Effect of Health Care Workers Training on Targeted Postnatal Care Package and Nurses Mentorship on Maternal Knowledge of Neonatal Danger Signs among Mothers Attending Well Baby Clinics in Nakuru County, Kenya: Quasi Experimental Study

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Abstract. *Background:* Health care workers role in imparting knowledge to mothers on obstetric care is pivotal in order to increase recognition of symptoms in neonates that indicate serious illnesses. *Objective:* To determine whether there was a change in level of knowledge on neonatal danger signs among mothers in the Nakuru County after the trainings on targeted postnatal care and the mentorship of nurses. *Study design:* Quasi experimental study. *Study method:* Hospitals providing obstetric care in Nakuru County were purposively selected. Mothers with children aged 0-9 months attending well baby clinics were sampled and interviewed at the baseline in 2014. Training and mentorship of nurses from the selected facilities on targeted postnatal care was done. On the third phase of the study a different cohort of mothers were interviewed in 2015. Structured questionnaires were used to determine mothers' knowledge on neonatal danger signs. Data was processed using the SPSS software (version 22). *Results:* 414 mothers were interviewed for phase 1 and 3 of the study. 310(73.9%), 198(46.6%), 166(40.1%), 146(35.3%) identified newborn danger signs as hotness of body, difficulty breathing, poor sucking, jaundice respectively at baseline and this improved after intervention to 331(80%), 326(78.7%), 217(52.4%) respectively. Mothers who could identify more than three neonatal danger signs improved from 63(15.2%) to 203(49%). *Conclusion:* Training and mentorship of nurses had a positive effect on maternal knowledge of postnatal neonatal danger signs.

Keywords: danger signs, newborn illness, MCH booklet

Introduction

Neonatal mortality has remained very high globally despite all the efforts that have been applied to reduce these rates (Abu-Shaheen et al., 2019). In Kenya neonatal mortality rates have not reduced much over the years despite the reduction in under years five mortality over the years. As per the Kenya demographic health survey 2009 in comparison to KDHS (2014) the under five years old mortality reduced from 74 per 100,00 live births to 52 deaths per 100,000 live births but the neonatal mortality reduction was 31 to 22 deaths per 100,000 live births (KDHS, 2009; KDHS, 2014).

Most neonatal deaths are usually reported within the first few days after delivery with three quarters of them occurring in the first week of life (WHO, 2018). A study by Irimu et al. (2021) noted that 60% of all neonatal mortalities occurred on the day of admission in the 16 county neonatal units in Kenya. Worldwide the causes of neonatal mortalities are varied with the three major causes of neonatal deaths worldwide being infections (36%, which includes sepsis/pneumonia, tetanus and diarrhoea), prematurity (28%), and birth asphyxia (23%) (WHO, 2018). This is in contrast to the findings by Irimu et al. (2021) whereby majority of the newborns who died had multiple diagnoses with 95% of the neonates having at least five diagnoses with the intrapartum complications been associated with most deaths.

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In Bangladesh in a community study the mortality due intrapartum complications and prematurity accounted for more than 60% of the neonatal mortality (Darmstadt, 2010).

Up to two thirds of newborn deaths can be prevented if known effective health measures are provided at birth and during the first week of life yet in developing countries nearly half of all mothers and newborns do not receive skilled care during and immediately after birth (WHO, 2018). In Kenya there has been a lot of improvement of skilled birth attendance with 62 % of deliveries been performed by either a doctor a nurse or a midwife as per the KDHS (2014) from 44% in 2009 (KDHS, 2009; KDHS, 2014).

Identification of simple signs and symptoms by the mother that signifies the severity of disease in neonates remain an integral part in reducing neonatal mortality in the developing world. WHO in 2018 identified at least nine neonatal danger signs that were noted to have high sensitivity and specificity for predicting severe illness with need for hospitalization of a newborn in the first week of life, according to a multicenter study conducted by the Young Infants Clinical Signs Study Group (YICSSG, 2008). Mothers need to be educated on this vital aspect of continuum of care as early as in the antenatal period. Imparting this knowledge is possible as majority of the mothers in Kenya attend antenatal clinic with majority been attended during these visits by skilled health provider (KDHS, 2014).

Immediate postnatal period has also been identified as one of the most significant maternal health care component for identifying, educating, and managing problems associated with childbirth (WHO, 2008). The postnatal period has been defined by W.H.O as the first six weeks after birth and is critical to the health and survival of a mother and her newborn (WHO, 2008). The most vulnerable time for both is during the hours and days after birth. Lack of care in this time period may result in death or disability as well as missed opportunities to promote healthy behaviors, affecting women, newborns, and children (WHO, 2010). Globally, the percentage of newborns receiving postnatal care, whether at home or in a health facility, was 33 per cent in 2018, below the 2021 target of 43 per cent (UNICEF, 2018).

Important information for both the antenatal and postnatal care has been incorporated in the mother and child book with pictorial representation. The booklet is divided in all the phases of pregnancy, immediate postnatal period for both the baby and the child and the third section on issues of the baby including nutrition, growth monitoring, milestone evaluation and child development. Most of the mothers in Kenya receive this booklet during their first visits in the antenatal clinics.

Studies have shown the importance of health care workers role in imparting skills and knowledge in this maternal and new born care and despite having this information in the booklet majority of the mothers have no idea what they contain. This was illustrated in a Kenyan study where it was noted that the utilization of the booklet among mothers attending well baby clinic was very low but was much better for mothers who were explained the content of the booklet during the antenatal and postnatal visits (Kibaru et al., 2015).

Studies done on effect of health services providers have been mainly community studies involving community health workers. A study in Bangladesh showed that mothers who had home visits counseling on care of newborn and signs of illness had a better knowledge of danger signs than the control (Bhutta et al., 2005). In a different community study in India it was reported that in the intervention group that received a preventive package of interventions for essential newborn care that included information on birth preparedness, clean delivery and cord care, thermal care, breastfeeding promotion, and danger sign recognition by health care workers during the antenatal period, there was reduced neonatal mortalities (Kumar et al., 2008). In a different study in Ethiopia among mothers who had babies admitted in neonatal intensive care unit (NICU) mothers who received neonatal danger sign information during their stay at the unit were more likely to have good

knowledge of danger signs (Bayil et al., 2020). Therefore, the study's aim was to determine whether there was a change in level of knowledge on neonatal danger signs among mothers in the Nakuru County after the trainings and the mentorship.

Study Objectives

To determine the pre and post intervention maternal knowledge of neonatal danger signs among postnatal mothers attending well baby clinic.

To determine the influence of staff training and mentorship on maternal knowledge of neonatal danger signs.

Research Design and Methodology

Study Area

Nakuru County, Kenya has 11 sub-counties. The study was conducted in two sub-counties that encompass Nakuru City i.e. Nakuru East Sub-County and Nakuru West Sub-County. Nakuru City is one of the cosmopolitan regions and currently the fourth largest urban center in Kenya. The town is a cosmopolitan community with people from different tribes.

Methods

Eight hospitals were randomly selected from total facilities of 37 in Nakuru East and west sub-counties that provide antenatal care, delivery and postnatal care services. The facilities were selected to include government-owned, private and faith-based.

Sampling Procedure for Postnatal Mothers

Using Fischer's formula a sample size of 414 mothers was selected. Random sampling of every third mother that were attending the child welfare clinic with a baby aged one day to nine months were selected during each day of data collection. In the first phase of the study in 2014, baseline data was collected from 414 mothers to determine the knowledge gap on neonatal danger sign. Using the gaps identified, health care providers from the selected facilities were given five-day training on targeted postnatal care, and mentorship was provided to the study nurses for a period of one year. In 2015 after completion of mentorship visits data was collected from another group of mothers attending the child welfare clinics with babies aged from birth to 9 months of age.

Data Management

The processing of data involved office editing, coding of open-ended questions, data entry, and editing inconsistencies found by computer programs. Data was processed using the SPSS software (version 22) to identify gaps in the implementation of the focused postnatal care and neonatal care in the district.

Results

Social Demographic Characteristics of the Mothers Who Attended Child Welfare Clinic

In the analysis of the characteristics of the mothers interviewed, over 80% were aged between the ages of 18 and 35 and were married. Less than 5% of all the mothers had no basic education and over 30% of the mothers in both phases of study had attained secondary level of education.

Table 1. Socio-demographic characteristics of mothers attending well baby clinic at Nakuru County (N=414)

Characteristics	Pre-intervention N (%)	Post-intervention N (%)
Age of the mother		
Less than 18 yrs.	6 (1.4)	15 (3.6)
18-35yrs	360 (87.0)	341 (82.4)
36-45yrs	48 (11.6)	58 (14.0)
Marital status		
Single	47 (11.4)	57 (13.8)
Married	362 (87.4)	343 (82.9)
Divorced/separated	5 (1.2)	14 (3.4)
Level of Education		
None	21 (5.1)	10 (2.4)
Primary school	134 (32.4)	109 (26.3)
Secondary school	136 (33.9)	132 (31.9)
Middle level college	87 (21.0)	110 (26.6)
University	36 (8.7)	53 (12.8)

Mother and Child Booklet Availability and Utilization

In evaluating access and utilization of MCH booklet 252(60.9%) of mothers were explained the contents of the book by health care providers prior to intervention, but this increased to 356 (86%) after intervention. As per the interviewed mothers at the baseline 237(57.2%) were taught on neonatal postnatal danger signs and this improved to 364(87.9%) of mothers. After the intervention, more than 70% of mothers reported reading the instructions in the MCH booklet, a 5% increase from the baseline.

Table 2. MCH booklet availability and utilization for mothers attending MCH clinic at Nakuru County (N=414)

Attribute	Pre-intervention N (%)	Post-intervention N (%)
Mothers received explanation on content of MCH booklet from the care provider during ANC	*252 (60.9)*	*356 (86.0)*
Mother received information on given information on postnatal neonatal danger signs	*237(57.2)*	*364(87.9)*
Mothers who read all the instructions in the MCH booklet during ANC	*296 (71.5)*	*317 (76.6)*

Recognition of Neonatal Danger Signs

Hotness of the body (fever) was the commonly identified as a neonatal danger sign during the baseline and also after intervention with 310(74.9%) and 339(81.9%) of mothers respectively. Out of 414 mothers, 198(46.6%), 166(40.1%), and 46(11.1%) identified newborn danger signs as difficulty breathing, poor sucking, and convulsions, respectively at the pre intervention period, and this markedly improved after intervention with, increments to 331(80%), 326 (78.7%), and 114(27.5%)., respectively. Neonatal jaundice, was identified as a danger sign in 146(35.3%) of mothers prior to intervention and 217(52.4%) after intervention as shown in Figure 1.

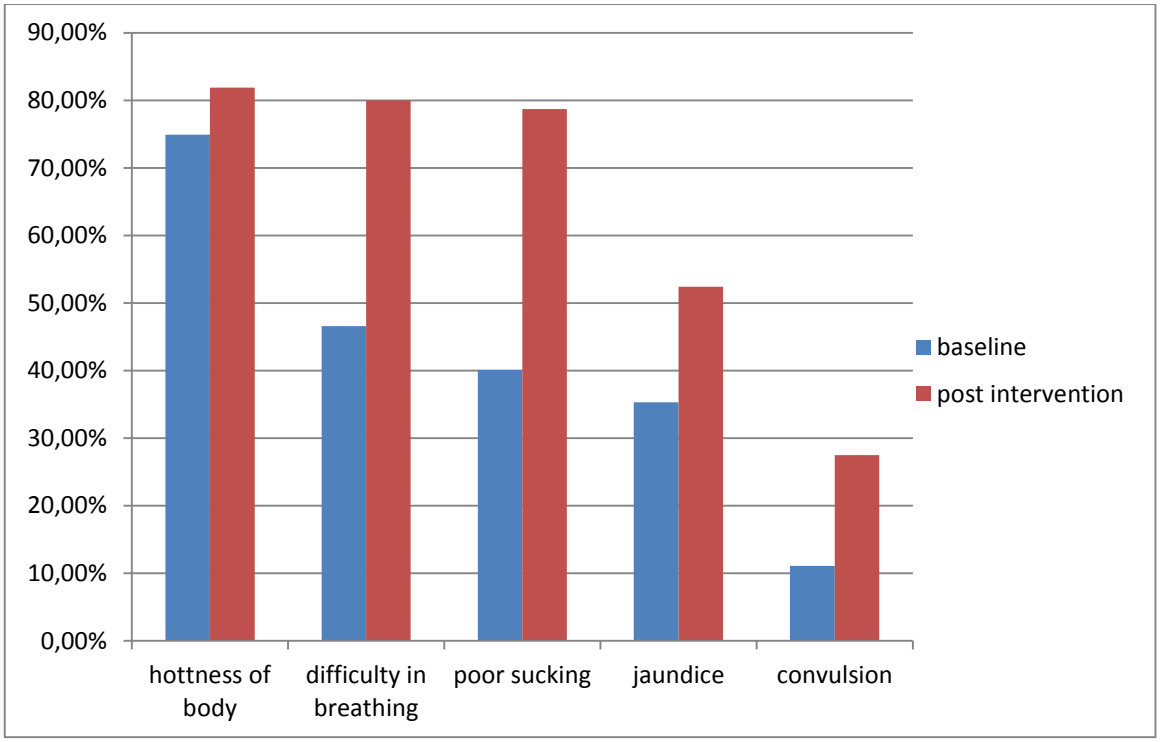

Figure 1: Knowledge of neonatal danger signs at baseline and after intervention among mothers attending MCH clinic in County (N=414)

Factors Associated with Maternal Knowledge of Specific Neonatal Danger Signs

Receiving information from healthcare providers and reading the booklet had a positive influence on maternal knowledge of inability to breastfeed as danger signs with P>000.Post intervention mother receiving information from nurses on PNC and maternal level of education had a positive influence on maternal knowledge p>0.005.

The mother's level of education, having read the MCH booklet, and getting explanation on content of MCH booklet from health care workers all had a positive influence on maternal knowledge of hotness of the body as neonatal danger sign in both the pre intervention and post intervention phases, which was statistically significant with a P Value less than 0.05.

Maternal Knowledge Scores of Neonatal Danger Signs

Knowledge was assessed as per the total number of WHO listed neonatal danger signs mothers were able to identify during the interview. It was classified as good knowledge if one scored more than three danger signs and poor knowledge for a score of less than 3. During the initial phase of the study most mothers could only identify less than three danger signs 341(82.4%) and less than 20% of the mothers had good knowledge of danger signs having been able to identify more than three of nine neonatal danger signs 63(15.2%). These percentages markedly increased to 209 (50.5%) for less than 3 and 203(49%) were able to identify more than 3 danger signs as shown in Figure 2.

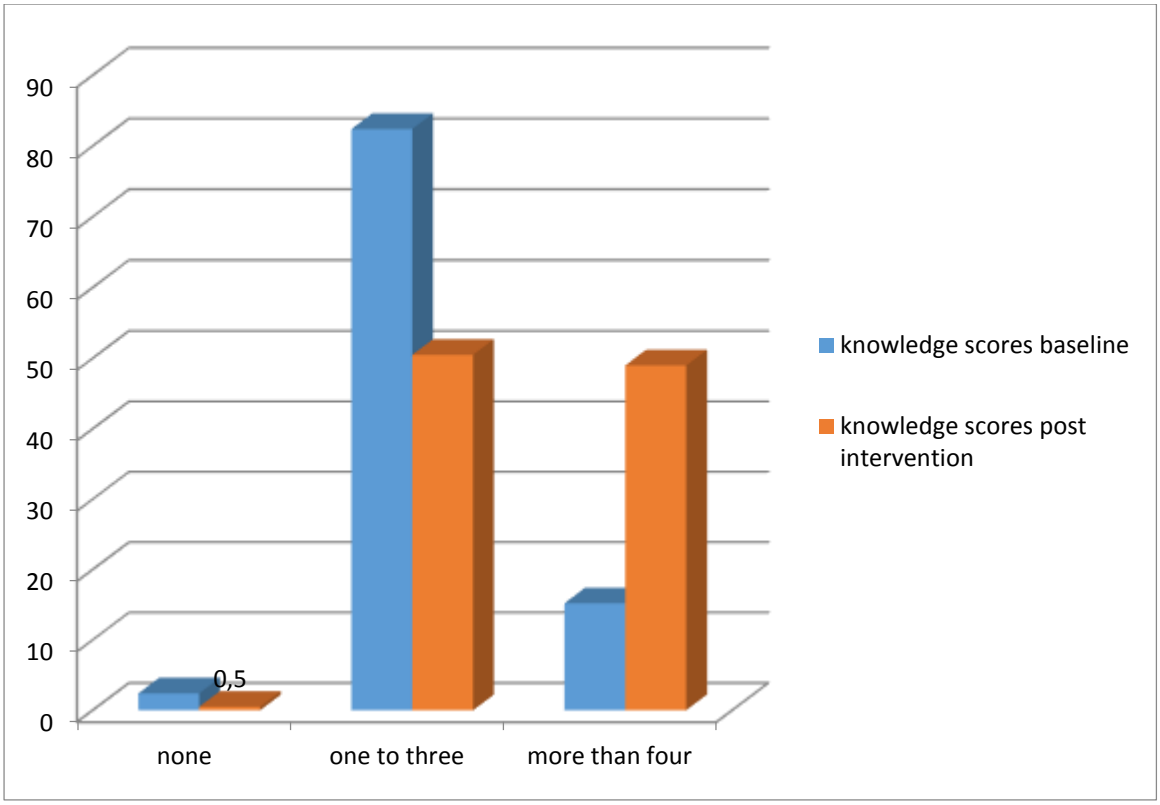

Figure 2: Maternal knowledge scores of neonatal danger signs at baseline and after intervention among mothers attending MCH clinic in County (N=414)

Mothers who had a higher level of education and had received information from health care workers on new born danger signs had a better knowledge scores p>0.003 and p>0.046 before and after intervention respectively. Mothers reading the MCH booklet were associated with good knowledge scores in the period before the intervention.

Discussion

Neonatal mortality and morbidity remain a big challenge in low and middle income countries. These are also the areas with inadequate number of health care workers and less neonatal monitoring equipments and therefore all efforts need to be applied in order to reduce the high neonatal mortality. Mothers have been identified to play a very important vital role and recognizing sick babies. There is need to empower mothers with knowledge on simple clinical features that signify severe illness in the neonates.

The Kenyan government has applied a lot of effort to ensure the appropriate information has been passed on to the mothers by developing a comprehensive mother and baby booklet that provide essential information in pictorial manner on newborn danger signs. Seven danger signs included in the MCH booklet are inability to breastfeed, hotness of the body or unusually cold baby, difficulty in breathing or rapid breathing, yellowness of the body especially in the eyes palms and soles and inactive baby. This study demonstrated that the five day in service training to nurses followed by one year of mentorship by the study nurses greatly influenced the information that was imparted to the mothers during the antenatal and the immediate postnatal period. The national orientation package for targeted postnatal care training manuals for health care workers is an important document that was developed by the government of Kenya in 2011. These manuals contain important information that can be imparted to the mothers during the antenatal care by the health care workers but there seems to have been inadequate dissemination of the guidelines or lack of

frequent retraining of the staff. Nyamtema et al. (2011) in have demonstrated in their study that there is need to building the capacity of health-care providers to ensure they have the necessary skills, knowledge and competencies to manage obstetric and newborn complications through in-service or on-the-job training. Utz et al. (2013) in their study found that regular in-service training and reorientation is recommended and is in some cases mandatory, to ensure health-care providers can continue to be accredited by their respective professional associations. Cheptum et al. (2016) in the Kenya noted that a single training health care workers in basic emergency obstetric care was inadequate and they concluded that for the maintenance of skills frequent skills-based trainings should be performed.

The frequently identified danger sign in the study in the pre and post intervention was hotness of body at 74.9% and 81.9% respectively. Jaundice was only identified in the 35.5 and this improved post intervention to 52.4%. In comparison to a study in Saudi Arabia where jaundice was the most commonly identified danger sign at 48%. This could be the fact that in this different environment sepsis may not be a big problem compared to this country. Knowledge scores on danger signs by different countries before intervention are generally low with our study reporting 15.2 % of the mothers were able to identify more than 3 of the nine neonatal danger signs and this improved significantly to 49%.At the baseline Nigeria had a higher percentage at 30.3% and Saudi Arabia at 37%. The differences in the knowledge scores could be attributed to the health care workers explaining to mothers in both antenatal and postnatal clinic about the neonatal danger signs as the educational levels the study population in Kenya and in Nigeria were almost similar to our study population but was much lower in the Saudi Arabia study population (Ekwochi, 2015; Abu-Shaheen, 2019).

Inadequate utilization of the MCH booklet by both the health care provider and the mothers has been identified as a barrier to impacting knowledge during the antenatal and post natal clinics (Kibaru, 2015). The findings of these study showed that almost all mothers were given the booklet in both the pre and post intervention period and majority reporting that they read the books most of them had inadequate knowledge at 15.2% of mothers would identify more than 3 dangers signs during the pre-intervention phase and these improved greatly to 49% after the various interventions were applied. The mothers who had read the booklets were noted to have better knowledge scores.

The role of health care provider imparting knowledge has been noted to have a great influence on maternal knowledge.in these study mothers who were explained the content of the MCH booklet and were taught on the newborn danger signs by the health care workers were likely to have better knowledge scores and these numbers increased markedly post intervention and the improvement was statistically significant. In a study by Bulto et al. (2019) in Ethiopia showed that receiving counseling on newborn care after delivery was associated with having good knowledge on neonatal danger signs. Other studies have in Bangladesh has also shown the significant role that the care provider plays in improving knowledge (Bhutta et al., 2005).

Conclusion

Improving health care knowledge and skills on targeted postnatal care and mentorship of health care providers in the respective health facilities had a positive impact on maternal knowledge of postnatal neonatal danger signs.

Recommendation

It is important to emphasize the role of antenatal health care workers in educating mothers about various reproductive health issues that may occur during the postnatal period. It is essential to provide health-care staff with training on targeted postnatal care with a focus on the value of using the MCH booklet and explaining its contents to ANC and PNC mothers.

Special emphasize should be applied on postnatal neonatal danger signs, among other information, and these should be provided to all mothers attending antenatal clinic. Mentorship programs to improve health care access and quality in the study facilities should be expanded and implemented in other facilities.

Ethics Approval and Consent to Participate

Ethical approval for the research was sought from the Egerton University Ethics Research Committee and National Council for Science and Technology. Signed consent was acquired from all participants. The questionnaires to consenting individuals with full disclosure of the study purpose and confidentiality of all information obtained. There was no coercion or enticement to participate in the study.

Competing Interests

The authors declare that they have no competing interests.

Funding

GSK Trust in Science Africa financed this study.

Authors' Contribution

E.G.K and A.M.O conceptualized the study and wrote the proposal, supervised data collection, entry, analysis and writing of the manuscript. E.G.K and A.M.O supervised the work and advised frequently during the study.

Acknowledgement

We appreciate the administration and staff of the respective health facilities for their support and assistance in provision of medical records, GSK Trust in Science Africa for financing this study and the Egerton University Division of Research and Extension for their continued support.

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