

Knowledge, Attitudes and Practices of Postnatal Mothers on Ophthalmia Neonatorum in the Central Region, Ghana

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ABSTRACT: Health education is key in the prevention of Ophthalmia Neonatorum (ON). However, health education in relation to eye care in Ghana is very low. To determine the knowledge, attitudes and practices (KAPs) of mothers on Ophthalmia Neonatorum (eye infection in newborns), a descriptive cross-sectional design was adopted, using a standardised interviewer-administered questionnaire to collect data. Using a consecutive sampling technique, we enrolled 407 mothers to participate in the study. The overall KAPs of the study participants were assessed using the sum score of each outcome based on Bloom's cut-off point. Completed data was then analysed using descriptive statistics with SPSS version 22.0 at the level of $P < .05$. Out of the 407 participants, 321 (78.9%) had not heard about Ophthalmia Neonatorum with nearly 93% having low levels of knowledge on the neonatal infection. We found a significant association between formal education ($P = .001$), skilled occupation ($P = .008$) and a high level of knowledge on Ophthalmia Neonatorum. The study highlights the need to find improved and alternative methods of educating mothers on Ophthalmia Neonatorum in the bid to reduce blindness attributed to the condition.

KEYWORDS: Knowledge, attitudes, practices, neonatal conjunctivitis, ophthalmia neonatorum, newborn care education

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Introduction

It is estimated that there are 1.5 million blind children in the world of which 20% live in Africa.¹ The major causes of blindness in children vary from region to region and are largely dependent on socioeconomic development, especially the availability of primary health care and eye care services.² In many parts of the developing world, poor practitioner-to-patient ratio, inadequate facilities, absence of eye care personnel and lack of educational programmes result in many childhood ocular disorders being unattended.³ Considering the West African countries, corneal scarring, vitamin A deficiency, Neonatal Conjunctivitis (Ophthalmia Neonatorum) and the use of harmful traditional eye remedies are the major causes of avoidable childhood blindness.⁴ Surveys conducted in the southern and northern parts of Ghana reported that children 15 years and below with impaired vision had it during their neonatal period and Ophthalmia Neonatorum has been identified as a major indirect cause.^{5,6} Other studies have shown that ON accounts for 2% to 3% of cases that cause corneal scarring leading to blindness.⁴ In addition, preventive measures for Ophthalmia Neonatorum include health education, antenatal care and prophylaxis in newborn. Unfortunately, health education in relation to eye care is very low in Ghana.⁴ Traditional medical practices by primary caregivers and mothers such as the application of breast milk to treat eye infections are still common.⁷ These practices have been shown to be ineffective in treating neonatal conjunctivitis.^{7,8} Several studies have also investigated mother's knowledge on newborn care practices which encompass breastfeeding, cord care, eye care, thermoregulation,

immunisation and care of the low birth weight infant.⁹⁻¹¹ However, in these studies, emphasis was placed on all the components of the essential newborn care practice guidelines by WHO with the exception of eye care. Similarly, a work on maternal knowledge of childhood blindness in Ghana did not provide the level of knowledge of Ophthalmia Neonatorum although it is one of the major contributing factors of childhood blindness.¹⁰ Mothers are known to be the closest persons to neonates and that gives them the chance to identify any visible signs in the baby's eye health. Equipping these mothers with better knowledge about Ophthalmia Neonatorum will aid them in making good decisions to seek appropriate healthcare services.¹² However, the knowledge, attitudes and practices of mothers about Ophthalmia Neonatorum has not been fully explored in Ghana. This study was therefore conducted to assess the various aspects of the mother's KAPs towards Ophthalmia Neonatorum.

Materials and Methods

Study design and study population

A cross-sectional survey on KAPs of mothers regarding Ophthalmia Neonatorum in the Central region of Ghana was conducted from January to June, 2018. The Central region was randomly selected from the 10 administrative regions of Ghana. The region, which houses the former administrative capital of Ghana, Cape Coast, is predominantly inhabited by farmers who are mostly into fish and crop farming. The region has some of the best educational institutions as well as tourist sites in Ghana, however, according to the 2010 Population and



Housing census data, a quarter of the population in the region are not literate. The inhabitants of the region depict what pertains in the other regions of Ghana. The study population consisted of postnatal mothers from 5 health facilities in the Central region namely; University of Cape Coast Hospital, Cape Coast Metropolitan Hospital, Mercy Women Clinic in Mankessim, Ewim Polyclinic in Cape Coast and Our Lady of Grace Hospital in Bremang Esikuma. These facilities were chosen because they provide both maternal and eye health services and are well patronised by most mothers in the Central Region. These facilities also serve a large number of people who are referred from nearby villages and towns.

Sample size and sampling methods

The sample size for the study was determined by using the Cochran's formula,¹³ $n = Z^2pq/e^2$ where, n = sample size, $Z = 1.96$ at 95% confidence level, $P = .5$ (estimated proportion of postnatal mothers with characteristics being measured), $q = 0.5 (1-P)$, $e = .05$ (margin of error). Hence, the minimum sample size calculated was 384. This was adjusted to 410 mothers to compensate for attrition rate. Study participants were consecutively sampled and based on the eligibility criteria, were enrolled into the study until the required sample size was achieved. Mothers who had babies 6 months of age and above were excluded from the study.

Data collection procedure and tools

A structured pretested interviewer-administered questionnaire, which comprised of 39 items (8 socio-demographic, 6 newborn care practices, 13 knowledge, 7 attitude and 5 practice questions) was used for data collection. The questionnaire was administered to the mothers by trained interviewers who read out the questions and filled in the mother's responses. The questionnaire was developed after literature review^{2,4,9,10,14,15} and validated by conducting a pilot study on 5% of the sample before the actual data collection period. It was also reviewed by 2 Ophthalmologists, 1 Gynecologist and 2 Optometrists to evaluate if relevant questionnaires were being asked. The scores for KAPs were transformed into percentage scores by dividing the scores obtained by each participant with the possible maximum scores and multiplied by 100. The sum score of each outcome was assessed based on Bloom's cut-off point.¹⁶ Having a score above the cut-off point was equated with having high levels of knowledge, positive attitude and good practice.

Participants' knowledge about Ophthalmia Neonatorum (which was translated to the local language as eye infection in new born babies usually manifesting as discharge) was assessed using 13 questions that consisted of general knowledge about Ophthalmia Neonatorum and the use of prophylaxis for neonates. Each correctly chosen answer had a value of 1, and each wrongly chosen and 'don't know response' had a value of zero. Hence, the aggregate score for all 13 knowledge questions ranged from 0 to 13 points. Participants' overall knowledge was categorised using Bloom's cut-off point, as high if the score was between

80% and 100% (10-13 points), moderate if the score was between 60% and 79% (7-9 points), and poor if the score was less than 60% (<7 points). Mothers were considered as having good knowledge about Ophthalmia Neonatorum when they:

- (1) Knew at least 3 out of 5 signs that shows a baby has an eye infection.
- (2) Knew at least 3 out of 5 of the conditions that could bring about such signs in the eye.
- (3) Had heard of Ophthalmia Neonatorum before and know what it is.
- (4) Know at least 3 out of the 5 risk factors of Ophthalmia Neonatorum, 3 ways of managing Ophthalmia Neonatorum and 2 ways of preventing the condition.
- (5) Were aware of the prophylaxis used and its side effects.
- (6) Could mention the name of the prophylaxis and some of the side effects.
- (7) Knew if the baby was given any prophylaxis.

These criteria were consistent with that used by Kumah et al.¹⁰

Similarly, attitude towards Ophthalmia Neonatorum was assessed using 7 questions. Responses to questions related to attitude were graded on a 5-point Likert scale, an agreement scale ranging from '1' for strongly disagree to '5' for strongly agree. The overall level of attitude was categorised using Bloom's cut-off point, as positive if the score was 80% to 100% (28-35 points), moderate if the score was 60% to 79% (21-27 points) and negative if the score was less than 60% (<21 points). Subsequently, level of practice was classified into good level (80%-100%), fair level (60%-79%) and poor level (less than 60%). The responses for the open-ended questions were summarised and analysed according to the main themes.

Data analysis

The collected data was cleaned and checked for completeness before analysis. Statistical analysis was done using the SPSS version 22.0.¹⁷ Whereas, frequency, percentage, mean and standard deviation were used for descriptive analysis, categorical analysis was done using Chi square tests to describe the association between variables with $P < .05$ considered statistically significant for comparison.

Ethical consideration

Ethical clearance was obtained from the Institutional Review Board of the University of Cape Coast with identification number UCCIRB/CHAS/2017/08. All participants provided written informed consent prior to enrolment in the study. They were informed of the purpose of the study in their local language and only those who consented were included in the study.

Results

Of the 410 participants who were enrolled, 407 completed the study given a participation rate of 99.3%. Out of the

407 mothers interviewed, 303 (74.4%) were married and 76 were single parents (18.7%). The mean age of the participants was 28.55 (± 6.11) years. Unemployed women accounted for 88 (26.1%) of those interviewed as shown in

Table 1. Sociodemographic factors of postnatal mothers.

CHARACTERISTICS (N = 407)	N (%)
Mothers age	
15-24	100 (24.6)
25-34	235 (57.7)
35-44	72 (17.7)
Marital status	
Single	76 (18.7)
Married	303 (74.4)
Divorced	1 (0.2)
Co-habiting	27 (6.6)
Employment status	
Unemployed	88 (21.6)
Skilled manual	175 (43.0)
Unskilled manual	34 (8.4)
Small scale business	110 (27.0)
Educational level	
No formal education	26 (6.4)
Primary	34 (8.4)
Secondary	240 (59.0)
Tertiary/vocational	107 (26.3)
Religion	
Catholic	59 (14.5)
Pentecostal/charismatic	202 (49.6)
Protestant	105 (25.8)
Islam	24 (5.9)
Traditionalist	12 (2.9)
Adventist	4 (1.0)
Atheist	1 (0.2)
Ethnicity	
Akan	354 (87.0)
Ewe	28 (6.9)
Ga-Adangbe	3 (0.7)
Northern tribes	18 (4.4)
Others	4 (1.0)
Address	
Urban	242 (59.6)
Rural	164 (40.3)

Table 1. Mothers in skilled manual work accounted for 78 (19.2%) of those employed while 110 (27.0%) were into small scale businesses. The proportion of women who had received basic education was high with only 107 (26.3%) having received tertiary education. More than half of the respondents were living in urban areas (242, 54.3%) (Table 1).

More mothers were given new born care education during the antenatal period (363, 89.2%) as compared to the postnatal period (307, 75.4%). In total, 388 mothers received education during both periods as indicated in Table 2. Twenty-five mothers out of the 388 did not receive any new born care education during the antenatal period. In addition, about 80% of the mothers who had no education during the post-natal period benefitted from antenatal new born care education. Table 2 shows that nurses/midwives provided most of the new born care education to mothers in both periods. Among the participants, (204, 50.1%) received ocular health education during the antenatal period as compared to (148, 36.4%) in the post-natal period. Only 128 mothers received ocular

Table 2. Education on the WHO essential newborn care at antenatal and postnatal periods.

CHARACTERISTICS (N = 407)	N (%)	
	DURING PREGNANCY	AFTER PREGNANCY
Mothers education on new born care		
Yes	363 (89.2)	307 (75.4)
No	44 (10.8)	100 (27.8)
Type of information provided		
Breastfeeding	341 (15.8)	294 (17.3)
Cord care	303 (14.0)	246 (14.5)
Eye care	204 (9.4)	148 (8.7)
Immunisation	264 (12.2)	222 (13.1)
Danger signs in new born	204 (9.4)	142 (8.4)
Care of low birth weight	177 (8.2)	123 (7.3)
Keeping good mother and baby hygiene	332 (15.3)	259 (15.3)
Good eating habit	339 (15.7)	262 (15.4)
Provider of the information		
Doctor	9 (2.0)	12 (3.2)
Nurses/midwife	353 (77.4)	302 (81.0)
Family	41 (9.0)	31 (8.3)
Media (eg, pamphlets, brochures, magazine, internet)	42 (9.2)	22 (5.9)
Peers/friends	11 (2.4)	6 (1.6)

Mothers could give more than 1 response.

Table 3. Knowledge on ophthalmia neonatorum.

KNOWLEDGE	N (%)
Are you aware of any signs that would make you know your baby has an eye infection? ^a	
Eye discharge	325 (30.1)
Reddening of eyes	241 (22.3)
Swollen eye	173 (16.0)
Itching/scratching	178 (16.5)
Pseudo membrane	55 (5.1)
Corneal ulcer	65 (6.0)
I do not know	44 (4.1)
Do you know of any eye disease that can bring about the above-mentioned signs? ^a	
Conjunctivitis	130 (32.7)
Corneal ulcer	11 (2.8)
Squint	12 (3.0)
Congenital cataract	13 (3.3)
Congenital glaucoma	13 (3.3)
Retinoblastoma/eye cancer	7 (1.8)
I do not know	212 (53.3)
Do you know about ophthalmia neonatorum/conjunctivitis of newborns?	
Yes	91 (22.4)
No	316 (77.6)
If yes, what is ophthalmia neonatorum/conjunctivitis of newborns?	
An eye infection that affects babies	59 (64.8)
An eye infection that affects babies in the first month	18 (19.8)
An eye infection that affects babies after 1 month of birth	1 (1.1)
I do not know	13 (14.3)
What are some of the risk factors of ophthalmia neonatorum? ^a	
Low birth weight	8 (5.3)
Improper breast feeding	12 (7.9)
Vaginal discharge	48 (31.8)
Prolonged labour	23 (15.2)
Premature rupture of membrane	19 (12.6)
Unsterile hands of birth attendants	16 (10.6)
I do not know	25 (16.6)
What are some of the things that can be done to manage ophthalmia neonatorum/conjunctivitis of newborn? ^a	
Clean eyes, topical (eye) and systemic antibiotics	26 (20.5)
Clean and give eye medication	25 (19.7)
Vitamin A	12 (9.4)

(Continued)

Table 3. (Continued)

KNOWLEDGE	N (%)
Eye drops/ointments only	22 (17.3)
Systemic antibiotics	4 (3.1)
Topical (eye) and systemic antibiotics	13 (10.2)
I do not know	25 (19.7)
What should be done to prevent ophthalmia neonatorum/conjunctivitis of newborns? ^a	
Cleaning eyes after birth	42 (25.6)
Application of tetracycline eye ointment to newborn	33 (20.1)
Good management of labour	40 (24.4)
Prompt treatment of infections in antenatal mothers	49 (29.9)
Are you aware of any medication used on the baby's eyes when delivered?	
Yes	66 (72.5)
No	25 (27.5)
Medication used on babies eyes after delivery	
Gentamicin	3 (4.5)
Tetracycline drops	3 (4.5)
Tetracycline ointment	14 (21.2)
Chloramphenicol	1 (1.5)
I do not know	45 (68.2)
Are you aware of any side effects of the medication put on the baby's eyes?	
Yes	11 (12.1)
No	80 (87.9)
Side effects of medication used after delivery	
Yellowing of the skin and teeth	5 (45.5)
Yellowing of the skin and teeth, eye stinging	4 (36.4)
Yellowing of the skin and teeth, eye stinging, eye redness	2 (18.2)
Was your child given any eye medication for preventing conjunctivitis of newborn?	
Yes	68 (74.7)
No	22 (24.2)
Not sure	1 (1.1)
Name of medication administered after delivery	
Gentamicin	2 (2.9)
Benzyl penicillin	1 (1.4)
Tetracycline drops	2 (2.9)
Tetracycline ointment	16 (23.2)
Chloramphenicol	1 (1.4)
I do not know	47 (68.1)

^aMothers could give more than 1 response.

health education during both antenatal and post-natal periods. Out of the 407 mothers interviewed, only 91 (22.4%) of them had heard about the condition while only 18 (19.8%) of these mothers could correctly define Ophthalmia Neonatorum (Table 3).

Among the participants studied, only 10 (2.5%) had high levels of knowledge on Ophthalmia Neonatorum while the majority, 381 (92.6%) had poor knowledge. Less than half (100, 24.6%) of the participants had positive attitude towards Ophthalmia Neonatorum as indicated in Table 4.

Table 4. Associations of knowledge and attitudes among postnatal mothers.

CHARACTERISTICS (N = 407)	FREQUENCY	P-VALUE
Knowledge		
High level	10 (2.5)	<.001
Moderate level	16 (3.9)	
Low level	381 (93.6)	
Attitude		
Positive	100 (24.6)	<.001
Neutral	283 (69.5)	
Negative	24 (5.9)	

Table 5 shows the various attitudes of mothers towards Ophthalmia Neonatorum. One hundred and fifty-two (37.3%) mothers strongly agreed to the treatment of Ophthalmia Neonatorum using both clinical and laboratory findings. Few of them, 43 (10.6%) neither agreed nor disagreed (neutral) on the use of topical eye ointment for the neonates. Of the 407 mothers, 311 (76.4%) indicated their readiness to report to the hospital should they notice any eye discharge, redness, or swollen eyelids. Again, out of the total number of participants, 103 (25.3%) indicated that they would use breast milk for treatment of eye infections in babies. The same percentage of mothers would use antibiotic eye ointment for the treatment of eye infections in babies. Mothers who were willing to use both breastmilk and antibiotic eye ointment were 11 (2.7%) out of the 103 (Table 6).

Association between socio-demographic characteristics with levels of knowledge on Ophthalmia Neonatorum showed no statistical difference between mother's age, marital status, religion, ethnicity, location of residence and levels of knowledge on Ophthalmia Neonatorum. There was however, a statistically significance difference between occupation ($P = .008$) and level of education ($P = .001$) and Ophthalmia Neonatorum. Majority of the participants who were in skilled manual work had low level of knowledge. Furthermore, those who have had tertiary education showed a high level of knowledge on neonatal infection (Table 7).

Table 5. Attitudes towards ophthalmia neonatorum.

ATTITUDES	N (%)				
	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE
Information on ophthalmia neonatorum/conjunctivitis of newborns should be provided during both the pre- and post-natal periods	224 (55.0)	178 (43.7)	3 (0.7)	2 (0.5)	0 (0.0)
All mothers together with the fathers should be screened and treated for STIs before delivery	190 (46.7)	201 (49.4)	11 (2.7)	5 (1.2)	0 (0.0)
Topical eye ointment should be applied on the baby's eye only when there is an infection	91 (22.4)	125 (30.7)	43 (10.6)	118 (29.0)	30 (7.4)
Substances (aside from those prescribed by a doctor such as breast milk) can be applied to the baby's eye if you notice discharge, reddening or swelling	59 (14.5)	127 (31.2)	39 (9.6)	139 (34.2)	43 (10.6)
Treatment of ophthalmia neonatorum/conjunctivitis of newborns should be based on both clinical and laboratory findings	152 (37.3)	200 (49.1)	36 (8.8)	19 (4.7)	0 (0.0)
Baby's delivered to mothers with vaginal infection and those without vaginal infections have the same risk of getting ophthalmia neonatorum/conjunctivitis of newborns	78 (19.2)	127 (31.2)	74 (18.2)	109 (26.8)	19 (4.7)
I would not allow any eye ointment to be put on my baby's eyes if I am made aware	49 (12.0)	46 (11.3)	26 (6.4)	242 (59.5)	44 (10.8)

Table 6. Practices on ophthalmia neonatorum.

PRACTICES	N (%)
Which of the following will you report to when you notice any eye discharge, redness or swelling in your baby's eye during the first month?	
General hospital	311 (76.4)
Eye clinic	93 (22.9)
Pharmacy	2 (0.5)
Others	1 (0.2)
What will you use on your baby's eyes when you notice any eye discharges, redness or swelling during the first month? ^a	
Breast milk	103 (24.7)
Kohl	8 (1.9)
Saliva	2 (0.5)
Antibiotic eye ointment	103 (24.7)
Sea water	2 (0.5)
Nothing	199 (47.97)
Have you ever used any of the options in question (2) above to treat any eye discharges, redness or swelling in the first month?	
Yes	83 (20.4)
No	324 (79.6)
If yes, which one of them did you use? ^a	
Breast milk	62 (73.8)
Kohl	4 (4.8)
Saliva	3 (3.6)
Antibiotic eye ointment	15 (17.9)
Why did you use the option you chose in question (3) above?	
Best option in treating eye infections	16 (19.3)
Recommended by their mothers	7 (8.4)
To treat eye discharges, redness and itching	49 (59.0)
Others	11 (13.3)

Others include: itching/rubbing-5, First aid-3, remove foreign body-2 and treat yellow eyes-1.

^aMothers could give more than 1 response.

Discussion

Ophthalmia Neonatorum (ON) is an ocular infection that occurs immediately after birth when the newborn is still at the hospital or after leaving the hospital within the first month.¹⁸⁻²⁰ Despite the use of prophylaxis, it is the most common ocular infection in neonates' worldwide.²¹ This study aimed to determine the knowledge, attitudes and practices on Ophthalmia Neonatorum among postnatal mothers in the Central region of Ghana. The age distribution was mostly in the youthful and adulthood (15-44 years) which was an expected finding as it reflected the age range of female fertility. In this study, approximately 93.0% of the participants had low levels of knowledge on Ophthalmia Neonatorum as

per the Bloom's cut-off points which was comparatively high as compared to a study by Kumah et al.¹⁰ Although the study reported an overall knowledge of 76.0% on childhood blindness as a whole, only 20.0% of the participants were knowledgeable about Ophthalmia Neonatorum. This hospital-based cross-sectional study also reported a lower percentage of mothers who could identify 'retinopathy of prematurity' (18%) and 'hereditary retinal dystrophies' (10%) as causes of childhood blindness. The reason assigned to the low percentages were that these causes are less prevalent in Ghana, hence less education is likely to be given on them during pregnancy care and in the mass media. However, the authors could not explain why only 20% could identify Ophthalmia Neonatorum as a major cause of childhood blindness.

About 50.1% of the participants in the current study reported having adequate antenatal education on eye care compared to a lesser number during postnatal visits (36.4%). Although there are available human resources for such health education in both periods, we observed that mothers attached more importance to the attendance of antenatal clinics than post-natal and also partly due to a more flexible and much spaced scheduling during the postnatal period. This brings to the fore, the need to intensify the education on eye health during the antenatal period while re-strategising to adopt new measures to intensify postnatal clinic education of mothers on general eye health.¹⁰ It may also be ideal for sections of such health promotions programmes to be specific on key potential childhood blinding conditions to help achieve the desired effect as compared to what will be achieved when the discussion is generalised. It is expected that mothers with high knowledge of Ophthalmia Neonatorum would make good decisions in seeking appropriate healthcare services since they are the closest persons to neonates and can easily identify changes in the neonate's eye health.¹² It was observed that the maternal and child health record book given to mothers on their first antenatal visit at the selected facilities contained pictorial information on signs of serious illness in babies which made mention of yellowing of skin or eyes (Neonatal Jaundice). We recommend the addition of pictures on Neonatal Conjunctivitis to make education on this condition more meaningful to the mothers.

Again, nurses and midwives were reported as the main sources of information at both the antenatal (353, 86.7%) and post-natal clinics (302, 74.2%) similar to what was reported by a previous study.¹⁰ Although education to mothers by midwives has proven to improve mother's knowledge,²² overall knowledge on ON was poor (92.6%) among the study participants in this current study. Given that midwives in the Bosomtwe district of Ghana are reported to have good knowledge on Ophthalmia Neonatorum,²³ it may be ideal to re-examine the methods of conveying information on Ophthalmia Neonatorum to mothers in this study particularly during the antenatal periods. For example, in addition to the child record book which

Table 7. Associations between socio demographic factors of postnatal mothers and levels of knowledge.

CHARACTERISTICS (N = 407)	HIGH LEVEL	MODERATE LEVEL	LOW LEVEL	P-VALUE
Mothers age				
15-24	1 (10.0)	1 (6.3)	98 (25.7)	<.248
25-34	8 (80.0)	12 (75.0)	215 (56.4)	
35-44	1 (10.0)	3 (18.8)	68 (17.8)	
Marital status				
Married	0 (0.0)	3 (18.8)	73 (19.2)	<.734
Single	10 (100.0)	12 (75.0)	281 (73.8)	
Divorced	0 (0.0)	0 (0.0)	1 (0.3)	
Co-habiting	0 (0.0)	1 (6.3)	26 (6.8)	
Mothers occupation				
Unemployed	1 (10.0)	2 (12.5)	84 (22.3)	<.008
Skilled manual	9 (90.0)	12 (75.0)	154 (40.4)	
Unskilled manual	0 (0.0)	0 (0.0)	34 (8.9)	
Small scale business	0 (0.0)	2 (12.5)	108 (28.3)	
Mothers level of education				
No formal education	0 (0.0)	0 (0.0)	26 (6.8)	<.001
Primary	0 (0.0)	0 (0.0)	34 (8.9)	
Secondary	0 (0.0)	7 (43.8)	233 (61.2)	
Tertiary/vocational	10 (100.0)	9 (56.3)	88 (23.1)	
Religion				
Catholic	4 (40.0)	4 (25.0)	51 (13.4)	<.131
Pentecostal/charismatic	3 (30.0)	12 (75.0)	187 (49.1)	
Protestant	2 (20.0)	0 (0.0)	104 (27.9)	
Islam	0 (0.0)	0 (0.0)	24 (6.3)	
Adventist	1 (10.0)	0 (0.0)	11 (2.9)	
Atheist	0 (0.0)	0 (0.0)	4 (1.0)	
Ethnicity				
Akan	8 (80.0)	12 (87.0)	334 (87.7)	<.478
Ewe	2 (20.0)	3 (6.6)	23 (6.0)	
Northern	0 (0.0)	0 (0.8)	3 (0.8)	
Guan	0 (0.0)	1 (4.5)	17 (4.5)	
Others	0 (0.0)	0 (1.1)	4 (1.0)	
Residential address				
Urban	10 (100.0)	15 (93.8)	289 (75.9)	<.054
Rural	0 (0.0)	1 (6.3)	92 (24.1)	

has some information on the health of the child, informative pamphlets with visual aids could be designed with all relevant eye conditions as well as others to serve as a reminder to mothers in caring for their babies. This is particularly needed since information retention during pregnancy and in the antenatal period may be compromised due to the stresses and pressures of pregnancy, childbirth and recovery. Another strategy worth considering is the introduction of educative sessions for both boys and girls in schools which could help improve the health of infants in the future. Since the retention of information by younger minds are better, such interventions would prepare young people for becoming parents later in life and this could also aid with young siblings at home and infants in the community. However, a study in Kenya¹³ reported that poor knowledge of health workers in making accurate diagnosis of Ophthalmia Neonatorum could be a major cause of the low level of mother's knowledge on Ophthalmia Neonatorum. It is therefore possible that the results in the current study is a reflection of the low level of knowledge on the part of the midwives which was not the focus of this study or the low retention of participants in this study.

Majority of the participants 321 (78.9%) in this present study had not heard of Ophthalmia Neonatorum although the term was explained in the local language. Interestingly, most of the mothers confused neonatal jaundice with neonatal conjunctivitis. A result which is consistent with the findings of Rodrigo and Cooray²⁴ who also indicated that nearly two-thirds of the mothers interviewed in their study had information on neonatal jaundice from the antenatal clinics and confused it with neonatal conjunctivitis. The finding in this current study is attributable to emphasis placed on neonatal jaundice by midwives which is considered more severe than neonatal conjunctivitis. The emphasis on neonatal jaundice is not out of place, however, it may be equally important to distinguish it from Ophthalmia Neonatorum and also educate mothers on the infection to avoid having healthy babies who are at risk of blindness which may not be timeously detected.

With regard to maternal attitudes, nearly three-fourth (69.5%) had a favourable attitude towards Ophthalmia Neonatorum, compared to their knowledge as more than half of the mothers (59.5%) were willing to allow for the use of prophylaxis on their babies. Furthermore, a significant proportion of mothers (224, 55.0%) were of the view that information should be provided at both pre- and post-natal periods. This result indicates the readiness of mothers to cooperate with health workers to prevent the occurrence of Ophthalmia Neonatorum provided they are given the necessary guidance and education. The burden is therefore on health care providers to find innovative ways of delivering information to mothers to enable them identify signs and symptoms which could pose danger to the visual status of their babies.

Assessment of respondents' practices on Ophthalmia Neonatorum was generally unsatisfactory which is in contrast

to a study by Meseka et al.²⁵ The study showed that some mothers 103 (25.3%) were still using breast milk to treat eye infections, a practice consistent with the findings from Ebeigbe and Osaiyuwu.⁷ Even though the use of breast milk is not a recommended best practice, it continues to appeal to mothers since it is enshrined in traditional beliefs as well as indigenous knowledge of healthcare. More efforts are therefore needed by healthcare practitioners to educate mothers against such practices which may be harmful to the eye. It is recommended that future studies will follow up on such practices to ascertain the efficacy of such treatment option chosen by mothers. In contrast to a study conducted in the Kenyatta National Hospital,⁹ which reported that a small proportion of mothers (6.6%) believed that substances aside those prescribed by medical personnel can be applied to an infected eye, approximately one-third of mothers 127 (31.2%) in this current study were amenable to the use of other substances not prescribed by qualified professionals. It is important to state that the study in the Kenyan National Hospital⁹ had more participants who were educated than in the current study. This may have accounted for the sharp difference recorded between the 2 studies. In spite of this, majority of the mothers had a positive attitude (76.4%) towards reporting to a health facility if they notice anything abnormal with the eyes of their children. This could explain why a significant number of mothers (199, 47.97%) were not receptive to the use of any substance or medication on their babies' eye when they notice an infection. It is a best practice to report to health facilities rather than self-medicating. Again, 152 mothers strongly agreed to the treatment of Ophthalmia Neonatorum using both clinical and laboratory findings (37.3%). This may imply that mothers are not too comfortable with the current practice of diagnosing Ophthalmia Neonatorum based on presenting signs, implying that eye care practitioners may have to modify their clinical approaches to diagnosing the condition.

An investigation into the demographic variables showed that occupation and level of education were significantly associated with mother's knowledge on Ophthalmia Neonatorum. All participants who were involved in skilled work had high level of knowledge while all mothers who were involved in unskilled work and small-scale business had low level of knowledge. About 90% of the participants involved in skilled manual work had high level of knowledge mainly because of their higher level of formal education as education plays an important role in both maternal knowledge and health education on various paediatric conditions.^{26,27} It is expected that educated mothers are more likely to find more information about their child's health from qualified health personnel, the internet and health related books^{28,22} and they would most likely have a higher purchasing power to be able to afford health care. This study depicted that 92.6% of the participants had poor levels of knowledge about Ophthalmia Neonatorum which included knowledge on eye infections, risk factors of Ophthalmia Neonatorum, management of Ophthalmia Neonatorum as

well as the prevention methods. In addition, the attitudes and practices towards the condition were also unsatisfactory considering the fact that some mothers were still using breast milk for the treatment of Ophthalmia Neonatorum.

Conclusion

In view of the findings of the current study, there is the need to improve upon the health promotion campaigns towards Ophthalmia Neonatorum to help increase mother's knowledge on the eye infection. It is suggested that in addition to the existing methods of educating mothers, informative pamphlets with visual aids to remind mothers of the information given to them by midwives, including pictures and other infographics of key symptoms to watch out for and what to do will help improve mother's knowledge as well as best practices on Ophthalmia Neonatorum. This will help reduce the occurrence of childhood blindness due to Ophthalmia Neonatorum within the Ghanaian population.

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Author Contributions

SBBK conceived the project. SBBK, SH and SK drafted the project protocols, SBBK, SH and SK were involved in data collection. SBBK, SH, SK and EKA were involved in analysis, interpretation, and drafted the original manuscript. All authors critically reviewed and approved the manuscript.

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Supplemental Material

Supplemental material for this article is available online.

REFERENCES

- Foster A, Gilbert C. Epidemiology of childhood blindness. *Eye*. 1992; 6:173-176.
- World Health Organization. Priority eye diseases. World Health Organization. April 18, 2018. Accessed November 22, 2020. www.who.int/blindness/causes/priority/en/index3.html
- Naidoo K. Poverty and blindness in Africa. *Clin Exp Optom*. 2007;90: 415-421.
- Foster A, Gilbert C. IAPB: VISION 2020 – the right to sight. *Br J Vis Impair*. 2000;18:126-128.
- Akafo SK, Hagan M. Causes of childhood blindness in Southern Ghana. Blind School Survey. 1990. Accessed September 12, 2020. <http://ugspace.ug.edu.gh/handle/123456789/33238>
- Huh GJ, Simon J, Grace Prakalapakorn S. Causes of childhood blindness in Ghana: results from a blind school survey in Upper West Region, Ghana, and review of the literature. *Int Ophthalmol*. 2018;38:1415-1423.
- Ebeigbe J, Osaiyiwu A. A comparative study of the effects of colostrum and gentamicin on organisms causing ophthalmia neonatorum. *J Nigerian Optom Assoc*. 2010;16:6-10.
- World Health Organization. Essential Newborn Care: Report of a Technical Working Group (Trieste, 25–29 April 1994). World Health Organization; 1996. No. WHO/FRH/MSM/96.13. Accessed April 4, 2020. <https://apps.who.int/iris/handle/10665/63076>
- Amolo L, Irimu G, Njai D. Knowledge of postnatal mothers on essential newborn care practices at the Kenyatta National Hospital: a cross sectional study. *Pan Afr Med J*. 2017;28:159.
- Kumah BD, Abdulkabir M, Kobia-Acquah E, Amponsah MA, Ablordeppey RK. Knowledge of childhood blindness among mothers visiting a Children's Hospital in the Kumasi Metropolis, Ghana. *Adv Ophthalmol Vis Syst*. 2017;7: 00221.
- Vonasek BJ, Bajunirwe F, Jacobson LE, et al. Do maternal knowledge and attitudes towards childhood immunizations in rural Uganda correlate with complete childhood vaccination? *PLoS One*. 2016;11:e0150131.
- Ramai D, Pulisetty T. Maternal and caregiver perceptions to childhood eye care in Ghana. *Internet J Epidemiol*. 2013;11:2-8.
- Mbogo SO, Kahaki K, Njambi L. Knowledge, attitude and practice in assessment of childhood ocular disorders among primary health workers in Garissa district, Kenya. *JOECSA*. 2016;20(1):12-20. <http://erepository.uonbi.ac.ke/handle/11295/100574>
- Cochran WG. *Sampling Techniques*. 3rd ed. Wiley & Sons; 1977.
- Yadav SP, Saund M, Thakur J, Yadav P, Yadav S, Shah GS. Knowledge, attitude and practices on the care of the newborn in postnatal mothers delivering at a tertiary care centre in Nepal. *Sri Lanka J Child Health*. 2016;45:189-192.
- Bloom BS. *Taxonomy Education*. David McKay; 1956.
- IBM Corp. Released. *IBM SPSS Statistics for Windows, Version 22.0*. IBM Corp; 2014.
- Di Bartolomeo S, Higa M, Janer M, Pennisi A, Balbin G, Priore G. Neonatal conjunctivitis in a hospital at Gran Buenos Aires. Last 5 years up-date. *Rev Argent Microbiol*. 2005;37:139-141.
- Gul SS, Jamal M, Khan N. Ophthalmia neonatorum. *J Coll Physicians Surg Pak*. 2010;20:595-598.
- Mallika P, Asok T, Faisal H, Aziz S, Tan A, Intan G. Neonatal conjunctivitis – a review. *Malays Fam Phys*. 2008;3:77-81.
- Kakar S, Bhalla P, Maria A, Rana M, Chawla R, Mathur N. Chlamydia trachomatis causing neonatal conjunctivitis in a tertiary care center. *Indian J Med Microbiol*. 2010;28:45-47.
- Dongre AR, Deshmukh PR, Garg BS. A community based approach to improve health care seeking for newborn danger signs in rural Wardha, India. *Indian J Pediatr*. 2009;76:45-50.
- Nkansah EK. Knowledge, attitude and practice of infant ocular health among midwives in the Bosomtwe district. *EC Ophthalmol*. 2018;9:100-108.
- Rodrigo BKNR, Cooray G. The knowledge, attitude & behaviour on neonatal jaundice of postnatal mothers in Provincial General Hospital, Badulla. *Sri Lanka J Child Health*. 2011;40:164.
- Mesekaa LA, Mungai LW, Musoke R. Mothers' knowledge on essential newborn care at Juba Teaching Hospital, South Sudan. *South Sudan Med J*. 2017;10:56-59.
- Gewa CA, Chepkemboi J. Maternal knowledge, outcome expectancies and normative beliefs as determinants of cessation of exclusive breastfeeding: a cross-sectional study in rural Kenya. *BMC Public Health*. 2016;16:1-13.
- Nigatu SG, Worku AG, Dadi AF. Level of mother's knowledge about neonatal danger signs and associated factors in North West of Ethiopia: a community based study. *BMC Res Notes*. 2015;8:309.
- Buor D. Mothers' education and childhood mortality in Ghana. *Health Policy*. 2003;64:297-309.