

Prevalence of Ophthalmia Neonatorum in Calabar, South-South Nigeria: A 3-Year Review

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ABSTRACT

Background: Ophthalmia neonatorum (ON) also known as neonatal conjunctivitis is inflammation of the conjunctiva caused by aseptic or septic factors. It commonly affects newborns usually within the first month of life. This study aimed to determine the prevalence and socio-demographic characteristics of ON in Calabar, Nigeria.

Methods: We retrieved all the clinical case notes with diagnosis of ON from the Neonatal Unit of University of Calabar Teaching Hospital (UCTH), Calabar, Nigeria, during 1st January 2012-31st December, 2014. The extracted information included age at presentation, gender, socio-demographic characteristics, conducted investigations, treatment, and outcome. Data was analyzed using SPSS, version 20.

Results: Out of a total of 3198 admissions, 34 (1.1%) had ON, most of whom were females (58.8%), and 21(61.8%) of the cases were admitted to the out-born neonatal unit. Eye swabs were taken from only 18 (52.9%) cases for microscopy, culture, and sensitivity prior to antibiotics initiation, from which no organism was isolated. Parents of the studied neonates were mainly from low and middle socioeconomic classes.

Conclusion: Determination of organisms responsible for ON is of paramount importance. Therefore, hospital delivery and maternal education on this condition should be considered as priorities. In addition, clinicians are suggested to take regular eye swabs for microbiological investigations prior to initiation of treatment.

Keywords: Blindness, Neonates, Ophthalmia neonatorum

Introduction

Ophthalmia Neonatorum (ON), also known as neonatal conjunctivitis, is inflammation of the conjunctiva caused by aseptic or septic factors. It commonly affects newborns usually within the first month of life. Aseptic conjunctivitis occurs when chemical irritants such as silver nitrate is instilled into the eye, while septic conjunctivitis is due to infections caused by bacteria or viral agents acquired from the genital tract of the infected mother.

Septic conjunctivitis is responsible for 1.6-12% of all neonatal infections (1, 2). Most serious infections are caused by *Neisseria gonorrhoeae* and *Chlamydia trachomatis*, leading to corneal damage, ulceration, perforation, and blindness (3). Globally, 39 million people are blind (5% of whom are cases of childhood blindness) and 285 million are visually impaired (3, 4-). Approximately 30-72% of such blindness are avoidable, 9-58% preventable, and 14-31% treatable (3, 5).

In the United States and Canada, *Chlamydia* is

responsible for approximately 2-40% and 40% of all cases of ON, respectively (4). In a hospital in Pakistan, the incidence rate of neonatal conjunctivitis was 17% (5). Gonococcal infections account for <1% of all cases of ON in mothers with dual infections with *Chlamydia trachomatis* (6, 7). The commonly identified gram-positive organisms responsible for ON are *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Streptococcus viridans*, and *Staphylococcus epidermidis*. These bacteria make up 30-50% of all cases of neonatal conjunctivitis (8). In a Nairobi hospital, more than 50% of all newborns sustained gonococcal conjunctivitis (6, 9). ON and corneal diseases were responsible for 6.67% and 21.74% cases of childhood blindness in Nigeria, respectively (10). In a study carried out in Benin, Nigeria, *Staphylococcus aureus* was the most prevalent (60.5%) bacterium, while *Neisseria gonorrhoeae* accounted for 1.7% of infections. *Escherichia coli*, *Klebsiella pneumoniae*, *Serratia marcescens*,

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Proteus, *Enterobacter*, and *Pseudomonas* species were also isolated (11). There was a case report on neonatal conjunctivitis caused by *Eikenella corrodens* (12). Since there is a paucity of data on ON in Nigeria, we aimed to review its current prevalence in our community and suggest proper solutions to prevent morbidity.

Methods

This descriptive, retrospective study was conducted at the neonatal unit of the University of Calabar Teaching Hospital (UCTH), Calabar, Cross Rivers State, South-South Nigeria. The review period spanned from 1st January 2012 to 31st December 2014. The neonatal units, as described earlier by Udo et al. (2006), are comprised of the in-born and out-born units (13). The out-born unit admits ill infants referring from home, health facilities, churches, traditional birth attendants, or any other delivery centre. The in-born unit admits babies delivered in the hospital of study. The ON diagnosis in the facility was based on clinical assessment following eye discharge.

The neonates presenting with only ON are not usually admitted. There were no facilities for diagnosis of chlamydia in the hospital at the time of this study. The hospital did not provide povidone iodine or silver nitrate for the prevention of ON as a policy.

Clinical records of all the neonates with ON were retrieved and reviewed. The extracted information included gender, age, diagnosis, referrals to the ophthalmologist, result of eye swabs, and outcome. The extracted outcome measures included patient discharge, discharge against medical advice, and death. For data analysis, descriptive statistics were used in SPSS version 20. P-value less than 0.05 was considered statistically significant.

Results

A total of 3,198 neonates were admitted to the neonatal unit, of whom 1,766 were male (with M:F ratio of 1.2:1). Thirty-four cases of ON (1.1%; CI: 0.54-0.71%) were identified during the review period. The mean age was six days (1 h-32 days); age distribution is demonstrated in Table 1.

The majority of the cases (61.8%) were admitted to the out-born unit. Ten newborns (29.4%) were less than a week old and mostly out-born (Table 2). Females presented with ON more than males (58.8%; $P=0.0572$ and $df = 2$). During the study period, only 18 eye swabs were taken for microscopy, culture, and sensitivity and no bacteria were isolated. There was no documented evidence of referrals to an ophthalmologist.

Parents of the studied babies were mainly from the middle and low (III and IV according to the classification by Oyediji et al. (1985)). Parents of 4 (11.8%) and 8 (23.5%) infants were in I and II socioeconomic classes, respectively (14).

Table 1. Age distribution of the 34 cases of ophthalmia neonatorum

Age Range (Days)	Number (%)
0-7	10 (29.4)
8-14	8 (23.5)
15-21	8 (23.5)
22-30	6 (17.6)
>30	2 (6)

Discussion

Our findings revealed that 1.1% of the neonates presented with ON in Calabar, Nigeria, which is lower than 5.4% recorded from three medical centres in Teheran (15) and less than 19% observed among babies in rural areas of Northern Norway (16). In Benin, Nigeria, Iyamu et al. (2003) recorded 1.7% and 60.5% prevalence rates for gonococcal and staphylococcal infections, respectively (11). The observation in our study might be partly due to the absence of bacteriological tests conducted prior to treatment. In addition, infants with this condition were mostly from parents of low socioeconomic status; accordingly, financial constrain, low literacy level, and poor health-seeking behavior might contribute to this condition. In a related study by Abdusalam et al. (2013), it was found that low maternal education, lack of antenatal care attendance, and low socioeconomic status were significantly associated with positive bacterial isolate (17).

The high admission rates noted in the out-born

Table 2. Ophthalmia neonatarum (ON) cases seen in Inborn, and Outborn Units, UCTH from 2012-2014

Year	INBORN						OUTBORN					
	Admissions	Male	Female	ON cases	Male	Female	Admissions	Male	Female	ON cases	Male	Female
2012	481	273	208	0	0	0	487	294	210	2	1	1
2013	554	306	248	7	4	2	592	295	280	9	4	5
2014	428	230	198	6	2	5	656	368	288	10	3	7
Total	1463	809	654	13	6	7	1735	957	778	21	8	13

P-value = 0.0572; $df = 2$

unit was because the unit admitted and treated all babies delivered elsewhere. The majority of the mothers of babies admitted to this unit neither attended antenatal care nor delivered in our facility. Poor antenatal care without early detection and treatment of vaginal infections or delivery in unhygienic environments by unskilled personnel are among the other risk factors for this condition, which is confirmed by the results obtained by Adeyantso (2004) from Kaduna, Nigeria (18), but inconsistent with the findings of Olatunji et al. (2004) from a case-control study of neonatal conjunctivitis in Kaduna, Nigeria (19). They observed that 49% of babies delivered in hospitals (vs. 34.5% delivered at home) developed ON. Isenberg et al. (1996) in Kenya, however, did not find birth in an unhygienic environment to be a significant risk factor (20).

Our review indicated that mostly female newborns presented with ON, similar findings were documented in Tehran and Norway (15, 16). In contrast, Pandey (1990) and Fransen (1986) showed male preponderance in India and Kenya, respectively (21, 22). This common observation among female infants may be associated with the application of traditional grinded lead sulphide granules called "Tiro", "Tozali", or "Kwaili" used in Nigeria by the Yoruba and Hausa ethnic groups, respectively. These substances are applied to darken the eyelids and serve as cosmetics and might have caused aseptic conjunctivitis (23). We could not ascertain if any of the babies in this study became blind or had significant visual disabilities, although ON is known to cause blindness in approximately 10,000 babies annually worldwide.

No organism was isolated from the eye swabs taken for microscopy, culture, and sensitivity, although there were no facilities for chlamydia test at the time of this study. The absence of bacterial growth could have resulted from breast milk instilled into the eye or from the use of ocular antibiotics prior to presentation. It has been documented that breast milk has antibacterial properties, a common practice among families in Nigeria and other African countries (24).

Conclusion

Our findings showed that babies presenting with ON were mostly delivered in unusual places and treatments for this condition were instituted without performing the relevant investigations. Therefore, hospital delivery and education on ON are of great significance, and clinicians are recommended to take eye swabs on a regular

basis for microbiological investigations prior to treatment.

Recommendations

We recommend taking eye swabs from all babies presenting with ON for microbiological investigations prior to initiation of treatment; these patients should also be referred to an ophthalmologist for follow-up.

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Conflicts of interests

None declared.

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References

1. Teoh DL, Reynolds S. Diagnosis and management of pediatric conjunctivitis. *Pediatr Emerg Care*. 2003; 19(1):48-55.
2. Wagner RS, Aquino M. Pediatric ocular inflammation. *Immun Allergy Clin North Am*. 2008; 28(1):169-88.
3. Pascolini D, Mariotti SP. Global estimates of visual impairment: 2010. *Br J Ophthalmol*. 2011; 10:1-15.
4. Steinkuller PG, Du L, Gilbert C, Foster A, Collins ML, Coats DK. Childhood blindness. *J AAPOS*. 1999; 3(1):26-32.
5. Gul SS, Jamal M, Khan N. Ophthalmia neonatorum. *J Coll Physicians Surg Pak*. 2010; 20(9):595-8.
6. Laga M, Plummer FA, Nzanze H, Namaara W, Brunham RC, Ndinya-Achola JO, et al. Epidemiology of ophthalmia neonatorum in Kenya. *Lancet*. 1986; 2(8516):1145-9.
7. Pickering LK. Red book 2009 report of the committee on infectious diseases. 28th ed. Elk Grove Village: American Academy of Pediatrics; 2009. P. 305-13.
8. Prevention of neonatal ophthalmia. In: Pickering LK, editor. *Red book 2009 report of the committee on infectious diseases*. 28th ed. Elk Grove Village: American Academy of Pediatrics; 2009. P. 827-9.
9. Palafox SK, Jasper S, Allyson D, Foster S. Ophthalmia neonatorum. *J Clin Exp Ophthalmol*. 2012; 2(1):100-19.
10. Magulike NC, Ezepue UF. Corneal diseases and childhood blindness. A retrospective hospital based study. *Niger J Ophthalmol*. 1993; 2(1):75-9.
11. Iyamu E, Enabulele O. A survey on ophthalmia neonatorum in Benin City, Nigeria (Emphasis on gonococcal ophthalmia). *Online J Health Allied Sci*. 2003; 2(2):1-6.
12. Chhabra MS, Motley WW 3rd, Mortensen JE. *Eikenella corrodens* as a causative agent for neonatal conjunctivitis. *J AAPOS*. 2008; 12(5):524-5.
13. Udo JJ, Anah MU, Ochigbo SO, Etuk IS, Ekanem AD. Neonatal morbidity and mortality in Calabar, Nigeria: a hospital-based study. *Niger J Clin Pract*.

- 2008; 11(3):285-9.
14. Oyedeji GA. Socioeconomic and cultural background of hospitalized children in Ilesa. *Nig J Paediatr.* 1985; 12(4):111-7.
 15. Hossein SM, Fariba S, Zhaleh R, Afshin B, Hooshang AA, Naser B, et al. The prevalence and etiology of ophthalmia neonatorum among hospital-born babies in Tehran, Iran. *J Compreh Paediatr.* 2007; 1(2):49-53.
 16. Dannevig L, Straume B, Melby K. Ophthalmia neonatorum in Northern Norway. I: Epidemiology and risk factors. *Acta Ophthalmol.* 1992; 70(1):14-8.
 17. Mohammed A, Mustafa A, Ihesiulor U. Maternal risk factors for neonatal conjunctivitis in Aminu Kano Teaching Hospital, Kano, Nigeria. *Niger J Basic Clin Sci.* 2013; 10(2):60-5.
 18. Adeyantso EA. Bacterial agents and risk factors of ophthalmia neonatorum at Ahmadu Bello University Teaching Hospital, Kaduna. (Dissertation). Nigeria: Faculty of Pediatrics West African College of Physicians; 2004.
 19. Olatunji FO. A case control study of ophthalmia neonatorum in Kaduna II: causative agents and their antibiotic sensitivity. *West Afr J Med.* 2004; 23(3):215-20.
 20. Isenberg SJ, Apt L, Wood M. The influence of perinatal infective factors on ophthalmia neonatorum. *J Pediatr Ophthalmol Strabismus.* 1996; 33(3):185-8.
 21. Pandey KK, Bhat BV, Kanungo R, Srinivasan S, Rao RS. Clinico-bacteriological study of neonatal conjunctivitis. *Indian J Pediatr.* 1990; 57(4):527-31.
 22. Fransen L, Nsanze H, Klauss V, Van der Stuyft P, D'Costa L, Brunham RC, et al. Ophthalmia neonatorum in Nairobi Kenya: the roles of *Neisseria gonorrhoeae* and *Chlamydia trachomatis*. *J Infect Dis.* 1986; 153(5):862-9.
 23. Department of Health & Human Services. Morbidity and Mortality weekly Report (MMWR). *Centre Dis Cont Prev.* 2013; 61(51-52):1033-52.
 24. Ibbanesebhor SE, Ootobo ES. In vitro, activity of human milk against the causative organisms of ophthalmia neonatorum in Benin City, Nigeria. *J Trop Pediatr.* 1996; 42(6):327-9.