

Measuring coverage of WHO recommended Essential Newborn Care practices in the squatter settlements of Islamabad Capital Territory in Pakistan.

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Abstract

Background: Pakistan has shown significant progress in reducing child mortality, however, significant challenges exist in reducing neonatal mortality rate. WHO recommends a package of “essential newborn care” practices based on effective coverage to improve newborn survival. This study assessed the level of effective coverage of newborn care in the squatter settlements of Islamabad Capital Territory (ICT) and also determined if the care received is within the parameters of essential newborn care as defined by WHO guidelines.

Methods: A cross-sectional survey was conducted to gather community-based data on newborn care practices from 416 mothers who delivered a live baby in the past twelve months within a randomly selected squatter population of ICT. Three composite outcomes (safe cord care, optimal thermal care and good neonatal feeding) were generated by combining individual practices from a list of essential newborn care practices recommended by WHO. All International ethical standards were followed including informed consent and confidentiality of respondents. Ethical clearance was obtained from the ethical review board of Health Services Academy (HSA).

Results: Despite a very high number of institutional deliveries, the study showed that only 2.9% of newborns received all components of WHO recommended essential newborn care. Only 17.1% of the newborns received essential elements of safe cord care, 40.4% received recommended optimal thermal care and 28.8% followed WHO guidelines of good neonatal feeding practice. This low uptake of essential practices was due to the application of various substances on the cord, delayed skin to skin contact and feeding of pre-lacteals to the newborn.

Conclusion: The study highlighted that the current level of effective essential newborn care is extremely low in the country. We found multiple cultural and societal misconceptions, that translate into harmful practices for newborns. Interventions such as educating mothers through front line workers, updating health care staff on WHO recommended guidelines for newborn care and declaring widespread harmful traditional practices hazardous for the health of newborn, can help improve essential newborn care in Pakistan.

Background

While the world has seen significant progress in improving child survival in recent decades, neonatal mortality rates (NMR) have dawdled far behind under-5 mortality rates (1, 2). A staggering 2.5 million neonates died in 2017 alone, showing a 51% reduction in the NMR compared with a 58% decline in under-five mortality rate (3). The neonatal period defined as “the initial 28 days in the life of a newborn infant or neonate” is considered as the most critical phase owing to the high vulnerability of infections during this period (4). It is also regarded as a sensitive marker of the quality of health care for women and newborns within the continuum of care that spans pre-conception, pregnancy, childhood and adolescence (5). Huge disparities in the rates of neonatal mortality exist across various regions, with low middle-income

countries (LMICs) reporting a significantly higher number of neonatal deaths as compared to high-income countries (6). In 2017, South Asia and sub-Saharan Africa accounted for 79% of the total burden of neonatal deaths, with South Asia alone accounting for 38% of neonatal deaths worldwide (3).

For years, the performance of health systems has been evaluated by the fraction of people who are provided a service among those who need it (7). More recently, WHO introduced the concept of effective coverage, which not only focuses on health services utilization but also emphasizes on quality, thus moving beyond the concept of mere provision of health services to a more comprehensive approach towards newborn care (8). Despite global interventions on increasing utilization of health services, a substantial number of newborns still die regularly during neonatal period which suggests that maximizing coverage alone is not sufficient and requires the world to embrace the idea of effective coverage (9, 10). WHO recommends the package of “essential newborn care” practices for improving newborn survival and reducing illnesses associated in the early days of life (11). These practices can be grouped into three broad components; named safe cord care, optimal thermal care and good neonatal feeding. “Safe cord care” encompasses use of a hygienic instrument to cut the cord, hygienic tying of the cord and application of nothing or chlorohexidine alone to the cord. “Optimal thermal care” includes immediate drying and wrapping the baby in clean, dry cloth within early ten minutes, immediate skin to skin contact of newborn with the mother within the first 10 min of birth and delaying washing the baby with warm water till 6 hours of birth. “Good neonatal feeding” comprises of timely initiation of breastfeeding, no pre-lacteal feeding and exclusive breast feeding (12).

While Pakistan has shown progress in reducing child mortality, significant challenges exist in reducing the neonatal mortality rate, which shows minimal improvement compared to infant mortality and under-five mortality (13). Serial data from demographic health surveys conducted in Pakistan shows a NMR of 55 deaths per 1,000 live births between 1992 to 2012 which improved to 42 deaths per 1,000 live births in the most current 5-year period (14, 15). This minimal improvement shown was even challenged by research that shows that neonatal mortality rates in the study area were under-estimated by 50% (16). The mortality patterns also vary across various districts and between urban, semi-urban and rural populations where the neonatal mortality rates almost double in certain regions (17). In Pakistan, the highest level of early newborn care is reported from Islamabad capital territory (ICT) at 55%. However, this data did not include any squatter settlements which has mostly remained neglected, in most surveys conducted in Pakistan e.g., PDHS (Pakistan demographic health survey), MICS (multiple indicator cluster survey) etc. (18). Due to huge disparities between urban and squatter settlements in ICT, it is assumed that there would be marked differences between the two in terms of newborn care indicators which is largely unknown (14, 15). We therefore, conducted this study to i) determine the level of effective coverage of essential newborn care in the squatter settlements in ICT, and ii) determine if the care received is within the parameters of essential newborn care as defined by WHO guidelines. Knowledge attained from this study will guide decision making and formulating healthy policies centered on essential newborn care in ICT and for Pakistan.

Methods

Using a cross-sectional design, this study gathered data on newborn care practices from mothers who delivered a live baby in the past twelve months residing in the squatter settlement of ICT between April to July 2019. A squatter settlement is defined as “a residential area whose inherent non-legal status deprives the households belonging to lower-income group from adequate or minimum level of services and infrastructure”. Eligible mothers who were not permanent residents of the selected squatter settlements and those who gave birth to newborns with congenital abnormalities were excluded from the study. Respondents who failed to give consent or were not mentally stable to give interviews were also excluded from participation in the study.

Sampling procedure and sample size

Of the 37 squatter settlements in ICT, seven Afghan settlements were excluded due to security and movement issues. Using a multistage sampling technique, nine most populated squatter settlements were selected in the first stage. A list of households with children up to 1 year of age was developed through assistance provided by lady health supervisors (LHS) and lady health workers (LHWs) within selected squatter settlement. In the next stage of sampling, eligible households were randomly selected from the list. In households with more than one eligible study participants, a list of eligible participants was developed and a child was randomly selected. The sample size was calculated to capture the population parameter with a 95% confidence level, and a 5% bound on the error of estimation. The prevalence of postnatal newborn care was presumed at 55% in ICT (18). The sample size was inflated by 10% to adjust for non-responses and data errors. The final sample size was calculated to be 416 for this study.

Data Collection and Management

Data were collected by interviewing mothers from selected households using a pre-designed, pre-tested structured questionnaire to elicit information on socio-demographic characteristics, obstetric history, maternal care and newborn care indicators. PDHS and MICs validated and reliable questionnaires were consulted to construct the questionnaire for the study. The questionnaire was developed in English, translated into Urdu and back-translated into English to eliminate translation errors. Urdu version of the questionnaire was administered in the field. Data collection team comprised of 4 public health graduates and a field supervisor, who were trained in field and data collection procedures in a three days training. A field office was established at the health service academy in Islamabad, where field teams met daily to discuss field schedules and proceeded to the field. Prior to field data collection, pilot testing was carried out to examine the reliability of the data collection tool, the content and procedures. All necessary modifications in the questionnaire were made accordingly. Field work was facilitated by LHWs, who identified eligible households within the squatter settlement area, introduced research team into the household and provided assistance during interviews.

Data management and analysis

A data management team supervised by a data manager and two data entry operators worked alongside the field team. All questionnaires received from the field were edited and coded before entry into a CS pro database specially designed for the study. The final data set was analyzed using Statistical Package for Social Sciences (SPSS v.22). Descriptive analysis was conducted by calculating mean with standard deviation for continuous variables and proportions for categorical variables. To estimate effective essential newborn care three composite variables; safe cord care, optimal thermal care and good neonatal feeding were developed. Each composite variable comprised of three components; i) Safe cord care encompassed use of a hygienic instrument to cut the cord, hygienic tying of the cord and application of nothing or chlorhexidine to the cord ii) Optimal thermal care included immediate drying the newborn within ten minutes, immediate skin to skin contact of newborn and mother and delayed bath with warm water for at least 6 hours of birth iii) Good neonatal feeding comprised of breastfeeding initiation within an hour of birth, giving colostrum and no pre-lacteal feed. Each of these variables were dichotomized to a 'yes' or 'no' response. Coverage of composite variable was calculated based on positive response to all the three variables within its domain. Effective essential newborn care was considered when all six practices with each domain of safe cord care, ideal thermal care and good neonatal feeding were fulfilled.

Results

Sociodemographic and economic characteristics

Of the 416 mothers interviewed 93.8% (n = 390) were currently married and were living with their husbands. The average age of the respondents was 26.7 ± 4.8 years with 31.9% being less than 25 years. A large majority of participants were married at a young age with approximately 46% less than 20 years old at the time of their marriage. One-quarter (24.5%) of the mothers were illiterate with no formal education, while only less than 10% had more than 10 years of education. Nearly one third were working women, engaged in some kind of paid work. Sixty nine percent lived in a joint/extended family system, with their husbands being the key family income providers. (Table 1)

Table 1
Socio-demographic characteristics of study participants in squatter settlements of ICT (n = 416)

Variables	Frequency (n = 416)	Percentage (%)
Marital status		
• Married	390	93.8
• Others (separated, widowed, divorced)	26	6.2
Mother's current age		
• Less than 20 years	17	4.0
• 20 to 24 years	116	27.9
• 25 to 29 years	158	38
• 30 to 34 years	88	21.2
• 35 years and more	37	8.9
• Average \pm SD	26.7 ± 4.8	
Mother's age at marriage (Avg \pm SD)		
• Upto 20 years	191	45.9
• More than 20 years	225	54.1
Mother's education		
• No formal schooling	102	24.5
• Primary education (upto 5 years)	107	25.8
• Secondary education (6 to 10 years)	172	41.3
• Metric and above (more than 10 years)	35	8.4
Mother's employment status		
• Employed	136	32.7
• Unemployed	280	67.3
Family system		
• Joint/extended family	286	68.8
• Nuclear family	130	31.2
Husband's age (Avg \pm SD)	25.4 ± 7.4	

Variables	Frequency (n = 416)	Percentage (%)
Husband's education		
• No formal schooling	82	19.7
• Primary	52	12.5
• 6–10 Secondary	213	51.2
• > 11 Higher	69	16.6
Husband's employment status		
• Employed	387	93.0
• Unemployed	29	7.0
Median Family Income (Avg ± SD)	21183.5 ± 10180.8	

Maternal and Obstetric history

Nearly two third (66.6%) of the respondents were multi-parous, 12.3% had a previous history of still birth and 28.6% had an abortion/miscarriage. A high proportion of respondents reported of eight or more antenatal visits and 95.7% delivered in a government or private health facility by a skilled health professional. One third reported complications during pregnancy, 55% had complications during delivery and another 35% reported of complications during post-natal period. Nealy 97% of the mothers reported having a neonatal post-natal checkup and a large majority (93.3%) of these were conducted in health facilities. (Table 2)

Table 2

Maternal history and obstetric characteristics among study population in squatter settlements of ICT.

Variables	Frequency (n = 416)	Percentage (%)
Parity		
• Primiparous	139	33.4
• Multiparous	277	66.6
Previous history of still birth	51	12.3
Previous history of abortion/miscarriage	119	28.6
ANC attendance (recent pregnancy)		
• None	17	4.1
• Less than 8 visits	115	28.8
• 8 or more visits	284	71.2
Place of Delivery		
• Institutional	398	95.7
• Home	18	4.3
Delivery conducted by Skilled birth attendant	398	95.7
Mode of delivery		
• Vaginal delivery (normal/assisted)	319	76.7
• Caesarean section	97	23.3
Postnatal care received at least once	389	93.5
Complications encountered		
• during pregnancy ^a	140	33.7
• during delivery ^b	229	55.0
• during post-natal ^c	146	35.1

^a includes high blood pressure, blurred vision, vaginal bleeding, loss of consciousness and convulsions (eclampsia),

^b includes high blood pressure, premature rupture of membrane, excessive vaginal bleeding, prolonged and obstructed labor,

^c includes high blood pressure, blurred vision, heavy vaginal bleeding (PPH), urinary or fecal incontinence (obstetric fistula), convulsions or fits (eclampsia) and high fever.

Variables	Frequency (n = 416)	Percentage (%)
Neonatal Postnatal check-up received	403	96.9
^a includes high blood pressure, blurred vision, vaginal bleeding, loss of consciousness and convulsions (eclampsia),		
^b includes high blood pressure, premature rupture of membrane, excessive vaginal bleeding, prolonged and obstructed labor,		
^c includes high blood pressure, blurred vision, heavy vaginal bleeding (PPH), urinary or fecal incontinence (obstetric fistula), convulsions or fits (eclampsia) and high fever.		

Essential newborn care practices

Table 3 shows essential newborn care practices segregated into domains of safe cord care, optimal thermal care and good neonatal feeding practices. Among safe cord care practices, 81% of the mothers reported use of a new blade/sterilized scissors to cut the cord whereas 98.3% reported that the cord was tied with umbilical clamp or a sterilized string/thread. A significantly low proportion reported to apply chlorhexidine or nothing (20.2%) on the cut end of the cord. Within the domain of optimal thermal care, immediate drying and wrapping of the newborn in a clean cloth within first 10 minutes after birth was reported by 68.8%. Initiation of skin to skin contact between mother and newborn within the first 10 min of birth and delaying the first bath for 6 hours was reported by 57% and 65.6% respectively. Almost 89% of the newborns were given colostrum and 61.5% newborns were breast fed within first hour after birth. No pre-lacteals feeding was given to 47.1% of newborns.

Table 3

Measure of various composite variables of essential newborn care in squatter settlements of ICT.

Variables	Frequency (n = 416)	Percentage (%)	Coverage of newborn practices %	Effective Coverage%
Safe Cord Care			17.1	2.9
• Used sterilized blade/Scissors to cut the cord	337	81.0		
• Used Clamp/String/Thread to tie cord	409	98.3		
• Applied Chlorhexidine or Nothing on the cord	84	20.2		
Optimal thermal care			40.4	
• Dried and wrapped the newborn within 10 minutes of birth	286	68.8		
• Skin to skin contact of newborn and mother within 10 minutes	237	57.0		
• Newborn's first bath delayed for more than 6 hours after birth	273	65.6		
Good Neonatal feeding practice			28.8	
• Colostrum given	370	88.9		
• Initiation of breast feeding within 1 hour after birth	256	61.5		
• No pre-lacteal feed given	196	47.1		

The coverage of different essential newborn practices for the three domains showed that only 17.1% of the newborns received all three essential safe cord care initiatives, 40.4% received WHO recommended optimal thermal care and 28.8% mothers had followed good neonatal feeding practices. Effective coverage of essential newborn practices showed that only 2.9% of the newborns received all essential practices of safe cord care, thermal care and neonatal feeding as recommended by WHO.

Discussion

Pakistan is regarded by UNICEF as one of the riskiest places to be born, as measured by its newborn mortality rate (20). The findings drawn from this study provide evidence that not all babies are dying of medical reasons such as diarrhea, pneumonia or prematurity etc., but a large proportion dies because they were exposed to primitive community practices and are not taken care of as recommended by WHO (21). To our knowledge, this is the first study conducted in the squatter settlements of the nation's capital, amidst a well-developed health care system with the availability of all RMNCH (Reproductive, maternal,

newborn and child health) services. Despite a high rate of institutional deliveries with over 95% of the children born in health facilities, it is surprising to see a fairly low uptake of the components of essential newborn care practices encompassing 17.1% safe cord care, 40.4% optimal thermal care and 28.8% good neonatal feeding. Overall only 2.9% of the newborns received all components of the WHO recommended essential newborn care which is fairly low when compared to similar studies (10).

Safe cord care is an important component of ENC to keep newborns healthy and avoid cord infection or sepsis. Community-based data on the incidence of omphalitis in Pakistan shows 217 per 1000 live births in Pakistan, which is associated with sepsis among newborns in low-income communities in Pakistan (22). Among the three sub-components of safe cord care, we found that chlorhexidine or nothing was applied on the cords of only 20.2% newborns; a proven intervention to be effective against neonatal infections (23). Although included in the list of essential drugs, the use of chlorhexidine in public and private health facilities in Pakistan still remains low. The various challenges include issues of availability, lack of strict protocols and training on recommended guidelines, and poor knowledge of mothers and health care providers to use it effectively (23, 24). In our study, 91.1% of the mothers reported applying various substances such as ghee, vegetable oil, turmeric, surma (local eye makeup) and skin ointments on the cord stump. This is in agreement to several studies from Pakistan as well as India, which show that application of these substance on the cord stump is closely linked to socio-cultural practices in the region (25, 26, 27, 28). A high proportion of women reported use of sterilized blade and scissors to cut the cord (81%) and another 98% of newborns had clean cord tying practices. These higher numbers could be because more than 95% of deliveries occurred in larger hospitals, and the situation might be different in another setting or home deliveries.

This study reveals that good neonatal feeding is another poor performed practice, as half of the respondents reported to have given pre-lacteal feed to their newborn. Research has shown that giving pre-lacteal feed is a long standing custom due to perceived beliefs on the benefits of certain pre-lacteals, where a pious member of the family should let the newborn suck the pre-lacteal from his/her finger as it helps transfer the characters and good qualities of the provider to the newborn (29). Common pre-lacteals include sugar syrup, honey, rose essence and cow's milk (30). We also found that nearly 89% of newborns were fed with colostrum, which is a proven mechanism to reduce neonatal infections (31). Similar findings were reported from multiple studies from Karachi and Gilgit which showed a fairly high proportion of newborns were given colostrum i.e., 85% and 96% respectively (32, 33). Early initiation of breastfeeding is a dogma for healthy newborns, however, we found 61.5% of the mothers initiated breast feeding within an hour after birth as per WHO recommendation. Our findings are significantly higher than the results of national nutritional survey 2018 (NNS) which shows early initiation of breast feeding in 48.1% newborns which was six percentage points more than observed in the 2011 report of NNS (34). One major hindrance to the early initiation of breastfeeding appears to be pre-lacteal feeding, which remains the first priority due to cultural reasons and delays the purpose of exclusive breast feeding.

Drying and wrapping the newborn instantly after birth and initiation of skin to skin contact of the mother and the newborn are proven interventions to limit hypothermia which is the leading cause of morbidity

and mortality of neonates especially in the developing countries (35). Drying the newborn within ten minutes after birth was reported by 68.8% of the respondents, while 57% of the newborn mother duo had skin to skin contact within ten minutes of birth. Skin to skin contact is an evidence-based intervention for the maintenance and regulation of body temperature of the newborn, which serves as a catalyst for breastfeeding by ensuring release of oxytocin in the first hour (36). Another worrying finding is the one-third babies who were bathed within the first 6 hours of birth, which is contrary to international guidance. Babies are born with a white, waxy coating “vernix caseosa” which serves as a protective layer to the skin, makes it softer and guards the immune system (37). Bathing in Pakistani culture is considered essential and is preferred to take place as early as possible for the religious rituals to be performed quickly (38). Similar results were reported from comparable studies conducted in squatter settlements of Karachi and Rawalpindi where more than half of the newborns were bathed within less than 6 hours of birth (25, 39).

The results of this study indicate that a mere improvement in the access of maternal and newborn health services won't be able to reduce neonatal and child mortality alone. Despite a high proportion of deliveries conducted by skilled birth attendants within secondary and tertiary level health facilities, the coverage of effective essential newborn care practices is extremely low. Pakistan as a country needs to address issues of quality care for newborns through policy and programs which focus on maternal, newborn, and child health (MNCH) continuum of care and address gaps in care which especially affect newborn babies. It needs a concerted effort at the grass root level, especially training front line workers to educate mothers of the various cultural and societal misconceptions which translate into harmful practices for newborns. We need to ensure that the widespread harmful traditional practices need to be declared hazardous for the health of newborn, and not only the mothers but also the secondary caregivers are educated accordingly. Furthermore, since this study did not determine the knowledge of mothers on essential newborn care, future research can be conducted to understand the relationship between the level of knowledge and newborn care practices from a user perspective as well.

Limitations

The findings of this study need to be considered with care as an extrapolation of the results to general Pakistan's population might not hold, as our study was limited to squatter populations in ICT. The squatter settlements in Pakistan in terms of literacy, health awareness and socio-economic status of its inhabitants closely resemble semi-urban and rural areas of Pakistan although the ease of availability of health facilities is in contrast with the rural landscape in Pakistan. Since most deliveries occurred in health facilities, the results of this study more imply to deliveries and practice of ENC in health facilities rather than to deliveries occurring at homes. Another limitation of the study could be the recall bias especially for those women who delivered almost a year ago. To minimize recall bias, well-formulated, specific questions were used while interviewing the mothers and the interviewer incorporated probing techniques to better elicit the responses.

Conclusions

To conclude, this study was able to identify a number of critical areas of early newborn care which were not researched before and has enlightened our knowledge on how ENC is provided in Pakistan. The issues identified by this study are simple to fix, and would require concerted efforts at the level of the community as well as health providers. Community efforts should focus on providing information on various cultural practices which are harmful for newborns. Health care providers must be regularly equipped with up-to-date knowledge based on advances in healthcare practices so that they could update their knowledge and practices in concordance with updated WHO recommendations on essential newborn care.

Abbreviations

NMR

Neonatal mortality rate

NNS

National Nutrition survey

WHO

World health organization

PDHS

Pakistan Demographic and Health Survey

MICS

Multiple Indicator Cluster Survey

SPSS

Statistical package for social sciences

LHS

Lady Health supervisor

LHW

Lady Health workers

ICT

Islamabad Capital Territory

RMNCH

Reproductive, maternal, newborn and child health

Declarations

Ethics approval and consent to participate

Ethical clearance was obtained from the Ethical Review Board of Health Services Academy. All study participants were briefed about the study and its objectives prior to receiving informed consent. As the study was conducted in low literacy settings, the consent was read by interviewers, upon receiving approval to participate by mothers, interviewer signed the consent form. No coercion was used for approval to participate. Measures to ensure confidentiality were taken by not obtaining any personal

identifying information like name or address, a unique study ID was assigned to all participants, face to face interview with little or no involvement of other family members etc. All completed questionnaires were kept in locked cabinets and soft data was protected via passwords file with limited access only to authorized people.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

RH collected data in the field and conducted parts of analysis. She also wrote the first draft of the paper. SH provided inputs in the conceptual design of the study and supervised the research process. TR conducted analysis and monitored field data collection. She also provided inputs in the analysis section. KH did field data collection and provided inputs in the analysis. JB provided inputs in the conceptual design of the study and also provided inputs in the final draft. FE helped in conceptualizing the study, supervised the overall research process and edited the final draft. All authors have read and approved the manuscript.

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