Original Article

Evaluation of Content and Cost of Traditional Eye Medication in a Resource-poor Country – Implications for Eye Care Practice and Policy

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ABSTRACT

Background: Cataract, glaucoma, and conjunctivitis are common causes of ocular morbidity in Nigeria. A major obstacle in reducing the burden of ocular morbidity in rural areas is access to eye care services. Up to 80% of the population in developing countries use traditional medications for their primary healthcare needs because they are accessible, available, and affordable. The aim of this study is to evaluate the content and cost of commercialized traditional medications used in the treatment of common eye conditions in Nigeria. **Patients and Methods:** All the registered traditional healers (THs) at an International Trade Fair in Enugu who treated eye problems were identified. Data on their location and scope of their practice were collected by the researchers. Proxy patients consulted THs in the trade fair with simulated cataract, glaucoma, and bacterial conjunctivitis, and treatment was sought. Medication for the treatment of the simulated disorders was paid for and procured. The mode of administration and the cost of the drugs were recorded by proxy patients. Each medication was labeled with a code and sent to the laboratories of the National Agency for Drug Administration and Control for analysis. Data were entered into a database on Microsoft Access and transferred to STATA V12.1 (StataCorp) for analysis. **Results:** Cataract was treated by 87.5% of all the traditional eye healers interviewed. A total of 32 samples were collected and analyzed. These comprised mainly oral (53.1%) and topical traditional medications (43.8%). The pH of the topical samples ranged from 3.5 to 10, while the mean microbiological load per topical solution was 3.3×10^4 cfu/mL $\pm$ 0.96. The cost of treatment of cataract ranged from 4 to 70 USD. **Conclusion:** The content of the majority of the samples of traditional eye medications in this study had high extremes of pH and/or had a high microbial content. The practice of THs should be regulated.

KEYWORDS: *Content, cost, Nigeria, traditional eye medication*

INTRODUCTION

The World Health Organization (WHO) estimates that about 34 million people in the world are blind.[1] In Nigeria, more than 1 million people are blind, and the majority of the causes of blindness are preventable.[2] Some of the commonest eye diseases in Nigeria are cataract and glaucoma which are blinding conditions and conjunctivitis which though not blinding produces symptoms which will require treatment.[3-5] A major obstacle in reducing the burden of ocular morbidity in rural areas is access to eye care services.[6] It has been reported that up to 80% of the population in developing countries use traditional medications for their primary healthcare (PHC) needs because they are accessible, available, and affordable.[7] In addition, many developing countries cannot afford a curative health system covering their entire population,

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hence traditional medicine may serve as a first contact system.[8] Unorthodox medication in developing countries is referred to as traditional medication, whereas in developed countries, it is called complementary or alternative medication (CAM).[9] Alternative medicine runs the gamut from well-tested and effective remedies to spurious and sham treatments.[10]

Many traditional healers (THs) in developing countries treat eye diseases.[11] In Malawi, THs are often consulted for the treatment of eye disease because they are six times more accessible to community members than health workers.[12] The use of traditional eye medications (TEMs) for eye conditions has also been reported in Ghana[13], Kenya,[14] and Tanzania.[15] In eye patient populations in Nigeria, the use of CAM/TEM has been reported as 5.9% in Enugu,[16] 3.4% in Ekiti,[17] and 1.6% in Benin.[18]

The use of TEM and CAM has not always been found to be effective, and there have been reports about the deleterious effect of TEM/CAM in the treatment of eye diseases.[12,18,19] However, because some traditional medications have been found to be effective in the treatment of certain diseases, the National Medicines Regulatory Authorities in some countries have granted licenses for the sale of well-researched traditional medications. Nigeria, Ghana, Mali, and Burkina Fasso are some of such countries.[7] These products are manufactured and marketed locally or distributed nationally.

Cataract, glaucoma, and bacterial conjunctivitis are common eye conditions in Nigeria that people most frequently present with to traditional eye healers.[20] The aim of this study is to evaluate the content and cost of commercialized traditional medications used in the treatment of common eye conditions in Nigeria.

Patients and Methods

All the THs who registered at the International Trade Fair in Enugu in April 2011 were identified and visited during the trade fair. Only those practitioners with traceable offices or large enough to have franchises were included, hence itinerant THs were not selected. Ethical clearance was obtained from the ethics committee of the University of Nigeria Teaching Hospital, Enugu. The stands of the identified prospective traditional practitioners were visited, and information was sought on whether these healers treated eye disorders or not. Only those who admitted to treating eye problems were selected and these formed the study population. The study involved the administration of a questionnaire to the participants to collect data on the geographical location of their practice and types of eye diseases treated. It also included the use of "mystery patients" to simulate common eye conditions for which treatment was sought. At each stand of the selected participant, rapport was built with the participant by conversing in the participant's native tongue. The team included two researchers who were fluent in at least two of the three main Nigerian languages. The THs were informed that patients may be sent to them but were not informed who or when or the underlying purpose of their visit.

Cataract, glaucoma and bacterial conjunctivitis which are common eye conditions in Nigeria were presented to the traditional healers by proxy and treatment sought. It has been reported that simulated patients have been found to be useful in the evaluation of healthcare providers.[21] The drugs needed for the treatment of the simulated disorders were paid for and procured. The methods of administration and the cost of the drugs were recorded by the acting patient. The cost of the medication was given in Naira and converted to US dollars at the official exchange rate at the time of the study. Each of the medications was labeled with a code. Only the researchers had access to the code. The labeled samples of the procured medications were sent to the laboratories of the National Agency for Drug Administration and Control for analysis in the exact containers in which they were procured. No names were used in the analysis. The laboratory was blinded to the source and indications for use of the samples. Each of the samples was assessed for identification of active components, pH, sterility, and particulate matter according to the United States Pharmacopeia USP 32 National Formulary NF 27.[22] The analysis of the samples and the questionnaires were entered into a specially designed database on Microsoft Access and transferred to STATA V12.1 (StataCorp, TX, USA) using STATransfer. Frequency tables were then generated and used for analysis and descriptive statistics

Results

There were 31 THs present at the fair, of which 19 had traceable offices or more than one branch in various states of the Federation. Seventeen of them (89.5%) were interviewed. Eleven (57.9%) of them were involved in treating eye diseases, of which eight (72.7%) agreed to take part in the study. The geographic locations of the places of practice of the THs are as shown in Figure 1.

Cataract was the most commonly treated eye condition by the healers (87.5%) among the three simulated diseases. About 50% and 37.5% of the healers reported that they treated glaucoma and "red itchy

Figure 1: Geographic locations of the traditional healers

Figure 2: Routes of administration of the TEM

Table 1: Cost (USD) of treatment of common eye conditions

Eye condition	No. of providers (%)	Mean cost (USD)	Standard dev.	Min	Max
Cataract	7 (63.6)	19.4	22.9	4	70
Glaucoma	4 (36.4)	10	0	10	10
Red itchy eye	3 (27.3)	18.5	23	3.5	45

discharging eyes," respectively. A total of 32 samples of treatment remedies were collected from eight healers, of which 53.1% were used in the treatment of cataract, 28.1% for the treatment of glaucoma, and 18.8% for red itchy discharging eyes. The collected samples of eye remedies consisted of oral medications (53.1%), topical medications (43.8%), and medications that were administered after scarification (3.1%). Figure 2 shows the modes of administration of TEM.

Topical medications consisted of powders (50%), soaps (14.3%), and eye drops (35.7%). The oral powders were to be mixed with drinking water in quantities prescribed by the healer. The soaps were for facial washing, whereas the topical powders were for conjunctival application. Alkaloids were present in 16 of the 17 (94.1%) oral solutions but were unidentifiable. Alkaloids were present in all the topical samples. Two of the topical solutions were identical; atropine and quinolone were identified in them. They were used in the treatment of cataract and conjunctivitis, while two of the topical samples were identified as soap. The pH of the topical samples ranged from 3.5 to 10, while the mean microbiological load per topical solution was 3.3×10^4 cfu/mL $\pm$ 0.96.

There was a wide variation in the cost of cataract treatment among the healers. Table 1 shows the variation in costs (in US dollars) of the medications used to treat the simulated eye diseases.

The cost of treatment of cataract by the practitioners ranges from 4-70 USD, that of glaucoma was uniform at 10 USD, while that of itchy red eye ranged from 3.5-45 USD.
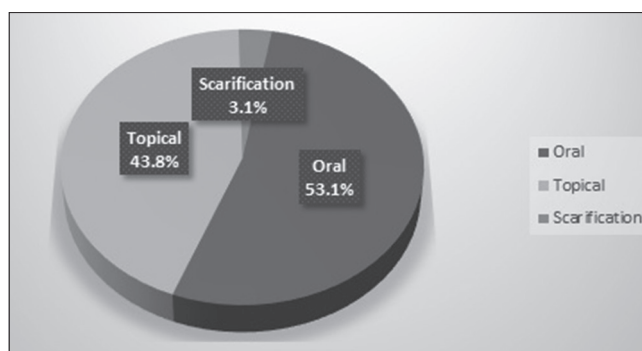
DISCUSSION

Our study gives an insight into the practice of TEM in our environment. The locations of the TH surveyed included the majority of geopolitical zones in Nigeria-Northcentral, North-East, South-East, South-South, and South-West. Some of them came from neighboring West African countries – Togo and Benin Republic. This suggests that the use of THs is widespread in Nigeria and beyond. Several other studies in Africa report the use of THs to treat health conditions including eye conditions.[11-14-18] About a third of the THs who participated in the trade fair were involved in treating eye diseases. This is higher than a study of THs in Ogun state, Southwest Nigeria, where only 14.6% of the THs surveyed indicated that they treated eye conditions. Almost all the traditional eye practitioners claimed that they could treat cataract. Cataract is the commonest cause of blindness in Nigeria, and it is estimated that by 2020, 1.4 million Nigerians will be blind or visually impaired by cataract.[3]

The majority of the samples prescribed by the healers contained alkaloids, suggestive of herbal origins. Alkaloids have been defined as a group of nitrogenous substances originating from plants. They exert profound physiological activity and have broad applications as chemotherapeutic agents but can also exert harmful effects.[23] Reports suggest that herbal preparations are the most commonly used forms of CAM.[24,25] Indeed, it has been reported that herbs such as marijuana and ginko bilboa may have beneficial effects in the treatment of glaucoma.[26]

In two eye drops prescribed for two different conditions (cataract and conjunctivitis), our analysis showed that both contained a mixture of the same two compounds (quinolone and atropine). Such a one-shoe-fits-all treatment may appear surprising but is known to be a feature of TH's practice.

There is a plausible scientific basis for some efficacy of this combination to treat both cataract and conjunctivitis. Topical atropine has been used to dilate the eye and to prevent ciliary spasm in uveitis. The pupillary dilatation may also allow more light rays into the eye, in people with advanced nuclear cataract. Quinolones are a group of antibiotics which include fluoroquinolones and are active against a range of bacteria. As a topical eye drop, it has been found to be effective in the treatment of bacterial conjunctivitis.[27,28] Therefore, bacterial conjunctivitis may respond to topical quinolone drops in these prescriptions, depending on the concentration and bioavailability of the active ingredient. In patients with cataract, while the main conventional treatment is surgical removal of the opaque lens, it is likely that the atropine in the traditional medications will cause pupillary dilation which may marginally improve vision, albeit for a short while. Though these drops may provide temporary relief for the end users, the final outcome is questionable.

Soap was the major component of two of the samples used in the treatment of cataract. Face washing has been described as a method of treatment by traditional eye healers in Malawi. It is thought to be beneficial in reducing eye discharges and reducing the dissemination of bacteria and viruses.[12] In a study on TEM in Kenya, a TH reported his ability to treat all stages of cataract without surgery.[8] There is need for regulatory agencies and eye health promotion programs to be able to verify such spurious claims or limit advertisement of such claims by traditional practitioners.

The medicinal samples analyzed in this study consisted of solutions, suspensions, and powders which were administered orally, topically, or by scarification. The practice of scarification for TEM has been reported in the literature.[29] Our study also mirrors findings from Kenyan traditional eye healers who administered TEM topically or orally.[8] In a study in Kitui, East Kenya, more than 50% of the healers treated cataracts and conjunctivitis by the administration of plant extracts into the conjunctival sac, whereas 4.6% of them practiced scarification for ocular swellings.[14]

The pH of the topical medications in our study ranged from very acidic (3.5) to very alkaline (10). Severe ocular injury from the use of plant seeds for TEM has been reported in the literature.[30] A study from southwestern Nigeria reports the use of battery acid and fermented cassava water in almost a quarter of TEM users presenting in a tertiary hospital.[17] The topical application of TEM of extreme pH will cause ocular irritation, inflammation, and pain. In addition, scarification and the application of unsterile concoctions may lead to severe local infections or generalized infections such as tetanus. It has been reported that THs feel that TEM is ineffective without attendant irritation and pain.[8]

The microbial content of the topical medications we sampled was very high, potentially predisposing end users to eye infections. Ideally, eye drops should be sterile. The source of the high microbial load could be from the nonaseptic technique used to prepare the drops. The use of well water for the preparation of TEM has been reported in the literature.[8] These examples of harmful TEMs have grave health consequences. Several complications of harmful TEM have been reported; these include keratitis, endophthalmitis, and panophthalmitis.[14] Yet the use of TEM in sub-Saharan Africa is fairly common ranging from 13% in Nigeria[31] to up to 34% in Malawi.[32] There may be need to reduce the harmful effects of TEMs by collaborating with THs in the treatment of eye diseases. Such a collaboration has had reasonable success in Malawi where blindness among patients using TEM fell from 44% to 21% after the collaboration.[32]

Cost

Several studies have reported the high cost of orthodox eye care as a major push factor for seeking treatment from THs.[33,34] In this study, the cost for the treatment of cataract by the THs ranged from 4 to 70 USD with a mean cost of 19.4 USD. The cost of cataract surgery in public health facilities in Nigeria ranges from 80 USD for outreach patients to about 130 USD for walk-in patients.[35,36] In South Africa, the median cost per visit to the TH was 20 USD,[37] whereas in Kenya, costs ranged from 0.5 to 200 USD.[8] Though there is need to make eye care services more affordable, cost may not be the only barrier as even when eye care is offered free of charge, THs are still patronised.[19] It has been reported that other factors may influence patients' preference for TEM such as patients' beliefs[19] and ease of access to treatment.[16]

Implications for eye care practice in Nigeria

In Nigeria, eye care is available in secondary and tertiary centers, which are mainly located in urban areas. There is a need to make eye care more accessible especially in rural communities. This can be achieved by developing and implementing primary eye care (PEC) in Nigeria. The WHO, through the Global Action Plan 2014–2019, stresses the importance of PEC in attaining universal eye

health, calling on member states to secure the inclusion of PEC into PHC.[38] The use of harmful traditional medications not only delays allopathic treatment but also causes complications resulting in blindness or visual impairment.[12] In Malawi, it has been demonstrated that training THs to recognize and refer eye conditions could result in improved visual outcomes.[32] This can be replicated in Nigeria. The implementation of Universal Health Coverage for all Nigerians will help reduce barriers to accessing quality eye care and make it more equitable for all Nigerians. This has been done with success in Ghana[39] and can be achieved in Nigeria.

Limitations of the study

Data from itinerant healers were not captured. This may significantly affect the findings of the study as their practice could fall within any range of the spectrum from professional practice to charlatans. In addition, it was not possible to assess the number of clients seen by these healers to estimate the extent of their coverage. Finally, the concentrations of the alkaloids in our samples were not determined. This assesses uniformity of dosing and the potential for efficacy or harm.

CONCLUSION

The content of the majority of the TEM used in the treatment of eye conditions in this study had high extremes of pH and/or a high microbial content. The content of a minority of the samples had arguable scientific bases for some form of efficacy. Our findings suggest that more research is needed into local medications for quality assurance on bioavailability, sterility, and appropriate active ingredient concentration. There is a need to collaborate with THs on their eye care practices which should be regulated.

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Conflicts of interest
There are no conflicts of interest.

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