle component analysis) account for 18% more neonatal deaths than rich families per year⁸. Based on the explanations provided in Ram and Singh and Pallikadavath et al.'s study, it is possible that families with a higher standard of living have increased access to health facilities in which institutional deliveries can occur because they generally have access to transportation (as cars are considered material goods included in standard of living indexes).

Because the strictly structured Hindu caste system infiltrates so many aspects of Indian lifestyle, including job opportunities and household income, socioeconomic status is directly influenced by caste; lower caste women are unlikely to have access to formal health institutions and trained medical practitioners who avoid seeing lower caste women in fear of caste contamination. India is infamous for its social stratification system that has immobilized social groups for decades. The four main castes, Brahmin, Kshatriya, Vaishya, and Shudra, have become less strict since India has gained independence, but distinct differences between castes still exist. Shudra, the lowest caste previously considered the "untouchable" group has gained political and social power through the Indian government's attempts to create equal opportunities for historically oppressed people, but fundamental differences between castes still contribute to discrimination that has influenced "how caste affects the use of specific maternal health care services"⁹. According to Saroha, Altarac, and Sibley, although former "untouchables" have gained opportunities and access to education, employment, subsidized food, health care, legal aid, financial loans, etc., "theories and fears of inter-caste "contamination" have maintained social and medical backwardness of the now-called Scheduled Caste (formerly Shudra). In other words, trained medical professionals who fall into the upper-caste categories do not attend to lower-caste women in fear of polluting their own social status. Thus, "lower-caste persons not only [experience] exploitation and social exclusion but they also [fail] to benefit from the subsidized health care services that were provided by the

government”⁹. According to Ram and Singh, “utilization of all four health care services [institutional delivery, assisted delivery, advice sought for pregnancy complications, and advice sought for post-delivery complications] is higher in the general castes than other backward castes and the scheduled castes and scheduled tribes”⁷. Saroha, Altarac, and Sibley found that “when the data were stratified by caste, fewer lower-caste women used antenatal care (8.4% vs. 20.0%), tetanus toxoid (45.9% vs. 68.0%), a trained birth attendant (2.5% vs. 10.6%), and contraceptives (6.6% vs. 16.0%) compared to upper-caste women ($P < 0.1$)”⁹. The fact that utilization of health care services is equally low in “other backward castes” shows that this trend is not as much a result of fundamental cultural differences between caste values as it is situational discrepancies that limit access to lower caste members. Ram and Singh claim, “It is not very realistic to assume that the odds of women experiencing the outcome of interest are independent, because the women are related to each other through common household and community characteristics”⁷. In other words, several of the factors that contribute to women’s utilization of health care are interrelated. As Mohindra found in a study titled “Women’s Health in a Rural Community in Kerala, India: Do Caste and Socioeconomic Position Matter?” examining the relationship between socioeconomic status and women’s health, being of low caste and low socioeconomic status often has a compounded effect; each factor by itself contributes to limited access to health care resources, but women who have both are extremely limited in opportunities to receive equal health. On the other hand, women who have high caste but low socioeconomic status are in a sense “buffered” against limited opportunities for health care. Thus, calculating odds ratios by assuming each of these factors are independent is unrealistic¹⁰. Ram and Singh’s statistical analysis takes steps to acknowledge common community characteristics that are related and may have compounding effects⁷. After acknowledging that caste plays a large role in determining mothers’ access to and utilization of health care services, all sources agree that targeting this affected group and promoting access to resources for lower caste women could drastically reduce neonatal mortality rates⁶. The Indian government has outlawed the Hindi caste system for over 60 years, but distinct differences and classist attitudes still exist; therefore, it is unrealistic to expect any short-term policy adjustments to change these segregating attitudes. However, providing lower caste people with trained health professionals of their own caste and educating them on the benefits of utilizing these health care services may prove effective in eliminating some of the problem. Although attempts have been made to increase access to resources for these groups, promoting vaccination use on a more local level by placing approachable health providers in lower-caste villages that promote utilization of care services may prove more effective⁹.

2.1.2. education level and literacy

Literacy, strongly linked with caste and socioeconomic status, is a powerful indicator of utilization of antenatal and neonatal care services. Sociologists and public health organizations studying maternal health care in India have generally found that illiterate women are far less likely to utilize health care, perhaps because they are less aware of the benefits of health care or because of compounding factors that result from their lack of education (lower socioeconomic status, lack of access to transportation to medical facilities, etc.). In “Caste and Maternal Health Care Service Use among Rural Hindu Women in Maitha, Uttar Pradesh India,” Saroha, Altarac, and Sibley found that 53% of literate mothers used antenatal care and 61% had trained birth attendants, as compared to 35% and 33% of illiterate mothers respectively⁹. In “Is Antenatal Care Effective in Improving Maternal Health in Rural Uttar Pradesh? Evidence from a District Level Household Survey,” Ram and Singh found supporting data; they claim that institutional deliveries, assisted deliveries, advice sought for pregnancy complication, and advice sought for post-delivery complication varied significantly between literate and illiterate women (30% vs. 11%, 19% vs. 8%, 45% vs. 30%, and 53% vs. 45% respectively)⁷. Both Pallikadavath et al. and Ram and Singh assert that literacy plays a role in determining delivery environment, claiming that literate women have an increased awareness of the importance of hygienic birth environments, resulting in illiterate women being far less likely to deliver in established health institutions than their literate counterparts⁶. In “Determinants of Neonatal Mortality in Rural India, 2007-2008,” Singh, Kumar, and Kumar add another facet to the discussion of education as a factor in the utilization of health care by raising an interesting point that Pallikadavath et al. and Ram and Singh fail to acknowledge: in patriarchal Indian society, the father plays a large role in making family decisions, including those regarding the health of children. If the father is educated, he may make informed health decisions on behalf of his family regardless of the mother’s knowledge of the issue⁸. Singh, Kumar, and Kumar found that mother and father’s education played the greatest role in determining risk of neonatal death of all socio-economic characteristics, but illiterate fathers had higher incidences of neonatal death (2.05%) than illiterate mothers (1.97%)⁸. As the father generally has the most autonomy and leverage in the household, Reynolds, Wong, and Tucker suggest it may be beneficial to target fathers rather than uneducated mothers who may or may not receive messages about health care¹¹. However, according to Singh, Kumar,

and Kumar maternal education is still necessary to increase household knowledge and increase use of maternal care services that improve overall child health⁸.

In “Factors Affecting Decisions to Seek Treatment for Sick Children in Kerala, India,” Rajamohanam Pillai, Sankey Williams, Henry Glick, Daniel Polsky, Jesse Berlin, and Robert Lowe found that in more educated and socioeconomically better off regions of India, “disease-related attributes and economic factors” play a more significant role in the decision to seek care¹². In other words, in states in which literacy is a prominent issue, literacy eclipses many other factors that affect utilization of health care; however, in regions like Kerala, noted for its “high levels of education,” particularly for women, and for having the “highest utilization rate of medical care services among Indian states”,¹² parents are able to make informed decisions about the nature of the disease and appropriately determine if their children needs professional medical attention. According to Pillai et al., in Kerala “parents chose not to seek care for their children significantly more often when the illness was mild, the child had a specific diagnosis, the mother had previously made fewer antenatal visits, and the family had a higher economic status”¹². Expressly, educated parents choose not to seek care for their children when they believe the illness is mild and will resolve itself on its own or when they have the resources to attend to the child’s illness on their own. The higher the cost of the hospital visit for the family (depending on access to resources), the less likely the parents are to seek care for their child because they do not deem a hospital visit worth the cost; thus, the severity of the illness can be subjectively defined by cost of corrective care. If the child has a specific diagnosis, parents with access to resources may be able to treat the disease appropriately without contacting medical professionals. Families of higher economic status generally have greater resources and are more educated about treating diseases and are able to attend to their child’s sicknesses without seeking professional care. In more impoverished regions, economics and literacy are the largest determinants of seeking professional attention; without knowing what the disease is, seeking care is only a question of whether or not the parent can afford the health services. On the other hand, in more educated regions of India, parents can more appropriately assess the situation and determine the need for care. Contrary to most other studies, Pillai’s data suggest that women with more education are less likely to seek medical care (odds ratio 1.72); Pillai et al. suggest that these women are more knowledgeable about resources that can be used to treat children at home, but the authors acknowledge that this data was collected in a region with very different demographic characteristics than the those of the rest of India and goes against findings of other studies done throughout India and may be a result of response or recall bias. Pillai cautions that this sort of pseudo-confidence may be risky, and mothers should be encouraged to utilize regular check-up services regardless of their perceived knowledge of child care¹².

In recent years, the World Health Organization has launched campaigns to promote the availability of tetanus toxoid vaccinations in rural areas of India. However, without proper education, women do not realize the importance of these health care services nor do they know how to fully utilize multiple doses. Education of this kind can only be a long-term goal, so it is important to identify and respond to other cultural factors that contribute to utilization of health care and target the most vulnerable groups¹¹. Understanding the patriarchal culture of Indian society has led some public health groups to target education intervention efforts at the father rather than the mother. Reynolds, Wong, and Tucker argue that reaching the father may be more effective and cost-efficient than demanding a structural change in the culture’s gender roles to solve neonatal mortality rates¹¹.

In the US, vaccines have become mandatory as part of the public schooling system, forcing all children to become immunized before they can enroll in kindergarten. However, in India, public schooling does not enforce these rules; even so, children of uneducated and impoverished parents are unlikely to attend school at such a young age. Perhaps some other form of governmental regulation may be effective in promoting vaccination, but a lack of regulated documentation at the time of birth may make this impractical¹³.

2.1.3. lack of female autonomy in adolescence

Adolescent mothers, particularly those aged 15-19, have particularly high neonatal mortality rates, partly due to biological factors that make them more susceptible to nutritional deficiencies (iron-deficiency anemia) during pregnancy and partly as a result of their lack of education in regards to using health services and antenatal supplements/vaccines. In “Adolescents’ Use of Maternal and Child Health Services in Developing Countries,” Heidi Reynolds, Emelita Wong, and Heidi Tucker acknowledge that iron deficiencies are much more common in pregnant adolescents and contribute to poor maternal health and neonatal outcomes¹¹. In addition to biological predispositions that make adolescents more susceptible to diseases, young mothers are often less educated in regards to pregnancy and delivery practices, and as a result, often improperly use or fail to use resources correctly. Reynolds, Wong, and Tucker found that 49% of babies born to mothers between the age of 15 and 16 received DPT vaccines, compared to 61% of mothers between 19 and 23, simply because younger mothers do not perceive these immunizations to be as important or have fewer resources to physically access health care¹¹. Reynolds et al. advocate antenatal care targeted

at adolescent mothers before their first pregnancy, as vitamins and supplements are cost-effective solutions to deficiencies common in teenagers that are ineffective solely because of limited use. According to Reynolds et al., if these women were more educated on the importance of utilizing antenatal and neonatal care services, they would be more likely to take initiatives to get vaccinated and use other available health services¹¹.

Reynolds et al. also acknowledge that young mothers lack autonomy and become increasingly dependent on their husbands. Early marriage often forces women to drop out of school to assume a more domestic role; as a result, they lose the autonomy that comes with education and financial independence and are forced to rely on their husbands to encourage them to utilize and transport them to medical facilities, greatly inhibiting their freedom to seek care for themselves and their children. If their husbands themselves disagree with health care services, these women have no voice to seek care on their own¹¹. Recent efforts to increase the legal age at marriage have been ineffective in creating any sweeping cultural changes. Part of Reynolds et al.'s suggested solution involves targeting adolescent women before they get married to educate them on their options in using antenatal and neonatal care services. However, as the father generally has the most autonomy and leverage in the household, it may be beneficial to target fathers rather than uneducated mothers who may or may not receive messages about health care¹¹.

2.2. Perceived Need of Care

Perceived need, defined by Andersen in “Revisiting the Behavioral Model and Access to Medical Care: Does It Matter?” as “how people view their own general health and functional state, as well as how they experience symptoms of illness, pain, and worries about their health and whether or not they judge their problems to be of sufficient importance and magnitude to seek professional help,” plays a role in mothers’ utilization of antenatal care services⁵. Andersen claims that the largest determinants of perceived need are severity of illness and “risk of homelessness”⁵.

In “Factors Affecting Decisions to Seek Treatment for Sick Children in Kerala, India,” Rajamohan Pillai, Sankey Williams, Henry Glick, Daniel Polsky, Jesse Berlin, and Robert Lowe expand on this definition, claiming that parents expect mild illnesses to resolve themselves and thus do not deem it necessary to seek professional medical attention. Pillai et al. claim that families of higher socioeconomic status generally have resources to attempt to treat their children at home and then use official medical care as a last resort; these parents do not perceive their need for professional care to be as great and thus are less likely to seek medical attention (odds ratio of 2.35). Age of the child is associated with severity of the illness, as Pillai et al. argue that minor illnesses are common in younger children, so parents expect these issues to resolve themselves. As a result, younger children are less often taken to official health facilities²¹.

Andersen’s reference to “risk of homelessness” refers to the degree of effort it takes to acquire medical attention. Ease of access influences perceived need, as mothers who have to take great effort to receive care for their children will consider the costs too great for the benefits and be less likely to seek medical attention. For example, if a family is in a rural village with limited access to medical care due to geographic barriers or a dearth of trained health professionals or is of low socioeconomic status and lacks means of transportation, that family may be less likely to seek medical care because their cost is too great to outweigh the perceived benefits. Pillai et al.’s study claims that rural families are less likely to seek medical care as access to care is limited due to greater distance to facilities and limited transportation (odds ratio 1.84)²¹. Often the presence of health providers and established health institutions in a community encourages utilization of health care services and allows mothers to establish a relationship with a trustworthy health provider that they can quickly reach in times of emergencies, but in rural villages that lack these services, perceived need is low⁷. Increasing the availability of health services and health providers who encourage utilization of resources in rural villages may increase perceived need of care among less educated mothers. By making health care more accessible, the costs of accessing care decline and mothers may be more likely to perceive the benefits to be greater than the hassle.

2.2.1. *previous delivery complications*

In “Determinants of Neonatal Mortality in Rural India, 2007-2008,” Singh, Kumar, and Kumar claim that mothers with previous delivery or pregnancy complications are more likely to seek antenatal and neonatal care because they know of the potential risks associated with attempting to resolve pregnancy complications on their own and delivering in an unsafe environment⁸. In “Antenatal Care: Provision and Inequality in Rural North India,” Pallikadavath, Foss, and Stones hypothesize that women with prior experience with pregnancy or delivery complications incur manifest functions of antenatal care of preventing future pregnancy complications by providing them with supplements to prevent diseases like anemia and latent functions in providing opportunities for health education and social support before and throughout future pregnancy. According to Pallikadavath, Foss, and Stones, interacting with health care

providers helps women establish relationships with dependable professionals who serve as readily accessible contacts in case of future emergencies⁶. Thus, use of antenatal and neonatal care in prior births encourages use of health care services during later pregnancies. For that reason, in “Adolescents’ Use of Maternal and Child Health Services in Developing Countries,” Heidi Reynolds, Emelita Wong, and Heidi Tucker’s suggest reaching women before their first pregnancy to encourage early promotion of health care services. If healthy mothers realized the necessity to use health care services as much as mothers with diagnosed pregnancy complications did, they would develop established relationships with health care providers that would prove beneficial in the event of complications. Thus, encouraging utilization of health care to all mothers despite physical condition would drastically reduce mortality rates¹¹.

2.2.2. *relationship between mortality and fertility*

Singh, Kumar, and Kumar also found that the presence of other children (fertility rate) also influenced mothers’ decisions to seek care, as “the odds of neonatal death reduced by 35%, 42%, and 38% for second, third and ‘four and above’ birth orders, respectively, compared to the first birth order”⁸. In *Infant and Child Mortality in India*, Arvind Pandey, Minja K. Choe, Norman Y. Luther, Damodar Sahu, and Jagdish Chand agree mostly with Singh, Kumar, and Kumar, but found that generally, mortality follows a U-shaped curve; it is highest with the first child, decreases slightly for children of birth order three and four, and increases again for children of birth order four or more. Pandey et al. hypothesize that mothers are generally less experienced with their first children and have limited knowledge in raising children, making mortality rates higher among this group. According to Pandey et al., first time mothers are also more susceptible to birthing complications as a result of a lack of education in regards to preventive antenatal supplements¹⁴.

In Indian culture, having four or more children is generally an indication of poor socioeconomic status or dependency on agrarian economies in which children serve as free labor sources; Pandey et al. and Singh, Kumar, and Kumar agree that having to distribute few resources among large families increase mortality rates with such high fertility. If indeed large families are characteristic of agrarian culture, these children would be exposed to a variety of toxins and parasites, particularly because of an abundance of animal feces on farms, that would increase mortality rates⁸. Pandey et al. suggest that mortality rates may also be higher amongst children of higher birth order because mothers gain a sense of pseudo-confidence that leads them to believe that they are experienced enough to handle their children’s illnesses, even when they should be treated by medical professionals¹⁴. Making child immunization a more regulated industry (mandated by government standards) instead of dependent on parents’ whims and perceived need of services could solve this inconsistency.

2.3. Enabling Variables (Geographic Location)

In both “Is Antenatal Care Effective in Improving Maternal Health in Rural Uttar Pradesh? Evidence from a District Level Household Survey” and “Factors Affecting Decisions to Seek Treatment for Sick Children in Kerala, India,” Ram and Singh and Pillai et al. respectively found that utilization of antenatal and neonatal care services was significantly lower amongst women in rural areas than those in urban areas. Pillai et al.’s study claims that rural families are less likely to seek medical care, as greater distances to facilities and limited transportation limit access to care (odds ratio 1.84)¹². Both authors acknowledge that the results are not indicative of independent outcomes: Scheduled caste members who have low rates of utilizing health care services for a variety of other reasons (including low socioeconomic status, education levels, and female autonomy that inhibits mothers from making independent decisions) also populate rural areas as a result of their initial agricultural beginnings; people in these regions often don’t have access to transportation and are inhibited by great distances to established health facilities⁷. Ram and Singh also acknowledge the fact that urban families generally have higher standards of living than their rural counterparts, and urban families are likely to be closer to health facilities. According to Ram and Singh, “the availability of all-weather roads and health facilities significantly affect institutional delivery. Distance to a transport facility and the presence of a health provider in the village are also found to significantly affect the likelihood of delivery assisted by trained professionals”⁷. In other words, mothers connected to health facilities by easily accessible routes (all-weather roads) are more likely to visit health institutions and have institutional deliveries, perhaps because of sheer ease of access. Distance to a transport facility has a negative relationship with utilization of antenatal care resources. The presence of a health provider promotes delivery by trained professionals in part because health providers are available to assist in deliveries and also because presence of trained medical practitioners increases awareness of the importance of safe delivery environments and promotes overall maternal health in villages.

According to Singh, Kumar, and Kumar in “Determinants of Neonatal Mortality in Rural India, 2007-2008,” “[wealthier women’s] knowledge [about the benefits of receiving medical attention and utilizing health care services]

and attitudes may be passed on to other women”⁸. Although urban women are generally wealthier and have greater access to health care, this knowledge is often passed more easily in rural communities that are more “socially cohesive”⁸. Thus, promoting access to care and educating rural women on the benefits of health care would be quite effective, as they would then pass knowledge onto other women and encourage them to seek health care.

3. Conclusion

Currently UNICEF is partnering with the World Health Organization with a goal of complete maternal and neonatal tetanus (MNT) elimination. Worldwide there was a 93% reduction in the incidence of MNT from the 1980s to 2010 because of efforts to distribute tetanus vaccines to high-risk areas. The implementation of supplementary immunization activities between 1999 and 2012 has protected almost 120 million women between the ages of 15 and 45 from tetanus¹⁵.

However, even with extensive elimination efforts, “as of June 2014, 24 countries are still to eliminate [maternal and neonatal tetanus]”³. While immunization is quite effective in preventing and treating tetanus, the most reliable way to lower the infant mortality rate in India and other developing countries is to limit the factors that contribute to poor neonatal umbilical cord care and promote use of available health care resources. Just as with any other issue, it would be more effective to eliminate the root of the problem than to treat the symptoms. Understanding what cultural factors make mothers more or less likely to utilize available health resources helps researchers target specific groups in efforts to educate the population on healthy infant care. Furthermore, making vaccination a more regulated industry rather than susceptible to the whims and perceived need of parents may make infants more likely to be treated appropriately. While many missionary groups have been sent to areas in which deleterious practices are performed with the goal of converting religious groups, there are obvious disadvantages to depleting an entire religious knowledge system; this, to many people, represents a failure to understand a culture. Perhaps a better alternative would be to work to understand mothers’ lack of motivation and educate people in these regions about proper neonatal care. Unfortunately, even this method is not so simple. Researchers have spent millions trying to distribute pamphlets and health public service announcements to villages that often go ignored. Mothers are unwilling to listen to “outsiders,” especially those from other countries and other religious groups, for advice on how to care for their young¹⁵. It is still important to acknowledge and understand contributing factors to practices that have such a large impact on the both the local setting and the national health system. The only way to truly make an effective difference in the incidence of neonatal mortality due to poor umbilical cord care is to create awareness of prevalent deleterious practices and the lack of motivation to use antenatal and neonatal care services and encourage the general population to take a stance in fighting such an important global issue.

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