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Promoting healthy habits for disease prevention

Two papers in the current issue of the journal focus on healthy habits namely: hand washing and wearing shoes. Hand washing is a cheap and effective means of preventing diseases that are contacted through faeco-oral route and person-to-person contact. Hand-washing combined with other public health measures curtailed the Ebola Virus Disease that ravaged parts of Africa between 2013 and 2015.

The paper by Ojo et al was based on the findings from a questionnaire survey on hand washing practices of 345 non-medical, undergraduate students. The authors found that over 80% of the students practiced hand washing which was quite impressive. However, what was worrisome was that only about half of them did so the standard way, and would seem to echo the saying that "not all that can be counted count" with regards to effective hand washing for disease prevention. The lesson to be learnt is that hand-washing is essential for disease prevention, but perhaps more importantly; it must be done in a standard way to be effective and the World Health Organization recommended protocol for hand washing should be taught and adhered to. Replication of the hand-washing study among food handlers and health care workers would determine the extent of compliance with standard practice amongst those who should know.

The paper by Umezurike and others reported that pregnant women who wore shoes were two times less likely to develop soil-transmitted, helminthic infection. They studied 326 women and found a prevalence of stool transmitted helminthes infection of about 14% with *Ascaris lumbricoides* predominating. Walking bare footed appeared to facilitate helminthic infection spread by increasing exposure to the eggs and larvae in the soil. Wearing shoes protects from other conditions as well and the appropriate use of anti-helminthic therapy is indicated.

These studies have reawakened our interest in basic public health measures for combating communicable diseases. They are cheap yet very effective and awareness is key. Innovative methods for information dissemination for habit change are needed. Prevention is always better than cure.

A. Ogunniyi
Editor-in-Chief

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Case Reports

Management of unerupted dilacerated upper central incisors with compound odontome obstruction along the path of eruption – A case report.

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Abstract

Failure to erupt permanent incisors is not a common feature in the orthodontics clinic. When such a case is encountered, its management could be challenging due to the importance of these teeth to aesthetics especially in the female gender. This is one of the reasons why patient seek orthodontic treatment in our environment. This case report is that of a young junior secondary school girl that presents with a history of unerupted upper right central incisor with a retained upper right primary central incisor despite several years of exfoliation of upper left primary central incisors and eruption of the upper left central incisors into their functional position.

On investigation, the upper right central incisor was found to have dilacerated apical third of its root complicated by the presence of compound odontome in its path of eruption.

The upper right primary central incisor was extracted; the upper right central incisor was surgically exposed and the compound odontome removed. Orthodontic traction technique was used to position the tooth in the arch.

Keywords: *Unerupted central incisors, dilacerations, odontome*.

Résumé

L'absence d'éruption des incisives permanentes n'est pas une caractéristique commune à la clinique d'orthodontie. Quand un tel cas est rencontré, sa gestion pourrait être difficile en raison de l'importance de ces dents pour l'esthétique en particulier dans le sexe féminin, une des raisons pour lesquelles les patients recherchent un traitement orthodontique dans notre environnement. Ce cas rapporté est celui d'une jeune collégienne présentant une histoire d'incisive centrale supérieure non ébréchée avec incisives centrales primaires supérieures conservées malgré plusieurs années d'exfoliation d'incisives centrales primaires supérieures gauche et d'éruption des incisives centrales supérieures gauches dans sa position fonctionnelle.

Lors de l'examen, l'incisives centrale supérieure droite s'est révélé à avoir un tiers apical dilaté de la racine, compliqué par la présence d'odontome composé sur son trajet d'éruption.

L'incisive centrale primaire supérieure droite a été extraite; l'incisive centrale supérieure droite était exposée chirurgicalement et l'odontome composé enlevé. La technique de traction orthodontique a été utilisée pour positionner la dent dans l'arcade.

Mots-clés: *Incisives centrales, non ébréché, dilacération, odontome*

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Introduction

Missing and unerupted maxillary incisors is second to the maxillary canine in prevalence of unerupted tooth in the labial segment of the jaw with a prevalence of about 1.7% in Nigerians and between 1 – 2% in the Americans[1, 2]. An American study considered it to be the most unattractive deviant occlusal trait [3]. It is the third most commonly impacted teeth in Caucasians [4]. The maxillary incisors and canines are also known as the 'social six' and are most exhibited teeth during a smile and speech hence, their position and morphology are important to facial aesthetics and phonetics [5].Impaction of one or both of the maxillary central incisors is rarely diagnosed during the mixed dentition but is diagnosed when there is a delay in their eruption [6]. Missing upper incisors are regarded as unattractive hence this may have an effect on self-esteem and general social interaction and it is important to detect and manage the problem as early as possible [7, 8]. If untreated early, especially among school children, it could result in low self-esteem, affects academic performance and or even defaults from school.

Supernumerary teeth are the main cause of the impaction of upper incisors [6, 9]. Other factors include: fibrous tissue bands, non-vital or ankylosed primary teeth, space loss, odontomes and dilacerations of root [5, 10]. Root dilaceration refers to a dental anomaly characterized by an abrupt deviation in the longitudinal axis of the tooth. It can

be localized in the crown; between the crown and the root or most frequently in the root. The dilaceration of a tooth is almost always associated with a history of trauma [10].

This report describes an impacted upper right central incisor with a dilacerated root complicated by a compound odontome and retained primary upper right central incisors in the path of its eruption. The dilacerations most likely was caused by a traumatic dental injury at an earlier age as suggested by the history given. The condition was managed through a multidisciplinary approach.

Case report

This is a case of a 13year old girl Miss 'A' who reported with a complaint of retained upper right primary central incisor. She gave a history of trauma (fall) to the face associated with bleeding gum at about age 5years which was managed at a neighborhood clinic. No history of pain, swelling or associated discomfort was observed.

On examination, she has the complement of teeth for her age except for the absence of the upper right central incisors and the presence of a retained primary upper right central incisor. There was no bulge palpable in the maxillary vestibular area of the mouth. An intra-oral periapical and standard upper occlusal radiograph was taken in the absence of an orthopantomogram (panoramic) view to ascertain the presence or absence and position of the upper right central incisors. The radiographs revealed the presence of the upper right central incisors which was found to be dilacerated and located high up, with the dilacerated distal portion (apical third of the root) in close proximity with the floor of the nose notching it. Between the root of the retained primary upper right incisors and the crown of the dilacerated upper right incisors were multiples of calcified teeth – like structures resembling 'odontomes'. The radiographic examinations also revealed that the crown of the dilacerated upper right central incisor was directed labially and embedded deep in the bone (Figure 1,2).

She was planned for the extraction of the retained primary upper right incisors, removal of the odontomes and the surgical exposure of the crown of the unerupted dilacerated upper right central incisor by closed flap technique for orthodontics attachment and subsequent traction. An incision was made to include two teeth on either side and a labial flap was raised under local anesthesia. The retained primary upper right central incisor was extracted and some bone removed from the cortical bone plate to expose the multiple odontomes which were all

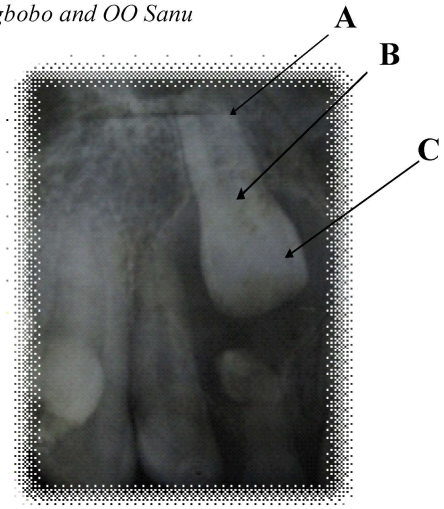

Fig.1: Periapical radiograph showing;
(a) Unerupted dilacerated upper right central incisor,
(b) Multiple odontomes and
(c) Root of retained primaryupper right incisor.

Fig, 2: Periapical radiograph showing Unerupted dilacerated upper right central incisors post extraction of the multiple odontomes and retained primary upper right incisors

Fig, 3. The piece of odontome remove at surgey

removed (Figure 3). The labial crown surface of the dilacerated tooth was made visible through another small window in the labial cortical plate about 8mm higher up. On the exposed part of the crown, an orthodontics button with twisted ligature wire attached to it was placed with the aid of 'Reliance orthodontic light bond following the manufacturer

procedure. The flap raised was then replaced back (close eruption technique) into position using black silk suture 3.0 materials to promote primary healing with the ligature wire projecting into the oral cavity. The healing was uneventful and sutures were removed after one week.

Fig. 4: Periapical radiograph showing; Unerupted dilacerated upper right central incisors following orthodontic traction

Fig.5: Periapical radiograph showing; Unerupted Dilacerated upper right central incisors in functional occlusion

A complete upper arch only setup was done with straight wire appliance using Lancer orthodontics Redi – Pak prescription kit. At the stage of 0.020 in. round stainless steel arch wire an 0.010 in. open coil spring was placed to regain adequately the lost space and create enough space for the unerupted dilacerated upper right central incisor. The midline diastema present was used to achieve this. With a centrally placed coiledloop incorporated on the 0.020 in. stainless steel arch wire around the edentulous space, a controlled and direct force of traction was made with the aid of an orthodontic elastic thread to bring the unerupted dilacerated tooth into occlusion in the mouth (figure 4).The patient was reviewed every six (6) weeks and the orthodontic elastic thread changed regularly. The unerupted dilacerated upper right central incisor was found to erupt into the mouth in seventeen (17) months following the initial orthodontic traction (figure 5, 6). The tooth was properly aligned and leveled at its functional position with adequate torque and angulations'using the rectangular arch wire 0.019×0.025 in. stainless steel wire. Also, a good gingival margin compared to the adjacent teeth was ensured.

Fig. 6: Intra oral photograph of upper right central incisors just about erupting

Fig. 7: Intra oral photograph of upper right central incisor in occlusion

The patient was overjoyed with the treatment outcome but was lost to follow up and the eventual debonding and placement of a retainer was not possible as all efforts to recall her proved futile. She was originally planned for gingival contouring of hyperplastic gingival and combined fixed retainer (palatally from the upper right canine to the upper left canine) and removable Hawleys retainer to prevent any form of relapse of the malocclusion and monitored for a period of twelve months before being eventually discharged (Figure 7).

Discussion

The occurrence of unerupted maxillary incisors brings concerns to the parents and patient in the early mixed dentition because of the conspicuous position of the teeth. [11]. Delay in the eruption of the maxillary

incisors requires monitoring especially in a situation where the contralateral maxillary incisor had erupted more than six months earlier or in a situation where both maxillary incisors are yet to erupt more than one year after the eruption of the lower incisors [5, 8].

Several treatment options have been offered by different authors in literature for the treatment of unerupted maxillary central incisors. Very few studies have reported the management of severely dilacerated maxillary incisors and this could be due to the attendant difficulty in its management [10]. Extraction of such a tooth is usually the last option as a loss of alveolar bone is anticipated [12]. Close flap technique with orthodontic traction is a more favourable technique that is commonly adopted [5].

The success rate of an unerupted dilacerated tooth depends on early diagnosis [5], the degree of dilaceration, stage of root formation and tooth vertical position of the tooth [10, 11]. Successful treatment of an impacted maxillary incisor with severe dilacerations is quite rare. Hence, orthodontists will often hesitate to align an impacted incisor with a severely dilacerated root due to failure from ankylosis, external root resorption, and root exposure after orthodontic tooth movement [10, 11].

Often the position or location of the impacted incisor determines the surgical procedure used [8]. The exact position of the tooth is usually determined following investigations with radiographs. Though the panoramic radiograph is considered the standard radiographic first step examination. In this case report, due to the unavailability of the panoramic view, the parallax method in which case two (2) periapical radiographs are taken at two different radiation cone beam angulations was adopted to localize the tooth position. Other methods that can also be used include a periapical radiograph combined with a standard occlusal radiograph of the jaw and a periapical radiograph combined with a panoramic (orthopanthomogram) radiograph. All these combinations of radiographs are all in a view of locating the object (incisors) in 3 dimensions. The 3 dimensions technologies such as computertomogram scan (CT scan) and Magnetic Resonance Imaging (MRI) are better investigatory tools for such anomaly. Gradually, these technologies are being introduced into dental practices especially in the western world. Due to cost, it could not be used in our environment.

The common surgical techniques used in orthodontic traction of unerupted tooth include the closed flap technique and the apically reposition flap technique. Two different studies suggested that the closed technique resulted in a more aesthetically pleasing gingiva than the apically repositioned flap [8, 13]. Therefore, this technique was adopted in this case. Superior results have also been reported in terms of gingival, periodontal and pulp status using the closed eruption technique in comparison with the apically repositioned flap. However, there was no significant difference between the techniques regarding periodontal attachment [13].

Trauma to the primary teeth may have various implications such as enamel hypoplasia and dilaceration. The latter has been found to be far more common, with maxillary teeth being more frequently involved than mandible [14, 15]. So, it is advisable to keep these patients under observation after trauma and to consult an orthodontist at an early stage in case of non-eruption of teeth. The reason for this is that early orthodontic intervention has been found to result in very good outcome with respect to the occlusion of the patient as it was seen in this present case. The timing of intervention is also important, with treatment and tooth eruption likely to be quicker at a younger age. However, some other studies have suggested that age of intervention has no effect. [8]

Also, it should be noted that it is not in all cases of dilaceration of apical third of the root of the unerupted incisors that apicectomy and retrograde root filling combined with subsequent orthograde filling of the tooth are required. In this case presentation, orthodontic traction alone following the removal of the obstructive odontome from the path of eruption using the close flap technique was enough to bring the impacted dilacerated central incisors from its high position around the floor of the nasal cavity into proper occlusion, good and pleasing aesthetics with good periodontal health. Hence, each case should be carefully chosen and required technique for management based on its own merit.

Conclusion

Timing and approach are factors that play important role in the orthodontic management of the unerupted maxillary incisors. Hence, a child involved in trauma should be well investigated and followed up to rule out any possibility of complications to the trauma. If and when diagnosis is made early enough, the timing and prognosis of treatment remains good if the position of the unerupted tooth is favourable.

The unerupted dilacerated incisor with a favourable path of eruption and adequate space on the arch diagnosed in the early mixed dentition should be treated with the aid of orthodontic traction alone as achieved in this case report. The patients should not be put through unnecessary over treatment that may eventually affect the quality of life in one form or the other.

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Knowledge, attitude, and practice of dental flossing among non-dental health personnel

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Abstract
Background: Tooth-brushing alone is reported as inadequate for removal of inter-dental plaque, indicating the need for adjunctive aids such as dental floss. Therefore, preventive dental health education, including the need for dental flossing has been regularly given among the various health personnel in the University College Hospital, Ibadan.
Aim: To determine the knowledge, attitude and practice of dental flossing among non-dental health personnel.
Materials and methods: A 22-item structured self-administered questionnaire was used to collect data regarding knowledge, attitude and practice of dental flossing among the non-dental health personnel of the University College Hospital, Ibadan. Ethical approval was obtained from UI/UCH Ethics Review Committee.The data was analyzed using Windows Statistical Package for Social Sciences version 21.0.
Results: Two hundred and four participants were involved, out of which 114(55.9%) were females, and 90 (44.1%) were males.The average age was 31 years. They included medical doctors, nurses, community health officers, medical laboratory scientists, surgeons, dieticians, pharmacists and physiotherapists.Response rate was 97%. Eighty-four percent of the participants were knowledgeable about dental flossing, with 74.0% using it to remove impacted food particles. Regarding participants' attitude to dental flossing, all respondents thought it was a good habit, but only 66.7% think it is a simple habit. However, about 60% flossed daily, while the rest flossed occasionally.
Conclusion: The knowledge, attitude and practice of dental flossing among non-dental health personnel of the University College Hospital, Ibadan is fair. However, regular dental flossing should be emphasized as mainly to remove inter-dental plaque, in order to prevent periodontal disease.

Keywords: *Knowledge, attitude, practice, dental flossing, health personnel*

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Résumé
Contexte: Le brossage des dents seul est considéré comme inadéquat pour l'enlèvement de la plaque dentaire, ce qui indique la nécessité d'utiliser des adjuvants telle que la soie dentaire. Par conséquent, l'éducation préventive en matière de santé dentaire, y compris le besoin d'utilisé la soie dentaire, a été régulièrement dispensée aux divers personnels de santé du Collège Hospitalier Universitaire d'Ibadan.
But: Pour déterminer la connaissance, l'attitude et la pratique de la soie dentaire parmi les personnels de santé non-dentaire.
Matériel et méthodes: Un questionnaire auto-administré structuré en 22-items a été utilisé pour recueillir des données sur la connaissance, l'attitude et la pratique de la soie dentaire parmi les personnels de santé non-dentaire du Collège Hospitalier Universitaire, Ibadan. L'approbation éthique a été obtenue auprès du Comité de Revue Ethique de l'UI / UCH. Les données ont été analysées à l'aide du Logiciel Statistique pour les Sciences Sociales version 21.0.
Résultats: Deux cent quatre participants étaient inclus, dont 114 (55,9%) étaient des femmes et 90 (44,1%) étaient des hommes. L'âge moyen était de 31 ans. Ils comprenaient des médecins, infirmières, agents de santé communautaires, scientifiques de laboratoire médical, chirurgiens, diététiciens, pharmaciens et physiothérapeutes. Le taux de réponse était de 97%. Quatre-vingt-quatre pour cent des participants étaient informés sur l'utilisation de la soie dentaire, avec 74,0% d'entre eux l'utilisant pour éliminer les particules de nourriture contaminées. En ce qui concerne l'attitude des participants envers la soie dentaire, tous les répondants pensent que c'est une bonne habitude, mais seulement 66,7% pensent que c'est une habitude simple. Cependant, environ 60% utilisent la soie dentaire par jour, tandis que le reste utilisent la soie dentaire de occasionnellement.
Conclusion: La connaissance, l'attitude et la pratique de la soie dentaire chez les personnels de santé non-dentaire du Collège Hospitalier Universitaire d'Ibadan est équitable. Cependant, l'usage régulier de la soie dentaire devrait être souligné pour principalement enlever la plaque inter-dentaire, afin de prévenir la maladie parodontale.

Mots clés: *Connaissance, attitude, pratique, soie dentaire, personnel de santé*

Introduction

Periodontal disease is one of the major public health problems in developing countries like Nigeria, thus there is a need to ensure preventive measures to reduce its burden [1]. Dental plaque is the main etiological factor in periodontal disease, and removal of this biofilm is the gold standard for the prevention of periodontal disease. Mechanical methods are the most effective measures of plaque control [2,3]; and toothbrushing alone is reported to be inadequate for removal of interdental plaque, indicating the need for adjunctive oral hygiene aids such as dental floss [4]. The dental floss was invented by Levi Spear Parmly, a New Orleans dentist, referred to as the apostle of oral hygiene [5]. They advised their patients to floss with a piece of silk thread in 1815. Subsequently, improvements have occurred to produce the current floss types [6].

Claydon [2] opined that there is good evidence to recommend dental floss to adults for the prevention of gingival inflammation. In a systematic review, Sambunjak *et al*. [7] concluded that in addition to tooth brushing, flossing further reduces gingivitis, compared to tooth brushing alone. Another study showed that use of dental floss regularly by orthodontic patients resulted in marginally better gingival outcome than those who did not use dental floss [8].

The American Dental Association (ADA) [9] recommends flossing at least once a day. It advises that dental flossing be done using about 18 inches of floss, wound around one of the middle fingers, with the rest wound around the opposite middle finger. The floss can then be held tightly between the thumbs and forefingers and gently inserted between the teeth. It should then be curved into a "C" shape against the side of each tooth, rubbed gently up and down, while pressed against the tooth.

The use of dental floss as an added oral hygiene measure has been reported as poor throughout the world [10-12]. In a study among Indians [13], it was reported that only 15.8% used dental floss,which was attributed to the low level of awareness among the people, and poor prescription practices of the dentists. In a study conducted among dentists practicing in theUSA and Japan, 56.3% and 23.4% respectively, used dental floss [14,15]. Studies have also shown that information, education, and communication by dentists regarding good oral hygiene play a significant role on positive health behavior among their patients [16].

Though dentists play a major role in prescribing effective oral hygiene measures for maintenance of good oral health, health workers in other disciplines can readily be engaged to provide valuable counsel to many people in the course of their practice with regard to dental flossing. Thus, improving the knowledge, attitude and practice of dental flossing among other health workers can influence both their personal oral care, and their oral health advice to others.

Oral health education activities are usually conducted by designated members of the Department of Periodontology and Community Dentistry on a daily basis. These oral health care talk sessions are given at several fora: en-masse in the Dental Centre reception hall, one-on-one during dental treatments, and in many gatherings of the hospital staff such as seminars. This study was done to assess the impact of these teachings.

Methodology

Design: This was a cross-sectional study using a 22-item structured, close-ended, questionnaire, designed to gather coded historical data regarding *knowledge, attitude and practice of dental flossing.* The study population was the **N*ON-DENTAL****health personnel of all specialties of the University College Hospital, Nigeria:* medical doctors (including those who did postings in dentistry), nurses, community health officers, medical laboratory scientists, surgeons, dieticians, pharmacists and physiotherapists. Ethical approval was obtained from UI/UCH Ethics Review Committee.

Sampling:

The sample size was determined using the formula for proportions: n=z2[pq]/d2 at 95% confidence level. A prevalence of 14.4% from a similar study [17] was used. This gave a sample size of 189. However, 210 questionnaires were distributed.Convenient sampling technique was employed i.e. non-dental health personnel who were informed and who consented to the research process, participated. This was continued until the questionnaires were exhausted.

Data collection procedure

The questionnaire was pretested among 20 non-dental health personnel that were not included in the study. Necessary modifications were made based on the pretest. The questionnaires were then distributed and self-filled by the consenting adults.*A*nonymity of participants was maintained.

Data analysis

The data collected were analyzed using Windows Statistical Package for Social Sciences (version 21.0,

SPSS, Chicago, IL, USA). Ranking was done during data entry in order to give maximum weight to the variable with the highest ranking. Descriptive statistics which included calculation of percentage, mean and standard deviation, were performed on the subjects' *knowledge, attitude, and practice of dental flossing,* and associated factors. Significant differences between variables were tested using Chi-square test, level of statistical significance set at $P < 0.05$.

Results

Of the 210 questionnaires administered, 204 (97%) were properly filled and used for analysis.

One hundred and fourteen (55.9%) participants were females, and 90 (44.1%) were males. Among the females 93, (81.6%) used dental floss, while 21, (18.4%) did not.Among the males, 79(87.8%) used dental floss, while 11, (12.2%) did not.On analysis, the gender was not found to have a significant influence on the use of dental floss ($X^2 = 1.461$, p=0.227).

The ages of the respondents ranged from 22 to 55years, with the majority between 35 and 45 years of age. There were 75 medical doctors (36.8%), out of which 64, (85.3%) use dental floss; 35 Nurses (17.2%), out of which 26, (74.3%) use dental floss. There were also 34 Community Health Officers, 17 Medical Laboratory Scientists, 15 Surgeons and others whose usage of dental floss is depicted in Table 1. Also, there was no significant association between the occupation and the usage of dental floss.(X^2=8.351, p = 0.303).

Knowledge

From Table 2; 84% (171) of the participants had knowledge about dental flossing, out of which, 46.5% sourced the information about dental flossing from dental hygienists, 32.8% from dentists, and 20.7% from other sources. A high majority of those who flossed did so to remove impacted food pieces; while others did it to remove dental plaque. The purpose for tooth flossing was found to have a significant impact on the usage of dental floss(X^2=11.395, p=0.010).

The majority (80.8%) of the respondents knew that regular flossing of teeth reduces risk for dental disease, and in the same manner, 71.7 % know that failure to regularly floss teeth increases the risk of dental disease. Theseknowledge had significant impact on the usage of dental floss (p=0.000) and (p=0.001) respectively.

Attitude

A high majority (84%) believe dental flossing is a good habit to form, while 66.7% of those who floss think it is a simple habit to form, and these

Table 1: Occupation versus use of dental floss *among* non-dental health personnel

Occupation	Use Dental Floss	Do Not Use Dental Floss	Total	Percentage among all Participants
Medical doctor	64	11	75	
	85.3%	14.7%	100.0%	36.8%
Nursing	26	9	35	
	74.3%	25.7%	100.0%	17.2%
Community	28	6	34	
Health Officer	82.4%	17.6%	100.0%	16.7%
Medical Lab.	13	4	17	
Scientist	76.5%	23.5%	100.0%	8.3%
Surgeon	15	0	15	
	100.0%	0.0%	100.0%	7.3%
Dietician	13	1	14	
	92.9%	7.1%	100.0%	6.9%
Pharmacist	7	1	8	
	87.5%	12.5%	100.0%	3.9%
Physiotherapist	6	0	6	
	100.0%	0.0%	100.0%	2.9%
Total	172	32	204	
	84.3%	15.7%	100.0%	100%

X^2=8.351,p=.303.

Table 2. Knowledge Versus *Use of Dental Floss among* Non-Dental Health Personnel

Knowledge use of dental floss	Frequency value	Percent	Chi-Square
Knew about dental floss	171	84	
Did not know about dental flossing	33	16.2	
Got information about dental flossing from dental hygienist	79	46.5	X^2=1.056 p= .590
Got information about dental flossing from dentist	56	32.8	
Got information about dental flossing from others (friend, mother, father)	35	20.7	
Purpose for tooth flossing is to remove impacted food pieces	126	74	X^2=11.395 p=.010
Purpose for tooth flossingis to remove dental plaque	45	26	
Thought regular flossing of teeth reduces risk for dental disease	138	80.8	X^2=23.972 p=.000
Did not think regular flossing of teeth reduces risk for dental disease	33	19.3	
Knew that failure to regularly floss teeth can increases the risk X^2=16.463p=.001	123	71.7	
Did not know if failure to regularly floss teeth can increases the risk of dental disease	48	28.3	

beliefs(that it is a good habit and simple habit to form) have a significant impact on the usage of dental floss(p=0.007) and (p=0.000) respectively (Table 3).About three quarter (75.8%) of the participants would like to be able to floss regularly.

occasionally. Many(64.3%) claimed they had a form of plan regarding dental flossing. Analysis showed that having such a plan had a significant influence on the usage of dental floss (X^2=8.662, p=0.013).

Table 3. Attitude Versus *Use of Dental Floss among* Non-Dental Health Personnel

Attitude	Use of dental floss		
	Frequency	Percentage	Chi-Square value
Think dental flossing is a good habit to form	171	100	X^2=10.018 p=.007
Do not think dental flossing is a good habit to form	0	0	
Think dental flossing is a simple habit to form	114	66.7	X^2=37.428 p=.000
Do not think dental flossing is a simple habit to form	57	33.3	
Would like to be able to floss regularly	130	75.8	X^2=.262
Would not like to be able to floss regularly	41	24.2	p=.877

Practice

From Table 4; 32.7%of participants use the Traditional Finger-held floss while 65.5% use disposable pre-threaded floss. There is a significant association between the type of floss used and the usage of dental floss(X^2=18.707, p=0.001). The majority (75.4%) of those who floss do it after eating a meal, and there is also a significant association between the time of flossing and the usage of dental floss(X^2=42.275, p=0.000). More than half (60.2%) of those who floss did it once daily; the rest did it

Few participants had complaints of pain during flossing (19.3%), which had no significant influence on the usage of dental floss (X^2=1.011, p=0.799), but 17.0% of those who flossed reported gum-bleeding during flossing, and this had a significant influence on the usage of dental floss (X^2=9.522, p=.023).

Discussion

This study aimed at determining the present level of knowledge about dental flossing,the attitude towards it, and the practice of it,among non-dental health

Table 4. Practice Versus Use of Dental Floss among Non-Dental Health Personnel

Practice	Use of dental floss		
	Frequency	Percent	Chi-Square value
Use the Traditional Finger-held floss	56	32.7	X^2=18.707
Use disposable pre-threaded floss	112	65.5	p=.001
Use Re-usable floss holders	3	1.8	
Floss in the: Morning	17	9.9	X^2=42.275
Floss in the Afternoon	4	2.3	p=.000
Floss in the Night	21	12.3	
Floss after meals	129	75.4	
Floss at least once a day	103	*60.2*	X^2=42.414
Floss Occasionally	68	39.8	p=.000
Have a plan/routine regarding Flossing	110	64.3	X^2=8.662
Have no plan/routine regarding Flossing	61	35.7	p=.013
Feel pain when flossing	33	19.3	X^2=1.011
Do not feel pain when flossing	138	80.7	p=.799
Gums bleed when flossing	29	17.0	X^2=9.522
Gums do not bleed when flossing	142	83.0	p=.023

personnel of the University College Hospital, Ibadan.This is in order to see how equipped these fellow health workers are, with regard to good personal use of dental flossing, to be able to effectively impart this advantage to the people they meet in the course of their work.

This study showed that an appreciable proportion (84.0%) of these health personnel are knowledgeable about dental flossing. This is higher than 56.3% reported by Merchant et al.[14], among dentists in US who used dental floss once daily, and farhigher than23.4% reported byNakamura et al. [15] among dentists in Japan. This difference may be due to the afore mentioned daily oral health education activity being carried out by the team of dental health workers comprising public health dentists, dental therapists and dental nurses from the Hospital, every workday morning.Our results also showed that most of the participants got their information about dental flossing from dental hygienists (46.5%) and dentists (32.8%).

The purpose of flossing had a significant influence on the usage of dental floss in this study (X2=23.972, p=0.000). However, more of the subjects floss for the purpose of removing impacted food pieces, rather than to remove dental plaque. This indicates an area where the flossing education needs to be improved: it should be better emphasized that removal of dental plaque from the inter-dental area is the main purpose for regular dental flossing. Many of our subjects also knew that regular flossing of teeth reduces risk for dental disease, and believe that failure to regularly floss teeth increases the risk of dental disease. This might attest to the possibility that they were well motivated by those who gave them instruction about dental flossing. Furthermore, this knowledge and belief (that regular flossing of teeth reduces risk for dental disease, and failure to regularly floss teeth increases the risk of dental disease), did have a significant impact on the use of dental floss among the respondents. However, this finding does not agree with the report of Neamatollahi *et al.*[18] which stated that though 40.6% of their subjects believed that tooth brushing is not enough for oral and dental health, they hardly used dental floss.Also,Orlando *et al.* [19] stated that though about 90% of their subjects had been instructed on dental flossing to prevent periodontal disease and bleeding gums, yet about 42% did not floss.

Though all those who floss think dental flossing is a good habit to form, fewer (66.7%) think it is a simple habit to form. Considering that the participants' attitudes about the simplicity of dental flossing significantly impacted the usage of dental floss: (X2=37.428, p=0.000), measures to improve on their perception of this simplicity will improve their use of dental floss. For instance, since we saw from the participants who have some form of plan regarding regular dental flossing, that this plan significantly influenced the usage of dental floss(X2=8.662, p=0.013), it is likely that if some effort is made towards building a workable plan with regard to regular flossing, there will be a good improvement in the perception about the simplicity of flossing. This is also a promising area to work on, considering that many (75.8%) would like to be able to floss regularly. The studies of Neamatollahi *et al*. [20]; Rise *et al*. [21]; Schüz *et al*. [22] and Suresh *et al*.[23] agreed with the positive effect of having a workable plan for regular flossing.

Conclusion

This study showed that the present level of knowledge of, attitude towards, and practice of dental flossing among non-dental health personnel of the University College Hospital, Ibadan are good; though there is need to emphasize that the main purpose of dental flossing is to remove dental plaque. We recommend that they should be encouraged to impart this advantage to the people they meet in the course of their work.

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Correlation of acetylcholinesterase activity inhibition with ageing in organophosphate-exposed farm workers at Ibadan, South-Western Nigeria

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Abstract
Background/Aim: In an attempt to destroy pests and enhance food production, Nigerian local farmers are occupationally exposed to organophosphate pesticides (OP). During exposure, OP affect the nervous system by impairing the activity of acetylcholinesterase enzyme (AchE) thus leading to accumulation of acetylcholine at t1he neuromuscular junction. This defect in the cholinergic pathway has been consistently reported for over two decades in studies on the brains of those with advanced age. This study is aimed at determining the relationship between the levels of AchE activity with ageing in apparently healthy OP-exposed farmers as well as in unexposed controls in Nigeria due to paucity of data in this environment.
*Method***:** This case-control study comprises a total of 104 apparently healthy participants. Fifty-two farmers (41 males, 11 females; aged 30-62 years) occupationally exposed to OP and 52 sex-matched unexposed controls (aged 38-60 years) were recruited from Idi-Ayunre farm settlements on the outskirts of Ibadan and University College Hospital, Ibadan respectively.
*Results***:** Mean AchE level of OP-exposed farmers (7.22 ± 1.99 kIU/L) was significantly lower ($p<0.05$) than the controls (12.23 ± 1.67 kIU/L). Correlation of AchE activity with age was 0.189, p=0.179 and -0.325, p=0.019 for the farmers and controls respectively.
*Conclusion***:** Low AchE activity level of the farmers indicates a persistent accumulation of acetylcholine at the neuromuscular junction, which may predispose them to intermediate syndrome. Significant negative correlation between AchE activity and age of the controls probably indicates that the normal ageing process is associated with decreased AchE activity.

Keywords: *Acetylcholinesterase, Organophosphate, Ageing, Farmers, Cholinergic Pathway*

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Résumé
Contexte / But: Dans le but de détruire les ravageurs et d'améliorer la production alimentaire, les fermiers locaux nigérians sont exposés professionnellement aux pesticides organophosphorés (PO). Au cours de l'exposition, PO affecte le système nerveux en altérant l'activité de l'enzyme acétylcholinestérase (AchE) conduisant ainsi à l'accumulation d'acétylcholine à la jonction neuromusculaire. Ce défaut dans la voie cholinergique a été régulièrement signalé depuis plus de deux décennies dans des études sur le cerveau des personnes ayant un âge avancé. Cette étude vise à déterminer la relation entre les niveaux d'activité de l'AchE avec le vieillissement chez des fermiers apparemment sains exposés au PO ainsi que chez des témoins non exposés au Nigeria en raison du manque de données dans cet environnement.
Méthode: Cette étude de cas-contrôle comprend un total de 104 participants apparemment en bonne santé. Cinquante-deux fermiers (41 hommes, 11 femmes, âgés de 30 à 62 ans) exposés professionnellement à l'OP et 52 témoins non exposés gendre-appariés (âgés de 38 à 60 ans) ont été recrutés respectivement dans les colonies fermières d'Idi-Ayunre à la périphérie d'Ibadan et au Collège Hospitalier Universitaire, Ibadan.
Résultats: Le niveau moyen d'AchE des fermiers exposés au PO (7,22 ± 1,99 kIU / L) était significativement plus bas ($p <0,05$) que celui des témoins (12,23 ± 1,67 kIU / L). La corrélation de l'activité d'AchE avec l'âge était de 0,189, p = 0,179 et -0,325, p = 0,019 pour les fermiers et les témoins respectivement.
Conclusion: Le faible niveau d'activité d'AchE chez les fermiers indique une accumulation persistante d'acétylcholine à la jonction neuromusculaire, ce qui peut les prédisposer au syndrome intermédiaire. Une corrélation négative significative entre l'activité de l'AchE et l'âge des témoins indique probablement que le processus de vieillissement normal est associé à une diminution de l'activité de l'AchE.

Mots-clés: *Acétylcholinestérase, Organophosphoré, Vieillissement, Fermiers, Voie Cholinergique*

Introduction

The enzyme acetylcholinesterase (AchE; E.C. 3.1.1.7) found in the cholinergic terminal is a specific choline esterase, hydrolyzing predominantly choline esters (acetylcholine- Ach) [1]. It plays a key role in cholinergic metabolism as it hydrolyzes the neurotransmitter acetylcholine into acetate and choline, thus terminating nerve impulse transmission [1]. These enzymes are highly distributed in the brain, nerves and red blood cells [2] as well as in the central and peripheral nerve tissues of different vertebrates, hence, demonstrating a high range of variation [3, 4].

The importance of acetylcholinesterase in the body homeostasis is underscored by the fact that they are the targets of some of the most potent toxins including insecticides or pesticides, snake venom and chemical weapons [5]. Inhibition of AchE by these compounds leads to accumulation of acetylcholine in the synaptic cleft and results in impeded neurotransmission [6]. Acetylcholine is considered as the most important neurotransmitter involved in the regulation of cognitive functions [7]. Its accumulation within the nervous system leads to continuous stimulation of cholinergic receptors, resulting in symptoms of toxicity such as salivation, tremors, and miosis and in severe cases, respiratory paralysis and death [8].

Organophosphates, esters of phosphoric acid, are a class of irreversible AchE inhibitors [6]. Thus, the inhibition of acetylcholinesterase (AchE) activity has been used widely as a biomarker of exposure to organophosphate pesticides (OPs) [9]. In our environment today, farm workers are the ones directly at the receiving end of the hazards associated with chronic exposure to organophosphate pesticides. These farmers are therefore vulnerable to defects in the cholinergic system attendant on accumulation of acetylcholine at the neuromuscular junction. Similarly, a marked decrease in AchE activity with increasing age has been reported by [10]. These researchers also suggest the vulnerability of those with advanced age to impaired neurotransmission [10]. Normal ageing is reported to be associated with a slow decline in brain functions such as sensory and motor performance. At times, this decline is accompanied by progressive memory loss, dementia and cognitive dysfunctions, ultimately resulting in limited functionality [11].

A neurochemical hypothesis has been proposed in which brain ageing is related to changes in cerebral neurotransmission, and the initial focus has been on cholinergic neurotransmission [12]. A body of animal literatures further suggested that disruption to the cholinergic system could be one possible mediating factor in age-related cognitive change in humans [12-19]. Changes in cholinergic function have been characterized and a strong correlation has been observed with cognitive decline associated with ageing [10].

Extensive evidence has substantiated the general hypothesis that cortical cholinergic inputs primarily mediate attention processes and capacities [20-24]. The aim of this study therefore, was to determine the plasma acetylcholinesterase (AchE) activity in apparently healthy organophosphate (OP)-exposed farmers and unexposed controls, and thereafter, correlate the levels of AchE activity with age in these participants.

Materials and methods

Selection and description of participants

A total of 104 apparently healthy participants were recruited for this case-control study. Fifty-two occupationally exposed farmers consisting of 41(78.85%) males and 11(21.15%) females between the ages of 30 and 62 years were recruited from Idi-Ayunre farm settlements, Oluyole Local Government Area located on the outskirts of Ibadan Metropolis, South-western Nigeria. All farmers studied used the pesticide parathion (*paraphos*). Similarly, 52 control participants comprising 41(78.85%) males and 11(21.15%) females between the ages of 38 and 60 years were recruited from the University College Hospital (UCH) Ibadan and environs. All participants were not on any medication. The study was approved by the University of Ibadan/University College Hospital (UI/UCH) Joint Ethics Review Committee and informed consent was duly obtained from each of the participants prior to specimen collection.

Questionnaire administration

At enrolment, the participants completed a short self-structured questionnaire designed to obtain information on their demographic characteristics, life style, number of years in the farming profession, duration of exposure to organophosphate pesticides per day, medical histories and dietary habits.

Blood sample collection

Five millilitres of blood was collected into lithium heparin bottles, and centrifugation of the blood samples was done at 3,000 rpm for five minutes, followed by freezing of the plasma samples at -20ºC until the samples were analyzed.

Assay Methodology for Acetylcholinesterase Activity in Plasma

Using the method of Ellman *et al*. [25], AChE activity in plasma samples was measured at the wavelength of 412 nm using a double beam spectrophotometer.

Statistical analysis

The statistical analysis of the data was carried out using Software Package for Social Sciences (SPSS) version 20. Results were presented as mean ± standard deviation (SD). Student t-test was used to examine the differences in mean AchE activity between the farmers and controls. Pearson correlation coefficient (r) was used to test the relationship between variables and the level of significance was set at $p< 0.05$.

Results

Some demographic and clinical indices of the subjects are shown in Table 1. As depicted in this table, there was a significantly higher systolic blood pressure in the farmers compared with the controls ($p < 0.05$). Table 2 depicts age grouping of the farmers and the controls with AchE showing that there is a significant depletion of AchE activity with increasing age in the controls but not in the exposed farmers. Table 3 depicts the correlation of AchE activity with age of the farmers. Inversely and positive association was found between these parameters in control group. Figure 1 shows a graphical representation of the mean plasma AchE activity observed in the participants. A significantly

Table 1: Comparison of Some Demographic and Clinical Indices of the Subjects

Index	Farmers (n = 52)	Controls (n = 52)	P-Value
Years of farming experience	19.79 ± 13.97	N/A	
Duration of exposure/day (Hours)	2.53 ± 1.30	N/A	
Systolic blood pressure (mmHg)	132.88 ± 8.25	123.37 ± 10.88	0.000*
Diastolic blood pressure (mmHg)	82.12 ± 7.76	95.2 ± 8.30	0.102

*significant at $p< 0.05$ n= number of subjects N/A = Not applicable

Table 2: Acetylcholinesterase (AchE) per age groups

Participants/ Age (yrs)	30-40 years	41-50 years	51-60 years	61 years and above	**Total** No. (N)	**Chi-** Square	**p-values**
Exposed	6.20±1.05	6.94±0.74	7.25±2.04	8.06±2.87	**7.22±1.99**		
Groups (n)	6	10	26	10	52		
Unexposed	12.93±2.41	12.67±1.61	11.51±1.23	11.08±0.13	**12.23±1.67**	**12.16**[a]	**0.007**
Control Group (n)	7	25	17	3	52		
Total No. (N)	**13**	**35**	**43**	**13**	**104**		

[a] 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.50.

Table 3: Correlation of AchE Activity with Age and Years of Farming Experience of the Participants

Index	Index	Farmers (n = 52) r (p-value)	Controls (n = 52) r (p-value)
AChE	Age	0.189 (0.179)	-0.325 (0.019**)

**significant at $p< 0.05$ n = number of subjects r = Pearson Correlation Coefficient

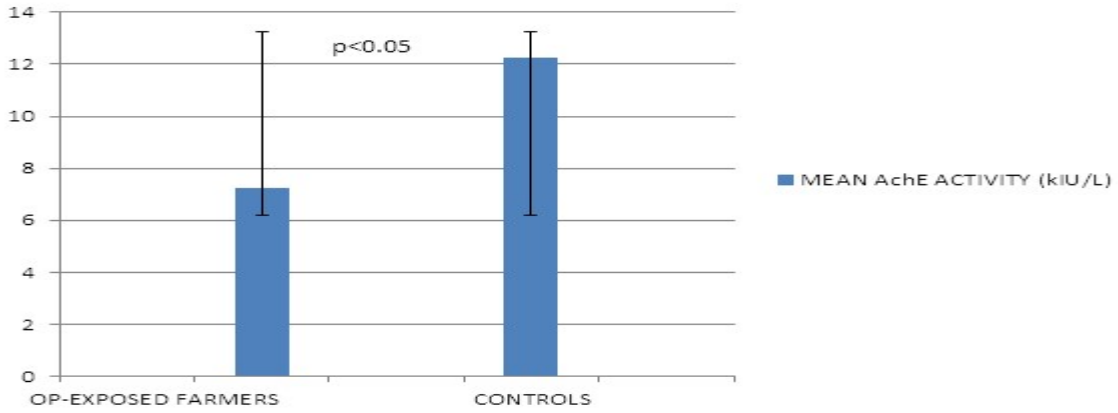

Fig. 1: Mean AchE activity (kIU/L) of the participants

lower value was found in the OP-exposed farmers compared with the controls.

Discussion

Occupational exposure to organophosphate pesticides has been shown to be characterized by a marked inhibition of acetylcholinesterase activity. In this study, the results indicated a clearly high level of exposure to organophosphate pesticide; *paraphos*, among the local farmers around Ibadan, Southwest Nigeria. This corroborates reports from the previous studies [26-27] in which significantly inhibited AChE activity was found in organophosphate-exposed workers. Inhibition of AChE may lead to accumulation of the neurotransmitter, acetylcholine at the neuromuscular junction which may render these farmers vulnerable to defects in cholinergic neurotransmission as indicated by the work of Shaked, Meerson, and Wolf [6].

This study also reveals that the normal ageing process is associated with a progressive decline in AChE activity as indicated by the depletion of AchE activity with increasing age in the controls but not in the exposed farmers and significant negative correlation observed between age and AchE activity in the controls ($p< 0.05$). This finding supports the previous reports of Jha and Rizvi [10] in which there was a marked decrease in AchE activity with increasing age in normal healthy participants. Similar findings were also reported separately by Das *et al* [28] and Skau and Triplett [29] in their studies in which the relationship between ageing and AchE activity in different brain regions were examined.

Decline in cholinergic indices (choline acetyltransferase, AchE, and muscarinic acetylcholine receptors) has already been reported during normal ageing process [30]. Ageing is an inevitable biological process. It has been defined as the progressive accumulation of diverse deleterious changes with time that increases the chance of disease and death [10]. McNeil and Valenzuela [12] have suggested that disruption to the cholinergic system could be one possible mediating factor in age-related cognitive change in humans. Therefore, it is presumed that increasing cholinergic transmission may enhance cognitive function in aged individuals [31]. Cells in all regions of the nervous system are affected by ageing, as indicated by the decline in sensory, motor and cognitive functions with time [32]. Data emanating from studies conducted in Egypt have indicated that blurred vision, dizziness, numbness, paraesthesia, headache, vertigo, asthenia, superficial sensory loss, trophic and vasomotor changes and decrease ankle and deep reflexes were more prevalent among pesticide applicators than controls especially those with longer duration of exposure [33]. It has also been indicated that moderate exposure to organophosphates over several years may also be associated with deficit in verbal abstraction, attention and memory [34]. However, there is considerable variability among individuals in the apparent rate of ageing, the neural systems most affected, and whether and how age-related deficits are compensated [35]. In contrast to the above, Salvi *et al* [36] found normal acetylcholinesterase activity in patients aged 60years and below chronically exposed to organophosphates who also presented with psychomotor alterations, cognitive slowing, memory and attention deûcits, and other psychiatric symptoms, alterations which are expected to be associated with inhibited acetylcholinesterase activity.

Conclusion

The marked inhibition of AchE activity by organophosphates is well established and further demonstrated by this study. Ageing-induced decline in AchE activity is also well documented in other parts of the world but has not been established in our environment due to paucity of data; which this study has shown to be so in our environment also. However, the correlation of changes in cholinergic function occasioned by a marked decrease in AchE activity with cognitive decline associated with ageing is needed, thus necessitating follow-up studies.

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Ultrasound diagnosis of cervical incompetence with cord prolapse

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Abstract

Cervical incompetence is a frequent cause of inevitable miscarriage in the second trimester, and it is often associated with a poor foetal outcome. Dilatation of the cervix was observed in a 31-year-old pregnant woman with previous preterm delivery. She presented with severe pelvic pains, preterm contractions and amniotic fluid discharge. Emergency abdominal sonography revealed polyhydramnios and umbilical cord prolapse. The cervical diameter measured 45 mm and the length measured 19 mm. The internal os was opened and showed conspicuous funnelling and protruding foetal leg through the internal os. The foetus was delivered by means of caesarean section and died about 24 hours later. This finding underscores the importance of ultrasonography to obstetricians and neonatologists and also highlights the need for routine obstetrics scan in patients at risk, especially in low income populations where such a procedure might be deemed as an unnecessary financial burden.

Keywords: *Cervical incompetence, dilatation, sonography, foetus, polyhydramnios*

Résumé

L'incompétence cervicale est une cause fréquente de fausse couche inévitable au deuxième trimestre, et elle est souvent associée à un mauvais résultat fœtal. Une dilatation du col de l'utérus a été observée chez une femme enceinte de 31 ans avec accouchement prématuré. Elle présentait des douleurs pelviennes sévères, des contractions prématurées et une décharge de liquide amniotique. L'échographie abdominale d'urgence a révélé un poly-hydramnios et un prolapsus du cordon ombilical. Le diamètre cervical mesurait 45 mm et la longueur mesurait 19 mm. L'orifice interne était ouvert et présentait un entonnoir visible et une jambe fœtale saillante à travers l'orifice interne. Le fœtusa été accouché par césarienne et est décédé environ 24 heures plus tard. Ces résultats soulignent l'importance de l'échographie pour les obstétriciens et les néonatologistes et soulignent également la nécessité d'un examen obstétrical systématique chez les patients à risque, en particulier dans les populations à faible revenu où une telle procédure pourrait être considérée comme un fardeau financier inutile.

Mots-clés: *Incompétence cervicale, dilatation, échographie, fœtus, poly-hydramnios*

Introduction

Cervical insufficiency (CI) is a condition in which there is dilatation and shortening of the cervix before the 37th week of gestation in the absence of preterm labour [1]. It is characterised by a painless, progressive dilatation of the uterine cervix in the second or early third trimester, leading to membrane prolapse, premature rupture of the membranes, mid-trimester pregnancy loss or preterm birth [2].

CI is a rare medical condition. In Nigeria the reported incidence of CI is 0.78% [3]. Elsewhere, Lidegaard reported a CI incidence rate of 4.6 per 1000 births over a 10-year period using registry information of all hospitalised patients in Denmark [4]. In the USA the prevalence was estimated at 0.41% [5]. CI is also associated with genetic conditions. It has been reported in pregnancies involving women with the Ehlers–Danlos syndrome [6,7] and Marfan syndrome [8,9]. Polymorphisms in the COL1A1 and TGFB1 genes have been associated with cervical insufficiency [10].

Cord prolapse is also a rare medical condition with a worldwide overall incidence of 0.2 – 0.6% [11]. Statistics from Nigeria also put the incidence rate for cord prolapse within 0.2 – 0.6% [11] .There is no diagnostic test for cervical insufficiency. However, recently, transvaginal ultrasonography has gained ascendancy as a demonstrable, valid and reproducible method of cervical assessment [12,13].

We present findings in a pregnant woman that came to our centre for routine obstetrics ultrasonography. She had a rare case of cervical incompetence combined with cord prolapse.

Case report

A 31-year-old pregnant woman $G_2P_2^{0+1}$ in her second pregnancy was admitted to Crystal Specialist

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Hospital, Lagos hospital at 31 weeks 4 days gestation. In her first pregnancy she had a preterm vaginal delivery at 27 weeks of gestation. She presented with severe pelvic pains, preterm contractions and amniotic fluid discharge. Emergency abdominal sonography revealed polyhydramnios and umbilical cord prolapse. The internal os was opened and showed conspicuous funnelling and protruding foetal leg into the introitus [Fig 1 A]. The cervical diameter measured 45 mm and the length measured 19 mm [Fig 1B].

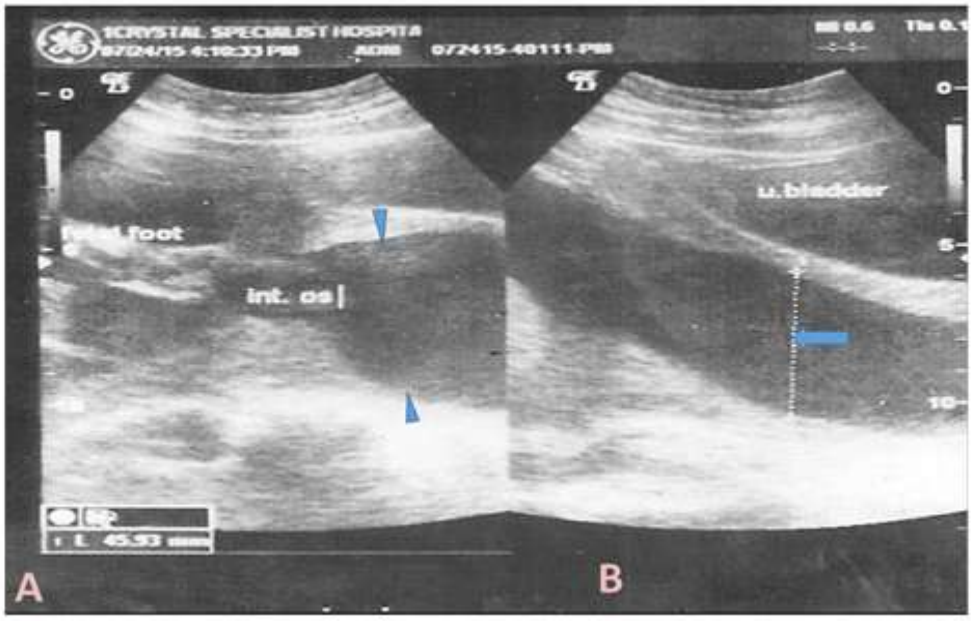

Fig. 1. Sonogram showing incompetent cervix. **A**. Observe the opened internal Os with the protruding foetal foot and the funnelling of the cervix (arrowheads). **B**. Observe the widened cervical diameter (block arrow).

A caesarean section was performed because of the cord prolapse and a baby boy was delivered with a birth weight of 1.93 kg. The neonate was admitted to the neonatal intensive care unit of the hospital where it was treated with antibiotics for congenital pneumonia. He died about 24 hours later.

Discussion

We reported a case of cervical insufficiency with occult cord prolapse. The cord prolapse necessitated emergency caesarean section to deliver the foetus.

Cervical incompetence is assessed by two main parameters, the cervical length and the appearance of the internal os. In this case we reported a cervical length of 19 mm and a funnel-shaped cervix using ultrasonography. The probability of preterm delivery is increased in cervical length less than 25 mm [14]. A dilatated cervix appearing funnel-shaped coupled with an opened internal os in ultrasound scan (as reported in this case) is a definitive indication of this clinical condition [15].

Available literature dwells extensively on the use of endovaginal cervical ultrasonography for the diagnosis of cervical incompetence [16,17,18]. However, in this study, the emergency of the patient's condition and the need to avoid further distress to the patient necessitated the use of trans-abdominal scan. Our findings proved that trans-abdominal sonography produced good results. This validates the use of trans-abdominal scan as the initial sonographic technique for routine evaluation.

Caesarean section was necessitated by the cord prolapse which was occult in this case. Polyhydramnios and ruptured foetal membranes are known risk factors of cord prolapsed [20,21] and where present in this case. Cord prolapse is an obstetric emergency that should be delivered as soon as possible usually by caesarean section.

Cervical incompetence is often associated with poor foetal outcome and increased perinatal morbidity [22]. In this case the neonate died 24 hours after the preterm delivery.

This case further indicates the need for sonographic vigilance in gravid women with history of miscarriage so as to improve the prediction of the risk of actual preterm delivery. If the patient was under surveillance, the cervical insufficiency might have been discovered earlier to engender a better outcome.

Pregnant women with cervical incompetence usually present with subtle cervical dilatation between 16 and 24 weeks of gestation. Hence, serial obstetric scans within this critical window period would be highly recommended to diagnose the condition and avert preterm delivery.

Conclusion

This study underscores the importance of ultrasonography to obstetricians and neonatologists as an excellent diagnostic tool for the evaluation of the uterus and cervix in the gravid state. It also validates the need for routine obstetrics scan in patients at risk, especially in low income populations where such a procedure might be deemed as an unnecessary financial burden.

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Brain death in children managed at a tertiary centre in Nigeria: a five-year review

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Abstract
Introduction: The recent advent of organ transplantation in Nigeria has emphasized the need for protocols in the diagnosis and management of brain death as is obtainable in developing countries in order to prevent waste of scarce resources and loss of potentially viable organ donors.
Aim: To determine the aetiology and outcomes of children with brain death at the University College Hospital, Ibadan.
Methods: All non-surgical paediatric patients admitted to the intensive care unit (ICU) over a five-year period were evaluated. Those with features of brain death had details of their history and physical examination findings throughout admission recorded in a proforma. The parents were counselled if the features remained consistent 24 hours after the initial assessment. Their decisions and the outcomes of the patients were documented.
Results: Thirteen patients (12.1%) out of the 108 non-surgical paediatric patients had brain death, 6(46.2%) males and 7 (61.5%) females. The major risk factor for brain death was intracranial infections, seen in 11 (84.6%). Others were bihemispheric cerebrovascular accident (7.7%) and tetralogy of Fallot (7.7%). All the parents were counselled and offered the option of withdrawal of care but none gave consent for withdrawal of care. All patients had a terminal cardiopulmonary arrest within 5 days of the first diagnosis of brain death.
Conclusion
Brain death occurred in 12.1% of non-surgical paediatric ICU admissions in our centre with intracranial infections as the leading risk factor. Our findings emphasize the need to intensify efforts and resources in the prevention of these diseases. There is also a need for development of protocols to guide the management of brain death.

Keywords: *Brain death children; organ donation; Nigeria; low resource countries*

Résumé
Contexte: L'avènement récent de la transplantation d'organes au Nigéria a souligné la nécessité de protocoles de diagnostic et de gestion de la mort cérébrale dans les pays en voie de développement afin d'éviter le gaspillage de ressources rares et la perte de donneurs d'organes potentiellement viables.
But: Pour déterminer l'étiologie et les résultats des enfants atteints de mort cérébrale au Collège Hospitalier Universitaire, Ibadan.
Méthodes: Tous les patients pédiatriques non chirurgicaux admis à l'unité de soins intensifs (USI) sur une période de cinq ans ont été évalués. Ceux avec des caractéristiques de la mort cérébrale avaient des détails de leurs antécédents et des résultats d'examen physique tout au long de l'admission enregistrés dans un formulaire. Les parents ont été conseillés si les caractéristiques restaient constantes 24 heures après l'évaluation initiale. Leurs décisions et les résultats des patients ont été documentés.
Résultats: Treize patients (12,1%) sur 108 patients pédiatriques non chirurgicaux ont eu une mort cérébrale, 6 (46,2%) garçons et 8 (61,5%) des filles. Le principal facteur de risque de mort cérébrale était les infections intracrâniennes, observées chez 11 (84,6%). D'autres étaient un accident vasculaire cérébral bi-hémisphérique (7,7%) et une tétralogie de Fallot (7,7%). Tous les parents ont été conseillés et ont offert l'option du retrait des soins, mais aucun n'a donné son consentement au retrait des soins. Tous les patients ont eu un arrêt terminal cardio-pulmonaire dans les 5 jours suivant le premier diagnostic de mort cérébrale.
Conclusion : La mort cérébrale est survenue dans 12,1% des admissions à l'USI pédiatriques non chirurgicales dans notre centre, les infections intracrâniennes étant le principal facteur de risque. Nos résultats soulignent la nécessité d'intensifier les efforts et les ressources dans la prévention de ces maladies. Il est également nécessaire de développer des protocoles pour guider la gestion de la mort cérébrale.

Mots-clés: *Enfants avec cerveau mort; don d'organe; Nigeria; pays à faibles ressources*

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Introduction

Brain death is generally defined as the irreversible loss of brain function [1, 2]. The diagnosis of brain death is usually made when a patient with a known irreversible massive brain lesion is comatose, unresponsive, apnoeic, with absent brainstem reflexes all in the absence of known central nervous system depressants like hypothermia, sedatives and metabolic derangements [1].

The concept of brain death was first described in the latter half of the 20th century when cardiopulmonary resuscitation and technological advances made it possible to sustain vital body functions in the presence of irreversible brain injury. In 1967, the report from a retrospective review of 1665 patients in the United States (US) who were diagnosed brain dead concluded that electro cerebral silence in a patient who is unresponsive, apnoeic, has no brainstem reflexes and is unable to maintain circulation could diagnose brain death. [3] It was however a year later that this state was equated to death legally in the US by the Ad Hoc Committee of the Harvard Medical School. The committee defined brain death as unresponsiveness, absence of movements or breathing, absent reflexes, and a flat electroencephalogram (EEG) [3].

Many other states in the US and other developed countries subsequently developed their own definition based on these recommendations. However many countries in Africa especially sub-Saharan Africa are yet to have a legal statement on the diagnosis and declaration of brain death often leaving the physician at a loss as to what to do when faced with a patient who is brain dead [2].

This has grave implications, especially in low and middle income countries, where continuing expensive medical care in patients who cannot possibly recover, in the setting of limited resources, at the expense of those with better prognosis may not be justifiable. Furthermore a clinical diagnosis of brain death allows organ donation. The need for organ transplantation in children is increasing worldwide but there are few viable donors suitable for organ transplantation in children, therefore identifying brain death early in children could mean identifying donors suitable for children. It is especially important to have more donors suitable for children because organ transplantation procedures are now being done in the country [4, 5].

We set out to review the profile of brain death in the paediatric age group at the University College Hospital, Ibadan in order to provide some basic information on the risk factors and outcomes of brain death in affected children. The aim of the study was therefore to determine the aetiology and outcomes of children with brain death at the University College Hospital, Ibadan.

Methods

This was a prospective, longitudinal study of all paediatric patients admitted to the intensive care unit (ICU) of the University College Hospital (UCH), Ibadan, over a five-year period from June 2011- June 2016. UCH is an 850 bedded tertiary health facility located in Ibadan, the largest city in the South Western part of Nigeria with a population of 2,550,593.[6] It serves as a referral centre to all health care facilities in the city and other neighbouring towns and states and it also accepts self referrals. University College Hospital has a twelve-bedded general ICU where all critically ill patients are managed. The ICU care is from out of pocket payments by caregivers.

All non surgical patients were carefully evaluated at admission and daily during the period of admission in ICU for features of brain death. Diagnostic criteria for brain death were based on the recommendations of the American Academy of Neurology.[7] A diagnosis of brain death was made in the presence of deep unresponsive coma, apnoea and absent brainstem reflexes in a patient with a known irreversible brain lesion.[7] The children were considered eligible for recruitment if they had all the features stated above, in the absence of known central nervous system depressants like hypothermia, sedatives and metabolic derangements [7]

At first diagnosis of brain death, details of clinical history and full physical examination findings, including the state of responsiveness determined by the Glasgow coma score, brainstem reflexes, temperature and blood pressure were recorded. The medical discipline of the first physician to make the diagnosis was noted, i.e. anaesthetist, intensivist or paediatric neurologist. All cases were on mechanical ventilation and had continuous monitoring of all vital signs. During the observation period, care was taken to ensure that the patient had normal temperature and electrolytes, and their circulation optimized. A repeat assessment was carried out 24 hours after the initial assessment and the diagnosis of brain death was confirmed when the features remained consistent. Personnel responsible for the second assessment were also documented.

In line with the hospital protocol, the parents/ caregivers were counselled by a team comprising of the intensive care unit nurse, the anaesthetist/ intensivist, the paediatric neurologist and the medical

social workers. Decisions of the caregivers with respect to continuing ventilator support was documented. Outcomes following diagnosis of brain death were recorded.

Results

General characteristics

A total number of 2,240 patients were admitted into the ICU during the study period. There were 225 children, 108 of whom were non surgical cases. The most common reasons for ICU admission among the non surgical paediatric patients were tetanus (21.3%), congenital heart disease (20.3%) and meningitis (15.6%) as shown in Table 1.

Table 1: Diagnoses of non-surgical paediatric patients admitted into the intensive care unit

Cases	Number of patients (%)
Tetanus	23(21.3)
Congenital heart disease	22(20.3)
Meningitis	17(15.6)
Pneumonia	8(7.4)
Septicaemia	6(5.6)
Severe malaria	6(5.6)
Complications of sickle cell disease	6(5.6)
Infectious pericarditis	4(3.7)
Corrosive poisoning	3(2.8)
Upper respiratory tract obstruction	3(2.8)
Acute flaccid paralysis	2(1.9)
Others	8(7.4)
Total	108(100.0)

Table 2: Age and gender distribution of children with brain death seen in the intensive care unit

Age in months	Sex	
	Male n (%)	Female n (%)
<1 year	0	1(7.7)
1 – 5 years	2(15.4)	4(30.8)
>5 years	4(30.8)	2(15.4)
Total	6(46.2)	7(53.8)

Risk factors for brain death

Thirteen non-surgical paediatric patients were diagnosed with brain death over the study period; 6 (46.2%) males and 7 (53.8%) females. Their ages ranged from 11 months to 11 years. Table 2 shows the age and gender distribution of the cases. Ten (76.9%) of them were comatose on admission while the remaining 3 (23.1%) were conscious on admission. All the patients were transferred to the ICU following deterioration in their clinical status.

Diagnosis

The underlying clinical condition that resulted in brain death was identified in all cases. Intracranial infections, seen in 11 (84.6%) of the cases represented the leading risk factor for brain death in the cohort; these consisted of 7 cases of bacterial meningitis, 2 cases of viral encephalitis and 2 case of cerebral malaria. All had features of raised intracranial pressure. There was one case each of bihemispheric cerebrovascular accident in a 10 year old with sickle cell anaemia and a 17 month old with tetralogy of Fallot with severe hypoxia from tet spells. Table 3 shows the clinical profile and risk factors for brain death in the cohort.

Table 3: Primary diagnoses in the 13 patients with brain death admitted into the intensive care unit

Cases	Number of patients (%)
Pyogenic Meningitis	7(53.8)
Cerebral Malaria	2(15.4)
Varicella Encephalitis	1(7.7)
Viral Encephalitis	1(7.7)
Cerebrovascular accident	1(7.7)
Tet Spells	1(7.7)
Total	13(100.0%)

Caregivers' perception on brain death

All the caregivers were counselled on the clinical state, course and prognosis of brain death. All were given the opportunity to decide on the withdrawal of ventilator and support. None of the caregivers opted for withdrawal of care. They all decided for continued ventilatory support till a definite outcome was determined, all citing religious belief in the miraculous as their reasons.

Outcomes

All patients had a terminal cardiopulmonary arrest within 5 days of the first diagnosis of brain death. Interval between first assessment and death ranged from 10 hours to 5 days, with a median duration of 51 hours.

Discussion

The implications of declaring a patient brain dead have far reaching consequences for the family and the physician. Most countries in Europe, Asia and South America therefore have well defined criteria for the diagnosis of brain death as well as laws to

govern both the diagnosis and what happens after the diagnosis is made [2, 8]. In Africa however, especially in sub-Saharan Africa most countries do not have protocols or guidelines to follow in the diagnosis and management of brain death. In Nigeria, there is no consensus yet to guide the diagnosis of brain death. Our protocol in our centre is guided by the American Academy of Neurology (AAN) protocol for diagnosis of brain death [7].

It has become important to have guidelines on the diagnosis of brain death since many hospitals now have staff who are trained in cardiopulmonary resuscitation [9]. In addition, tertiary centres now have ventilators and are therefore able to maintain respiration and keep the heart beating in the absence of brain function [10]. Having clear guidelines will help the physician to identify when a patient on mechanical support suffers brain death and to follow the appropriate steps. This has major implications for the optimal allocation and deployment of the scarce resources as is seen in many resource-poor countries of the world. In this review unresponsiveness, apnoea, absent brainstem reflexes in the absence of confounders such as hypothermia and sedatives and in a patient with a known cause of brain injury was diagnosed as brain dead. These criteria are based on parameters developed by the Harvard committee which most states in the US have based their guidelines on except for the fact that no EEG was done in this study because the consensus in most countries now is that brain death is a clinical diagnosis and does not require any investigations except in neonates [11].

There is a paucity of data from developing countries on the risk factors for brain death. In this review, majority (78.6%) of the cases were due to intracranial infections, there was however one subject who had congenital heart disease, one with tracheoesophageal fistula and another with cerebrovascular accident. This high percentage of patients with intracranial infections is consistent with findings from developed world where the most common medical cause for brain death was intracranial infections [12]. This therefore brings to the fore the need to increase efforts and resources directed at the prevention of these infections.

The diagnosis of brain death is usually followed by a series of serious decision making. It is usually very emotional for the parents and family and often these emotions have to herald not just the decision to withdraw support but also the decision to donate or not to donate organs. In a setting where there are no definite laws and the sympathy usually lies with the family of the patient, these decisions are left solely in the hands of the family rather than having protocols which the physicians can follow. As seen in this review however, despite the fact that these patients were all brain dead, which should be synonymous with death legally, because there are no laws in place to guide and guard the physicians, withdrawal of care was impossible leading to an enormous waste of resources which could have been put to better use. Some countries in sub Saharan Africa have recognised the need for protocols and policy regarding brain death in order to prevent waste of resources and prolonged suffering of patient's relatives [13]. It is no surprise however that these parents refused to give consent for withdrawal of care as most people in Nigeria have strong religious beliefs that either prohibits from any interference in the process of death or gives hope in miraculous recovery. The impact of religious beliefs and ethnic differences in these processes have been well documented [5].

Another major reason why making the diagnosis of brain death early is important is to allow for prompt identification of suitable organ donors and those vital organs could be ethically obtained for transplantation. This has become quite important because the country now has a number of centres where kidney transplantations take place [4]. Identifying these viable donors early will likely reduce the mortality from end stage renal failure and improve the outcomes for end stage renal disease which currently has grave prognosis in Nigeria.

All the patients proceeded to cardiac arrest within a few days despite efforts to optimize circulation. This is similar to the previously reported 48 to 72 hours in adults and up to 10 days in children.

Conclusion

Intracranial infections were the most common aetiology of brain death and all patients had a cardiac arrest within five days of diagnosis. All caregivers refused to give consent for withdrawal of care, this implies that the concept of brain death may not be well accepted in this environment although there is a need for further studies evaluating the effect of socio cultural and religious beliefs in the acceptance of brain death. The focus of such studies should also include generating data that can be used in policy making and protocol development in brain death in children in this environment.

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Thyroid hormones and obesity in Nigerian women with breast cancer

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Abstract
Background: Africans have breast cancer expressions different from Caucasians. Interactions between oestradiol (E_2), adiposity and thyroid hormones in breast cancer development have been reported but controversial. The study was designed to investigate the relationships among thyroid hormones, E_2 and adiposity in Nigerian pre and postmenopausal women with breast cancer (pre cases and post cases respectively).
Methods: One hundred and sixty nine non-pregnant women aged 48.3±1.3 years were recruited for this study. They comprised of 85 histologically confirmed breast cancer patients **(**pre-therapy) matched with 84 apparently healthy women without breast cancer (controls) according to age and menstrual phase. Anthropometry was obtained by standard methods. Blood (10ml) was obtained from participants for determination of free thyroxine (fT_4), free triiodothyronine and thyroid stimulating hormone (TSH) by enzyme immunoassay (EIA). Data analysed by chi-square, **s**tudent's t-test and multiple regression were significant at $p < 0.05$.
Results: 16 (29.63%), 18 (33.96%); 12 (22.22%), 4 (7.55%) pre cases and controls were overweight and obese respectively. 12 (38.71%), 15(48.39%); 8 (25.81%), 4 (12.90%) post cases and controls were overweight and obese respectively. The fT_4 was significantly higher in pre and postmenopausal cases than controls ($p<0.05$). Only waist circumference had inverse relationships with TSH in both pre cases and post cases (â=-8.790, $p=0.005$). E_2 was elevated in post cases only ($p<0.05$) but had no relationship with any of the thyroid hormones in all groups.
Conclusion: Altered adiposity and subclinical hyperthyroidism may be associated with breast cancer. Weight control and thyroid hormone testing may improve associated morbidity and mortality.

Keywords: *Thyroid hormones, oestrogen, adiposity, breast cancer, anthropometry, menstrual status.*

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Résumé
Contexte: Les Africains ont des expressions de cancer du sein différentes des Caucasiens. Des interactions entre l'œstradiol (E_2), l'adiposité et les hormones thyroïdiennes dans le développement du cancer du sein ont été rapportées mais controversées. L'étude a été conçue pour étudier les relations entre les hormones thyroïdiennes, l'E_2 et l'adiposité chez les femmes nigérianes pré et post-ménopausées atteintes d'un cancer du sein (pré-cas et post-cas respectivement).
Méthodes: Cent soixante-neuf femmes non enceintes âgées de 48,3 ± 1,3 ans ont été recrutés pour cette étude. Ils comprenaient 85 patientes atteintes d'un cancer du sein confirmées histologiquement (pré-thérapie) assorties avec 84 femmes apparemment en bonne santé sans cancer du sein (témoins) en fonction de l'âge et de la phase menstruelle. L'anthropométrie a été obtenue par des méthodes standard. Du sang (10 ml) a été prélevé sur les participants pour la détermination de la thyroxine libre (fT_4), de la triodothyronine libre et de la thyréostimuline (TSH) par immunodosage enzymatique (EIA). Les données analysées par le chi-carré, le test t d'élève et la régression multiple étaient significatives à $p < 0,05$.
Résultats: 16 (29,63%), 18 (33,96%); 12 (22,22%), 4 (7,55%) pré-cas et les contrôles étaient en surpoids et obèses respectivement. 12 (38,71%), 15 (48,39%); 8 (25,81%), 4 (12,90%) post-cas et les contrôles étaient en surpoids et obèses respectivement. Le fT4 était significativement plus élevé dans les cas pré et post ménopausiques que chez les témoins ($p < 0,05$). Seul la circonférence de la taille avait des relations inverses avec la TSH dans les deux cas pré-cas et post-cas ($\beta = -8,790$, $p = 0,005$). L'E_2 était élevée dans les post-cas seulement ($p < 0,05$) mais n'avait aucun lien avec les hormones thyroïdiennes dans tous les groupes.
Conclusion: Une altération de l'adiposité et une hyperthyroïdie sub-clinique peuvent être associées au cancer du sein. Le contrôle du poids et le test des hormones thyroïdiennes peuvent améliorer la morbidité et la mortalité associées.

Mots-clés: *Hormones thyroïdiennes, œstrogène, adiposité, cancer du sein, anthropométrie, état menstruel.*

Introduction

Breast cancer is the most common type of cancer among women worldwide with a noticeable fatality rate [1]. The genetic predisposition of African women, particularly younger women to triple negative breast cancer expressions has been suggested as a reason for the aggressiveness of the disease. These women present late in the clinic with advanced breast cancer in stages 3 and 4 [2]. Despite these associations, the pathophysiology of breast cancer is inconclusive.

The growing and developing breasts require the coordinated action of several hormones such as oestrogen, progesterone, and thyroid hormones [3]. Oestrogen, progesterone, gonadotrophins, adiposity and their probable interactions with endocrine disruptors resulting in epigenetic changes have been reported as possible mechanisms in breast cancer development [4]. Oestradiol is a potent mitogen for normal mammary gland while thyroid hormones appear to stimulate lobular development, contributing to the differentiation of normal breast tissue [5]. It is postulated that the thyroid gland interacts with the breast tissues based on the common property of the mammary and thyroid epithelial cells to concentrate iodine by a membrane active transport mechanism. Additionally, TSH receptors in fatty tissues which are abundant in mammary gland have been reported to be a possible reason for this interaction [6, 7].

Thyroid hormones are the only iodine-containing substances of physiologic significance in vertebrates [8]. Thyrotropin releasing hormone (TRH) acts on the pituitary thyrotropes to stimulate both the synthesis and release of TSH. Thyroid stimulating hormone controls the size and number of thyroid follicular cells. It stimulates the thyroid gland to produce thyroxine (T_4). Thyroxine, a pro-hormone is converted to triiodothyronine (T_3), the active form of thyroid hormone in the peripheral tissues by 5'-deiodination [8, 9].

The relationship between breast cancer and thyroid hormone is controversial [10]. Many studies show that thyroid diseases are common in women with breast cancer while others observed no association between thyroid diseases and breast cancer [6, 11]. Many forms of thyroid diseases including hyperthyroidism have been identified in association with breast cancer [12, 13, 14]. The contribution of subclinical hyperthyroidism to breast tumour growth has been speculated in postmenopausal patients [10]. The importance of fT_3 in the physiology of fibrocystic breast disease [15] has also been suggested.

Interactions between E_2 and thyroid hormones in the development of breast cancer have been reported. Physiological concentrations of T_3, the more active form of thyroid hormone, significantly enhance E_2 growth stimulation of a number of human breast carcinoma cell lines [16]. In T47D breast cancer cells, E_2 and T_3 similarly regulate cell cycle progression and proliferation raising the p53 level and causing hyperphosphorylation of pRb [17]. The mimicking of E_2 by T_3 at supra-physiologic concentrations and in the absence of E_2 possibly through the ER in breast cancer cell line has been demonstrated [18].

Obesity, a global epidemic with an increasing prevalence, is associated with increased risk of metabolic diseases including cancer [19]. Central obesity has been linked with thyroid dysfunction [20]. Triiodothyronine regulates metabolic processes and thermogenesis [21]. Impaired thyroid function might be associated with dyslipidemia and insulin resistance which have been implicated in breast carcinogenesis [22, 23]. Reports showed that subclinical and overt hypothyroidism are frequently associated with weight gain, decreased thermogenesis and metabolic rate [24, 25]. Emerging evidence suggests that slight variations in thyroid function, even as indicated by tests that are within laboratory reference ranges could contribute to the development of regional obesity and the tendency to gain weight [26, 27].

The menstrual status of women may be an important determinant of breast cancer as differences were observed in the pattern of hormones and some hormone receptor expressions in pre and post menopause. Oestradiol was associated with postmenopausal breast cancer while triple negative receptor expressions (Oestrogen, progesterone and human epithelial receptor 2 receptor expressions) were more prominent in premenopausal breast cancer [4].

Although, several studies on breast cancer have been conducted in Nigeria to identify its aetiology and possible mechanisms to improve patient management, there is paucity of information on the association of thyroid hormones with breast cancer. We therefore investigated the role of thyroid hormones and their interaction with oestrogen and

adiposity in Nigerian pre and postmenopausal women with breast cancer.

Materials and methods

The study was a prospective case-control study conducted in the Surgical Oncology Clinic of the Department of Surgery, University College Hospital, Ibadan. The study protocol was approved by the University of Ibadan and University College Hospital Health Review Committee. Informed consent was obtained from the participants before recruitment into the study. Participants were recruited between April, 2011 and March, 2014 [4].

Study participants

One hundred and sixty nine non pregnant women aged 28-80 years were consecutively recruited for this study. Eighty-five were histologically confirmed breast cancer patients who had not commenced treatment (Cases). They were recruited by the Surgical Oncologist from the Surgical Oncology Clinic of the Department of Surgery, University College Hospital, Ibadan. Eighty-four non-pregnant, apparently healthy women who served as controls were recruited at three Primary Health Clinics (PHC) in Ibadan North Local Government Area of Oyo State namely; PHC, Idi Odundun, Agodi, PHC, Agbowo and Elderly Women/Widows Clinic, Agodi-Gate. Their breasts were examined by trained nurses for the presence of any breast lump. They were asked if they felt any pain or had any discomfort in their breasts. Those that complained of pain, discomfort and/or had lump in their breasts were excluded from the study. One of the controls was excluded from the study due to incomplete data on questionnaire and insufficient blood sample [4].

Each cases was matched for age and menstrual status (follicular phase, luteal phase and pre and postmenopausal) with the controls. Participants were reported as postmenopausal if they had stopped menstruating over the last twelve months [1]. Participants that had bilateral oophorectomy were also considered postmenopausal. Both cases and controls were subdivided into pre and postmenopausal groups (54 premenopausal cases; 31 postmenopausal cases; 53 premenopausal controls; 31 postmenopausal controls respectively).

Exclusion criteria

Pregnant women and those who reported being on hormonal drugs (i.e. contraceptives), had other types of cancers and/or hypertension were excluded from the study. Postmenopausal women on hormone replacement therapy were also excluded [4].

Anthropometric indices

Anthropometric indices: weight, height, body mass index, waist circumference, hip circumference, waist-hip ratio, waist-height ratio were measured by standard methods described and reported elsewhere [28].

Sample collection

Ten ml of venous blood was collected from each woman into plain bottles. For premenopausal participants, blood samples for determination of E_2 were drawn between days 5 and 9 of their menstrual cycle in follicular phase (forward dating) and 5 to 9 days before the anticipated start of their next menstrual cycle in the luteal phase (backward dating) [4]. This was done by applying a tourniquet 10-15 cm above the intended puncture site to obstruct the return of venous blood to the heart and to distend the vein. The site of puncture, the medial cubital vein in the antecubital fossa was cleansed with alcohol swab. The blood was allowed to retract and centrifuged at 3500 rpm for 5 minutes. The resulting serum was aliquoted and stored at -20^{o}C until analysis [4].

Hormonal assay

Serum fT_3, fT_4, TSH and E_2 were determined by enzyme immune assay on TOSOH AIA System Analyzers (Tosoh Corporation, Tokyo 105-8623, Japan). Values for TSH, fT_4 and E_2 have been reported elsewhere [2, 4]**.**

Statistical analysis

Data were analyzed using the statistical package for social scientists (SPSS 18.0) SPP, Inc., Richmond, CA. Chi-square test was used for categorical variables, student's t-test was used for comparison of quantitative variables. Multiple regression analysis was employed to determine relationships between variables. $p<0.05$ was considered statistically significant.

Results

In the premenopausal cases and controls, 26 (48.15%), 31 (58.49%) had normal weight, 16 (29.63%), 18 (33.96%) were overweight and 12 (22.22%), 4 (7.55%) were obese respectively. There was no significant difference in the BMI classes in the premenopausal cases and premenopausal controls ($p<0.05$). In the postmenopausal cases and controls, 11 (35.48 %), 11 (35.48 %) had normal weight, 12 (38.71 %), 15(48.39 %) were overweight, and 8 (25.81 %), 4 (12.90 %) were obese respectively. There was no significant difference in the BMI

Table 1 Thyroid hormones and measures of obesity in premenopausal women with breast cancer and controls

Variable	Pre Cases (n=54)	Pre Controls (n=53)	t	*P*
Age (years)	40.91±0.65	40.74±0.64	0.187	0.852
Blood Pressure				
SBP (mmHg)	122.96±1.44	119.04±1.24	2.062	0.042*
DBP (mmHg)	82.41±1.12	80.94±1.02	0.967	0.336
Anthropometric Indices				
Waist circumference (cm)	88.54±1.42	78.25±1.31	5.321	<0.001*
Hip circumference (cm)	100.52±1.47	95.98±1.04	2.512	0.014*
Body weight (Kg)	67.99±1.87	60.14±1.30	3.435	0.001*
Height (m)	1.63±0.01	1.57±0.01	4.345	<0.001*
Body mass index (Kg/m^2)	25.70±0.68	24.51±0.51	1.401	0.164
Waist hip ratio	0.88±0.01	0.81±0.01	6.073	<0.001*
Waist height ratio	54.55±0.96	49.97±0.88	3.516	0.001*
Hormones				
E_2 (pmol/L)	452.84±43.34	430.82±46.47	0.347	0.729
fT_3(pmol/L)	3.59±0.39	3.49±0.06	0.249	0.804
fT_4 (pmol/L)	17.83±0.56	14.89±0.33	4.507	<0.001*
TSH (mIU/L)	1.75±0.17	1.48±0.11	1.357	0.178

*n=number of participants, t=Student's t-test, P=probability value, *=significant, mean± SEM (standard error of mean), Pre Controls =apparently healthy premenopausal women without breast cancer, Pre Cases=Premenopausal women with breast cancer, SBP=systolic blood pressure, DBP=diastolic blood pressure, E_2=oestradiol, fT_3=free triiodothyronine, fT_4= free thyroxine, TSH= thyroid stimulating hormone, pmol/L=picomol per litre, mIU/L=milliinternational unit per litre.*

Table 2 Thyroid hormones and measures of obesity in postmenopausal women with breast cancer and controls.

Variable	Post Cases (n=31)	Post Controls (n=31)	t	*P*
Age (years)	61.23±1.50	61.65±1.48	-0.199	0.843
Blood Pressure				
SBP (mmHg)	122.26±1.84	120.00±1.61	0.925	0.360
DBP (mmHg)	80.32±1.27	80.3±1.18	0.000	1.000
Anthropometric Indices				
Waist circumference (cm)	92.16±1.73	89.87±1.46	0.969	0.337
Hip circumference (cm)	103.94±1.70	102.74±1.67	0.500	0.619
Weight (Kg)	71.39±2.18	65.61±1.67	2.103	0.010*
Height (m)	1.63±0.01	1.59±0.01	2.340	0.023*
Body mass index (Kg/m^2)	26.81±0.65	25.85±0.65	1.048	0.217
Waist hip ratio	0.89±0.01	0.88±0.01	0.716	0.477
Waist height ratio	56.63±1.56	56.49±0.91	0.093	0.930
Hormones				
E_2 (pmol/L)	156.48±12.42	90.42±3.59	5.036	0.000*
fT_3(pmol/L)	3.14±0.09	3.34±0.11	-1.372	0.175
fT_4 (pmol/L)	17.65±0.58	14.33±0.39	4.785	<0.001*
TSH (mIU/L)	1.62±0.17	1.33±0.14	1.355	0.181

n=number of participants, t=Student's t-test, *P*=probability value, *=significant, mean± SEM (standard error of mean), Post Controls =apparently healthy postmenopausal women without breast cancer, Post Cases=Postmenopausal women with breast cancer, SBP=systolic blood pressure, DBP=diastolic blood pressure, E_2=oestradiol, fT_3=free triiodothyronine, fT_4= free thyroxine, TSH= thyroid stimulating hormone, pmol/L=picomol per litre, mIU/L=milliinternational unit per litre.

classes in the postmenopausal cases and postmenopausal controls (p<0.05).

Table 1 shows comparison of age, reproductive, anthropometry, oestradiol and thyroid

hormones between premenopausal cases and premenopausal controls. The fT_4 levels as well as all anthropometry except BMI were significantly higher in premenopausal cases compared with premenopausal controls ($p<0.05$).

Table 2 shows comparison of age, anthropometry, oestradiol and thyroid hormones between postmenopausal cases and postmenopausal controls. Only body weight, height and fT_4 were significantly higher in postmenopausal cases compared with postmenopausal controls ($p<0.05$).

Table 3 shows multiple regression of thyroid hormones and anthropometric indices in pre and postmenopausal cases as well as pre and postmenopausal controls. Similar relationships were observed in pre and postmenopausal cases. Hip circumference and waist hip ratio were positively related with TSH (β=6.430, p=0.000; β=6.118, p=0.000, respectively) while waist circumference had an inverse relationship with TSH (β=-8.790, p=0.005). In premenopausal controls, only hip circumference and waist hip ratio had positive

Table 3 Multiple regression of thyroid hormones and measures of obesity in women with breast cancer and controls, premenopausal women with breast cancer and controls, postmenopausal women with breast cancer and controls

Groups	Dependent	Predictors	β	t	*P*
Cases					
R^2=0.194,F=2.010,p=0.050	fT_3	TSH	-0.267	-2.309	0.024*
		Height	2.414	2.635	0.010*
R^2=0.252,F=2.815,p=0.007	TSH	fT_3	-0.248	-2.309	0.024*
		Height	1.919	2.143	0.035*
Controls					
R^2=0.219,F=2.308,p=0.024	fT_4	fT_3	0.221	2.016	0.047*
		Waist circumference	8.921	2.722	0.008*
		Waist height ratio	-9.149	-3.358	0.001*
		Height	-1.990	-2.611	0.011*
R^2=0.142,F=1.364,p=0.220	TSH	Hip circumference	3.914	2.708	0.008*
		Waist hip ratio	3.006	2.543	0.013*
Premenopausal cases					
R^2=0.714,F=5.811,p=0.000	TSH	Waist circumference	-8.790	-3.148	0.005*
		Hip circumference	6.430	4.622	0.000*
		Waist hip ratio	6.118	5.232	0.000*
Premenopausal controls					
R^2=0.260,F=1.677,p=0.124	fT_3	Waist circumference	-12.635	-3.119	0.003*
		Hip circumference	3.852	2.212	0.032*
		Height	2.139	2.031	0.048*
		Waist hip ratio	3.264	2.095	0.042*
R^2=0.239,F=1.498,p=0.179	fT_4	Waist height ratio	-8.684	-2.274	0.028*
R^2=0.271,F=1.780,p=0.100	TSH	Hip circumference	5.263	3.214	0.002*
		Waist hip ratio	4.633	3.172	0.003*
Postmenopausal cases					
R^2=0.714,F=5.811,p=0.000	TSH	Waist circumference	-8.790	-3.148	0.005*
		Hip circumference	6.430	4.622	0.000*
		Waist hip ratio	6.118	5.232	0.000*
Postmenopausal controls					
R^2=0.746,F=4.567,p=0.006	fT_3	fT_4	-0.454	-2.153	0.049*
		Body mass index	-0.391	-2.491	0.026*
		Height	-4.677	-2.361	0.033*
		Waist height ratio	-14.308	-2.372	0.033*
	fT_4	fT_3	-0.547	-2.153	0.049*
		Height	-5.772	-2.806	0.014*
		Waist circumference	16.067	2.236	0.042*
		Waist height ratio	-18.627	-3.076	0.008*

*=significant at p<0.05, beta= Standardized coefficient, p=Probability value, fT_3=free triiodothyronine, fT_4=free thyroxine, TSH=Thyroid stimulating hormone

relationships with TSH (β=5.263, p=0.002; β=4.633, p=0.003, respectively). Additionally, hip circumference, height and waist hip ratio had a positive relationship with fT_3 (β=3.852, p=0.032; β=2.139, ***p***=0.048; β=3.264, p=0.042, respectively) while waist circumference was inversely related with fT_3 (β=-12.635, p=0.003). Waist height ratio was inversely related with fT_4 (β=-8.684, p=0.028). In postmenopausal controls, no relationship was observed between anthropometric indices and TSH. However, fT_4, BMI, height and waist height ratio were inversely related with fT_3 (β=-0.454, ***p***=0.049; β=-0.391, p=0.026; β=-4.677, p=0.033; β=-14.308, ***p***=0.033, respectively). Free triiodothyronine, height, waist height ratio were inversely related with fT_4 (β=-0.547, p=0.049; β=-5.772, p=0.014; β=-18.627, p=0.008, respectively). Waist circumference had a positively relationship with fT_4 (β=16.067, p=0.042).

Discussion

Thyroid hormones may be critical in the pathogenesis and progression of diseases due to their regulatory role on cell maturation [29, 30]. Thyroid signalling may be altered in cancer as a result of the activation of growth kinase signalling which may be of physiological relevance [31, 32]. Individuals with thyroid dysfunction have been reported to have an increased occurrence of breast cancer compared with healthy women. However, the potential association between thyroid conditions and breast cancer risk is inconclusive [13, 33-35].

Serum levels of the thyroid hormones in the study participants were within the normal reference interval (fT_3: 3.2-6.0pmol/L, fT_4: 10.6-21.0 pmol/L, TSH: 0.38-4.31mIU/L). However, only serum fT_4 was significantly higher in both pre and postmenopausal women with breast cancer compared with their respective controls (p<0.05). This is consistent with other reports [6, 36]. Emerging evidence shows that changes in thyroid hormone levels within normal range may be associated with proliferative activity of breast tumours in euthyroid patients with breast cancer [37].

The interactions between oestradiol and thyroid hormones in the development of breast cancer have been reported [16]. Physiological concentrations of T_3, have been shown to significantly enhance oestradiol growth stimulation of a number of human breast carcinoma cell lines [16]. The elevation of both E_2 and fT_4 were observed in postmenopausal cases compared with postmenopausal controls in this study. However, there was no significant difference in the premenopausal group in this study. This indicates that they may independently exert their influence in breast cancer development.

The association of increased adiposity with breast cancer as observed in this study has been reported previously [4]. All the indicators of adiposity were similar between pre and postmenopausal cases but not controls in this study. This suggests that the involvement of obesity in breast carcinogenesis is irrespective of menstrual status. The association of regional adiposity with E_2 in postmenopausal women with breast cancer and apparently healthy women with increased adiposity was previously reported [4, 38]. This indicates that obesity alone may not contribute to breast cancer.

Obesity is marked by alteration in the production of adipocytokines-leptin and adiponectin. The promotion of breast carcinogenesis by increased leptin levels and decreased adiponectin levels have been reported [39, 40]. Leptin is strongly angiogenic and may increase tumour angiogenesis by directly acting on the endothelium or by increasing local vascular endothelial growth factor (VEGF) secretion [41, 42]. However, a previous study by Fabian et al reported an association of high leptin levels with increased adiposity in apparently healthy women as a compensatory measure for the maintenance of normal blood pressure [38]. Systolic blood pressure was significantly higher in premenopausal cases than premenopausal controls in this study (p<0.05).

Thyroid hormone receptors expressed on visceral and subcutaneous fat directly influence various functions of the adipocytes [43]. Indicators of various regional fat depots had relationships with TSH, fT_3 and fT_4 in pre and postmenopausal cases and controls in this study (p<0.05) consistent with other studies [44- 47]. However, only waist circumference, an indicator of visceral obesity had significantly inverse relationship with TSH in pre and postmenopausal cases (p<0.05). This suggests that visceral adiposity indicated specifically by elevated waist circumference may be a risk factor for subclinical hyperthyroidism in pre and postmenopausal women with breast cancer, which may have implications in their management. The contribution of subclinical hyperthyroidism to breast tumour growth has been speculated in postmenopausal patients [9].

Conclusion

Free thyroxine and oestradiol may be independent risk factors for breast cancer. Free thyroxine may be important in both pre and postmenopausal breast

cancer. Although, adiposity is associated with breast cancer, only waist circumference had a significantly inverse relationship with thyroid stimulating hormone in pre and postmenopausal subjects implicating subclinical hyperthyroidism in this study. This may be important in the management of these women. Weight control through change in lifestyle is recommended.

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Patients' waiting experiences and satisfaction with oral care delivery at two levels of care in Ibadan, Nigeria

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Abstract
Background: Patients waiting experiences at the dental centre and their satisfaction with services rendered by the health care team have not been fully explored and may be important factors that have influenced the pattern of utilization of dental services in this part of the world. The aim of this study was to determine what patients' waiting experiences are, at two dental centres and find out how satisfied patients were with the services provided.
Methods: A cross sectional study was conducted at two dental centres in Ibadan, Oyo State, Nigeria over a period of twelve months. Data was collected using a 29-item structured questionnaire. Information sought were patients' biodata, reasons for presenting at the dental centre, time on entry into the centre, their experiences from point of entry into the dental centre to consultation with the dentist and how satisfied they were with the services rendered. Data were analyzed using SPSS version 22.
Results: Two hundred and sixty-six respondents participated in the study with a mean age of 36.3 ± 17years. The mean waiting time at the Primary Oral Health Care Center (POHCC) and tertiary health centre (UCH) were 11.5 ± 17.0 and 102.3 ± 47.3 minutes respectively. Many (85.3%) were satisfied with the services offered by the dentist, 78.0% were comfortable while waiting to see the doctor. Patients attending the POHCC were more satisfied with the stage of dropping appointment cards but less satisfied with the stage of being called in to see the doctor (22.9%) and when with the doctor (20.6%) compared with patients attending UCH (13.3%)($p<0.005$).
Conclusion: Many patients were comfortable while waiting to be seen by the dentist and the majority were satisfied with the stages of service delivery. However, causes of dissatisfaction and discomforts experienced by some of the patients will have to be addressed.

Keywords: *dental clinics, dental experiences, oral care, patient satisfaction, waiting time*

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Résumé
Contexte: Les patients en attente d'expérience au centre dentaire et leur satisfaction à l'égard des services rendus par l'équipe de soins de santé n'ont pas été entièrement explorés et pourraient être des facteurs importants ayant influé sur l'utilisation des services dentaires dans cette partie du monde. Le but de cette étude était de déterminer les expériences d'attente des patients dans deux centres dentaires et de déterminer dans quelle mesure les patients étaient satisfaits des services fournis.
Méthodes: Une étude transversale a été menée dans deux centres dentaires à Ibadan, dans l'État d'Oyo, au Nigeria, sur une période de douze mois. Les données ont été recueillies à l'aide d'un questionnaire structuré à 29-items. Les renseignements recherchés étaient les données biographiques des patients, les raisons de présenter au centre dentaire, l'heure d'entrée au Centre, leur expérience du point d'entrée dans le centre dentaire jusqu'à la consultation du dentiste et leur degré de satisfaction à l'égard des services rendus. Les données ont été analysées en utilisant SPSS version 22.
Résultats: Deux cent soixante-six répondants ont participé à l'étude avec un âge moyen de 36,3 ± 17 ans. Le temps d'attente moyen au Centre de Santé Buccodentaire Primaire (CSBP) et au Centre de santé tertiaire (CHU) était respectivement de 11,5 ± 17,0 et de 102,3 ± 47,3 minutes. Beaucoup (85,3%) étaient satisfaits des services offerts par le dentiste, 78,0% étaient à l'aise en attendant de voir le médecin. Les patients du CSBP étaient plus satisfaits de l'étape de la quittance des fiches de rendez-vous mais moins satisfaits de l'étape d'appel du médecin (22,9%) et quand avec le médecin (20,6%) par rapport aux patients de l'UCH (13,3%) ($p <0,005$).
Conclusion: De nombreux patients se sentaient à l'aise en attendant d'être vus par le dentiste et la majorité était satisfaite avec les étapes de la prestation de services, mais les causes d'insatisfaction et d'inconfort vécues par certains patients devront être corrigées.

Mots-clés: *Cliniques dentaires, expériences dentaires, soins buccodentaires, satisfaction des patients, temps d'attente*

Introduction

The healthcare service is patient oriented, requiring continuous interaction between health care providers and patients, who are the receivers of care. It utilizes facilities and equipment and consumes a large volume of nursing care [1]. Public health systems are confronted with constantly rising costs of diagnostic facilities and treatment services that are becoming more and more specialized. On the other hand, resources (staff and finances) are limited, whereas the patient load for treatment in the clinic is on the increase [2]. Consequently, purposeful planning and demand oriented scheduling of patient appointment in the outpatients' departments and specialty clinics gain more importance [3]. Therefore, to keep treatment efficiency and quality warranted [3 – 5], highly specialized treatments as well as those for very rare illness and diseases with complicated healing process, has to be integrated into the overall plan, resulting in increased demand and pressure on the healthcare industry [2]. The overall effect however, is long waiting time; delays and queues of patients. Patient waiting time has been defined as the length of time from when the patient entered the outpatient clinic to the time the patient actually leaves the Out-Patient Department (OPD) [6]. Waiting time can be time used for registration of patient, routine doctor's appointment, emergency room treatment, laboratory diagnostic test, receiving the results of various tests. Waiting time for elective care (procedures/treatment) has been considered a serious problem in many health care systems since it acts as a barrier to efficient patient flow [6] and has been documented as an important determinant of utilization of healthcare facility [7] . Reduced patient waiting time may lead to increased patient satisfaction and greater willingness of patients to return in primary and specialty care setting [8] .Moreover, the level of patients' satisfaction has been used in assessing the quality of health care services [9], as patients was highly satisfied with quality of care, had better health outcomes [10] . Waiting experiences and degree of satisfaction at each stage of waiting to be seen by the dentists are apparent factors that should be investigated in this environment where utilization of dental services is problem driven coupled with delayed presentation, when their condition is advanced with complications [11]. The deficiencies in the process of health care delivery and causes of dissatisfaction by patients noted from this study will be utilized to enhance favorable preventive health seeking behaviour and early dental presentation among the populace. This study therefore assessed patients' waiting experiences at a primary and tertiary oral healthcare centres and how satisfied patients were with services provided.

Methodology

This cross sectional descriptive study was carried out at the Primary Oral Health Care Center, Idikan and the Dental Centre University College Hospital both within Ibadan. The Primary Oral Health Care Center (POHCC) is located at Idikan, a peri-urban community in Ibadan South West Local Government Area of Ibadan, the capital of Oyo State in South-Western Nigeria. This POHCC provides oral primary health care to the population within this area characterized by low social class [12]. The University College Hospital (UCH), Ibadan is a teaching hospital located within the Ibadan metropolis. The tertiary hospital serves as a referral centre for other oral health care centres within the town, state and the country.

All consenting patients presenting for the first time at the two dental centers, from September 2014 to August 2015 were recruited for this study. Patients were duly informed about the study and a written consent was obtained from the study participants before commencement of the study. Parents of patients aged $\leq$14years filled the questionnaires as they were considered minor. However, the age of these patients were recorded for analysis in this study.

Data were collected from the study participants using a 29 item questionnaire which was pretested among 25 patients not involved in the main study. The questionnaire was divided into sections. Section A sought information on sociodemographic characteristics such as age, sex, patient's and parent /guardian (in case of children) educational level, and patients' occupation which was regrouped as skilled, unskilled and dependants using a modification of Office of Population Census and Surveys OPCS modified for this environment by Esan *et al* [13]. Section B sought information on duration of waiting time from the time patient entered into the dental center till the patient was attended to by the dentist [6]. This was assessed by the trained research assistants at the two dental centres. On patient's arrival, the purpose of the study was explained to each patient by the research assistant who subsequently noted the time on the questionnaire after the patient had consented. The time at which the documentation was completed by the health information /medical records unit for first timers or time at which old patients drop his/her card was noted, and the time when patient was called in to

see the doctor/dentist as well as time spent with the dentist were also recorded.

Questions were also asked on patients' level of satisfaction or dissatisfaction with services rendered. Satisfaction was assessed on a Likert's five rating scale (1- very dissatisfied, 2=dissatisfied, 3=neutral, 4= satisfied, 5= very satisfied). Patient satisfaction was determined by asking questions about comfort in the waiting room, physical environment, patient- doctor interaction, conduct of other health care providers, availability of medical resources and quality of health care. The participants were further required to suggest possible causes of prolonged waiting time as well as to proffer solutions to reduce the waiting time were. The face validity of the questionnaire was done by a team of experienced dentists who confirmed that the questions assessed the stated objectives.

Data analysis was carried out with SPSS version 22.0 using descriptive statistics., Satisfaction ratings with services provided was collapsed as dissatisfied (comprised of "very dissatisfied and dissatisfied"), and satisfied (comprised of "very satisfied and satisfied"). Chi square statistics was used to analyze categorical data and the level of significance was set at $p<0.05$.

Results

A total of 266 respondents participated in the study. The participants' age ranged from 3 to 85 years with a mean of 36.3 ± 17years. More than half (57.9%) of the respondents were female and male to female ratio was 1:1.4. 57.5% of participants were married while 36.8% respondents had University education or its equivalent (Table 1). Thirty seven percent of respondents were dependants i.e. they were either students, unemployed, retired or housewife and 53% have had no previous consultation and were consulting with the dentist for the first time (Table 1). Half of the respondents were presenting at the dental centres because of pain, and other reasons which varied from routine check-up to tooth fracture, ulcerations or combination of these reasons (Fig 1).

The waiting time of respondents ranged from 2 to 245 minutes with a mean of 55.8 (± 57.5) minutes, a median waiting time of 40 minutes and modal waiting time of 2 minute. The mean waiting time 11.5 ± 17.0 minutes for Idikan POHCC was significantly lower than that of UCH 102.3 ± 47.3 minutes ($t= 20.2, p < 0.001$). The majority of patients (92.0%) attending the POHCC experienced shorter waiting time 0- 30 minutes compared to those (4.2%) attending UCH ($p < 0.001$). More than half (62.3%) of the respondents consulted with the doctor within the first hour of their arrival at the dental centres (Table 2).

Table 1: Sociodemographic characteristics of Participants

Variables	n	(%)
Sex		
Male	112	42.1
Female	154	57.9
Age Group (years)		
≤20	46	17.8
21-40	123	47.5
41-60	66	25.5
>60	24	9.2
Marital status		
Single	100	37.6
Married	153	57.5
Divorced	2	0.8
Widowed	7	2.6
No response	4	1.5
Educational level		
Tertiary or its equivalent	98	36.8
Post-secondary	25	9.4
Secondary	82	30.8
Primary	29	10.9
None	19	7.1
Occupational class		
Skilled	47	17.7
Unskilled	116	43.6
Dependants	103	38.7
Religion		
Christianity	150	56.4
Islam	111	41.8
No response	5	1.9
Previous consultation		
Yes	117	44.0
No	41	53.0
No response	8	3.0

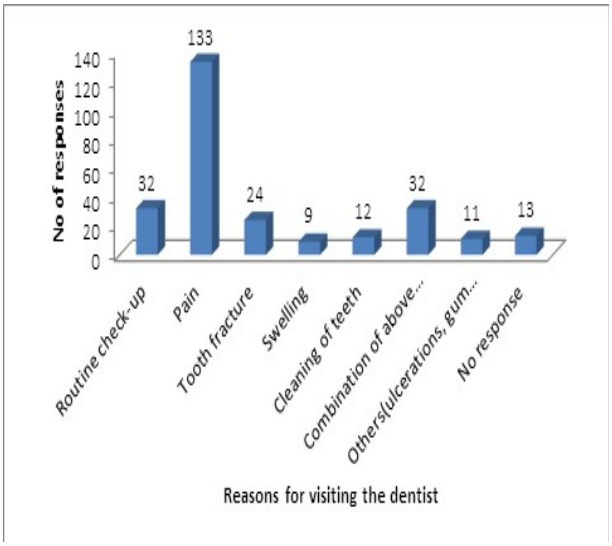

Fig 1: Respondents reasons for visiting the dentist

Table 2: Waiting time at the different Dental Clinics

Waiting time (minutes)	UCH N (%)	POHCC N (%)	Total N (%)	X^2	P -value
≤ 30	5 (4.2)	115 (92.4)	120 (49.2)	190.68	0.000*
31-60	26 (21.8)	6 (4.8)	32 (13.1)		
61-90	26 (21.8)	3 (2.4)	29 (11.9)		
91-120	28 (23.5)	1 (0.8)	29 (11.9)		
>120	34 (28.6)	0 (0)	34 (13.9)		
Total	119 (100.0)	125 (100.0)	244 (100.0)		

*Statistical significant

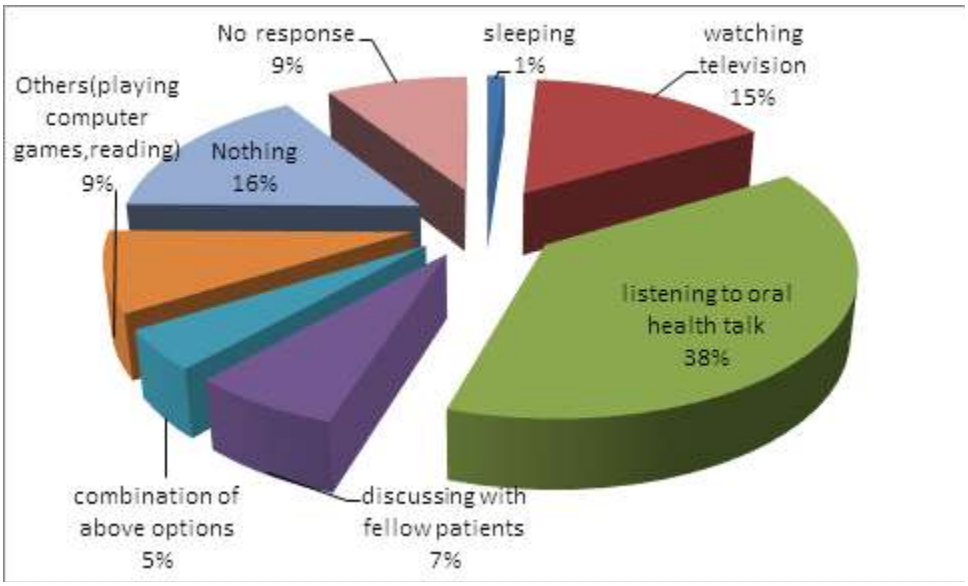

Fig.2: Activities engaged in by respondents while waiting at the reception

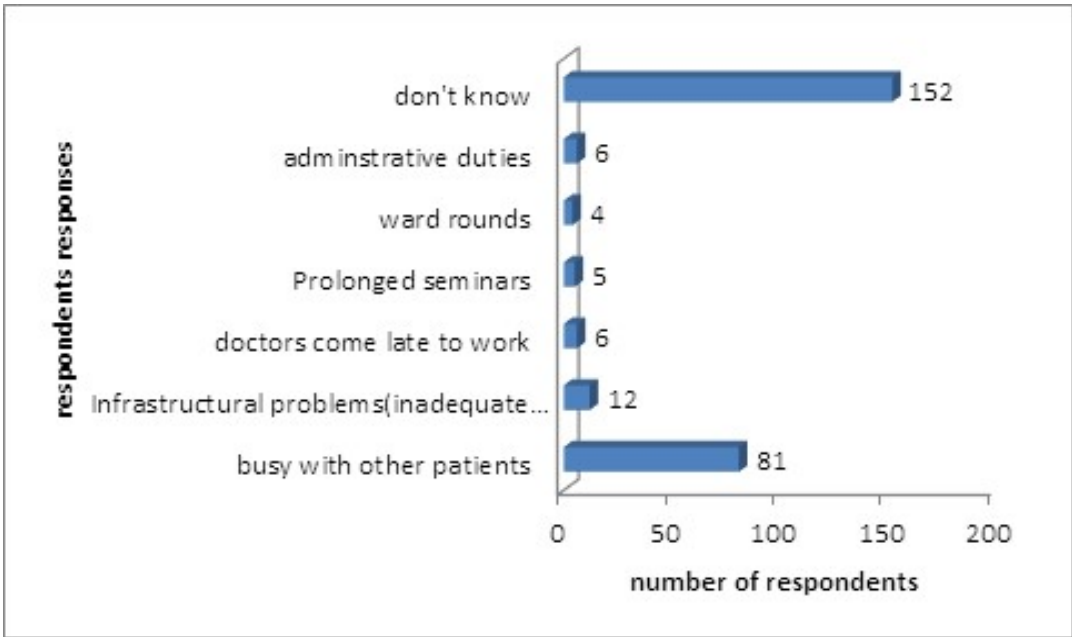

Fig. 3: Possible causes of delay in consulting the dentist by respondents

Table 3: Satisfaction with the various stages at the Out-Patient Department (OPD) and dental centre type

Variable	UCH N (%)	POHCC N (%)	X^2	p-value
On entering the dental centre				
Satisfied	115 (85.2)	112 (85.5)	0.005	0.943
Dissatisfied	20 (14.8)	19 (14.5)		
At the point of dropping appointment card at the records unit				
Satisfied	117 (86.7)	124 (94.7)	4.984	0.026*
Dissatisfied	18 (13.3)	7 (5.3)		
While waiting to consult with the doctor				
Satisfied	99 (73.3)	102 (77.9)	0.739	0.390
Dissatisfied	36 (26.7)	29 (22.1)		
When called in to see the doctor				
Satisfied	117 (86.7)	101 (77.1)	4.115	0.043*
Dissatisfied	18 (13.3)	30 (22.9)		
While with the doctor				
Satisfied	121 (89.6)	104 (79.4)	5.347	0.021*
Dissatisfied	14 (10.4)	27 (20.6)		
After consulting with the doctor to nurses station for next appointment				
Satisfied	120 (88.9)	126 (96.2)	5.087	0.024*
Dissatisfied	15 (11.1)	5 (3.8)		

**statistical significant*

Table 4: Sociodemographic characteristics and satisfaction with service delivery at various stages in OPD

Variable	Satisfaction /dissatisfaction with the stage of dropping card at OPD		X^2	P- value
Age group (years)	Disatisfied	satisfied		
≤20	8 (17.4)	38 (82.6)	8.119	0.044*
21-40	14 (11.4)	109 (88.6)		
41-60	3 (4.5)	63 (95.5)		
61-80	0 (0.0)	24 (100.0)		
Total	25 (9.7)	234 (90.3)		
Marital status	*Satisfaction with services delivered after consulting with the dentist at OPD*			
	Disatisfied	*Satisfied*		
Single	12 (12.0)	88 (88.0)	10.212	0.017*
Married	6 (3.9)	147 (96.1)		
Divorced	0 (0.0)	2 (100.0)		
Widowed	2 (28.6)	5 (71.4)		
Total	20 (7.6)	242 (92.4)		
Occupational class	*Satisfaction with services at the stage of being called in to consult with the dentist at OPD*			
	Dissatisfied	*Satisfied*	7.672	0.022*
Skilled	2 (4.3)	45 (95.7)		
Unskilled	26 (22.4)	90 (77.6)		
Dependents	20 (19.4)	83 (80.6)		
Total	48 (18.0)	218 (82.0)		

**Statistical significant*

The ideal time to wait before being attended to by the dentists as perceived by respondents was 30 minutes or less in 44.7%, more than 30 minutes by 7.5% while 47.8% had no idea of the ideal waiting time.

Quite a number (38.3%) of respondents listened to oral health talk given by public health nurses while waiting, 15.4% watched television and others engaged themselves in other activities (Fig.2). When asked about possible causes of delay in being attended to by the dentists, responses varied from "I don't know "in 57.1%, "Busy with other patients" in 30.5% to "ward round" in 1.5 %. (Fig.3).

The majority 227 (85.3%) believed that the doctors who attended to them performed according to their expectations and 209 (78.6%) mentioned that they were comfortable while waiting to be seen by the doctor.

The satisfaction ratings of respondents with their experiences at the various stages at the out-patient department was such that the majority (85.3%) were satisfied with the conduciveness of the environment and attitude of the attending staff as they entered into the dental center, 90.6% as they dropped their card, 75.6% while waiting to be called in to see the dentist, 82.0% and 84.6% while being called in to consult with the dentists and when they were actually with the dentists respectively (Table 3).

Patients attending the POHCC showed dissatisfaction with the stages of being called in to see the doctor (22.9%) and while with the doctor (20.6%) which is statistically significant compared with their counterpart attending the tertiary dental centre. ($p = 0.021$ and $p = 0.043$ respectively) (Table 3). A higher proportion (13.3%) of patients attending UCH showed greater dissatisfaction at the stage of dropping their appointment card for retrieval of their case notes and while fixing appointment for next visit (11.1%) compared to patients attending the POHC, (5.3% & 3.3%) which was also statistically significant ($p= 0.026$ & 0.024 respectively) (Table 3).

All the respondents in age group 61-80years were satisfied with the stage of dropping their appointment cards when compared with other age groups (Table 4). The widowed 28.6%were most dissatisfied with services delivered after consulting with the dentist compared to others (Table 4). Skilled workers (4.3%) were the least dissatisfied with the stage of being called in to see the doctor (Table 4). No significant associations were found with other sociodemographic variables and being satisfied or dissatisfied with the various stages at the OPD ($p > 0.05$).

Suggested ways of improving waiting time and satisfaction with dental services as mentioned by respondents include; employing more doctors 19 (7.1%), clinic expansion and improved facilities 15 (5.6%), reduced protocol to cut time spent in waiting 8 (3.0%), steady power supply 5 (1.9%), availability of audiovisuals for educators and audible television set 4 (1.5%), more workers 4 (1.5%), friendliness 3 (1.1%), and 208 (78.3%) were completely satisfied.

Discussion

This study assessed the waiting time experiences of patients attending a POHCC and Tertiary Health institution and their satisfaction with service delivery at these centres. Analysis of our results showed that many of the patients were consulting the dentist because of pain, which is in accordance with previous findings by Lawal *et al* [11], confirming the fact that consultation with the dentist in our environment is problem driven.

The waiting time of the respondents ranged from 2 to 245minutes, higher reported from the Medical Outpatients in the Northern part of Nigeria [14]. However, of note is the mean waiting time that was higher in that study than what was observed at the POHCC but lower than the mean waiting time of 102 minutes at UCH, a similar tertiary health institution. Other studies (15,16,17) have reported lower waiting time than that observed at UCH(present study) while higher mean waiting time values was reported by Ajayi at the general out-patient department at UCH [18]. The differences may be attributed to the variations in the doctor -patient ratio and patient load experienced in the different regions studied. In addition to the reduced waiting time of patients attending the POHC compared to UCH, the majority of patients seen at the POHC were seen within 30 minutes of their arrival at the dental center, which is not unusual due to the complex organizational structure of tertiary health institutions and the several protocols involved before patients are seen, as well as the teaching of both medical and residents doctors in such institutions. However, a higher mean waiting time than that recorded at the POHC has been documented at Primary Health Care Centres [19]. This may also be explained by the higher patient load in such centres.

Many of the respondents perceived the causes of long waiting time to be related to doctor being busy with other patients[16], as similarly reported by Umar [14], supporting the high patient to doctor ratio experienced in many developing countries like Nigeria. The ideal time to wait before being seen by the doctor from the respondents' point of view was 30 minutes or less, which is in accordance with reports by other authors [14]. The major activity engaged in by the respondents while waiting to consult with the dentist was oral health talk which is

different from what was reported at the General Out –Patient department(GOPD) of UCH where many of the studied outpatients engaged in observing what was happening around the clinic area [18]. Health talk is an educative session aimed at informing and motivating patients about their oral health and oral health care, this has been ongoing for years in both the POHCC and dental centre, UCH. Health education sessions organized for outpatients have been found beneficial [20].

Watching television was another means of engaging the respondents as reported by respondents in UCH. Though this was missing at the POHCC, it is a form of entertainment appreciated by many individuals in this environment, which may all have contributed to the comfort experienced by many of the respondents while waiting to be seen by the dentist. The majority of the respondents believed the doctors performed to their expectations in accordance with the fact that doctors are known to have good attitude towards their patients [21]. The fact that quite a few mentioned that doctors did not perform to expectations is an issue to address as such respondents probably may not consult with the dentist unless when in dire need for treatment, likewise, they may also not recommend such facilities to others, which may result to generalizing their experiences at the dental center..

The majority of the patients were satisfied with the different stages at the dental outpatients a finding similar to what was reported by Umar [14], but contrary to findings in India where many of the respondents were dissatisfied with the services rendered at the OPD [22]. Present study showed that respondents were dissatisfied most with the stage of waiting to be called in to consult with the dentist which is similar to what has been has similarly been documented [23]. This is not surprising as many patients' minds are preoccupied with their conditions [18].

Dropping cards to retrieve casefiles was the stage least satisfied with by respondents, with the older age groups least disatisfied with this stage compared to younger age groups. Increasing age has been associated with increased satisfaction with healthcare facilities [24]. The widowed followed by the singles were the most disatisfied with services delivered after consulting with the dentist compared to others. This finding is similar toa previous study where singles were least satisfied of healthcare facilities when compared to others [24]. Skilled workers were the least dissatisfied with the stage of being called in to see the doctor contrary to findings by Afzal [24] where occupational class had no significant association with satisfaction with health care services delivery. The differences in the various studies may be attributed to variations in perceptions of individuals.

Respondents attending the POHCC showed more dissatisfaction with the stage of being called in to see the dentists and when they were consulting with the dentists compared with respondents attending the teaching hospital UCH. This may be attributed to the architectural design of POHCC which is based on the principles of primary healthcare. The clinic is designed with appropriate technology and not necessary the most sophisticated ones compared with teaching hospitals, however, patients attending teaching hospitals were more dissatisfied with the stages of dropping their appointment cards to retrieve their casefiles and after consulting with the dentist in an effort to secure an appointment for the next visit. These stages are associated with confirming appointment time which may be cumbersome in some cases due to the patient load and the few staff available to perform such tasks. Suggested ways to improve service delivery by respondents ranged from employing more doctors in order to improve the doctor to patient ratio thus reducing waiting time, clinic expansion and improved facilities to accommodate and make waiting to consult the dentist more comfortable and the environment more conducive, reducing protocols except for the necessary ones. All the suggested ways will need to be considered in order to make the satisfaction rating of service delivery at dental centres 100% or almost. This is the need to improve early presentation for dental ailment, improve the quality of services given by professionals at the various health centers as well as overall reduction in complications from preventable dental ailments in the populace.

In conclusion, many patients were comfortable while waiting to consult with the dentist and the majority were satisfied with the stages of service delivery. However, causes of dissatisfaction and discomforts experienced by some of the patients will have to be addressed in order to make dental care experiences fully commendable.

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Household tobacco smoking and otitis media in Konduga Area of Northeast, Nigeria

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Abstract

Introduction: Otitis media represents one of the commonest illness in childhood. Studies have been conducted to identify the risk factors for this disease. However, the true prevalence of otitis media may remain elusive because community based studies are few. Investigation of household exposure to tobacco smoke and occurrence of otitis media had also not been extensively explored in the Nigerian context.

Methods: A community based study was conducted in Konduga Local Government. A multi-staged sampling procedure was used to select 400 mother-child dyads. Using an interviewer administered questionnaire, information was obtained on child's history of otitis media, socio-demographic characteristics, and household tobacco use and exposure. Bivariate analysis and logistic regression were used to explore associations and predictors.

Results: Majority of the mothers had either Quranic 194 (48.5%) or no formal education 137 (34.3%) and were predominantly artisans/traders 123(30.8%) or full housewives 221 (55.3%). Only 79(19.8%) had more than two families living together, 16% of the fathers were current daily smokers while in 31.3% of households, smoking was done on a daily basis. About a quarter (24.8%) of the children in the study had experienced otitis media while only 11.7% had more than one episode. Household daily tobacco smoking increased the odds of having otitis media up to five times (OR 4.8; 95% CI 2.5 – 9.2).

Conclusion: Household level tobacco smoke exposure was significantly associated with otitis media. Mothers and children often have no control over household smoking decision, therefore pro-active community awareness should be encouraged.

Keywords: *Smoking, otitis media, household smoking, children*

Résumé

Contexte: L'otite moyenne représente l'une des maladies les plus courantes chez les enfants. Des études ont été menées pour identifier les facteurs de risque de cette maladie. Cependant, la véritable prévalence de l'otite moyenne peut rester évasive parce que les études communautaires sont peu nombreuses. L'enquête sur l'exposition à la fumée du tabac au ménage et la survenue d'otites moyennes n'a pas été étudiée de manière approfondie dans le contexte nigérian.

Méthodes: Une étude communautaire a été menée dans la mairie de Konduga. Une procédure d'échantillonnage en plusieurs étapes a été utilisée pour sélectionner 400 dyades mères-enfants. À l'aide d'un questionnaire administré par intervieweur, on a recueilli de l'information sur les antécédents d'otite moyenne chez les enfants, les caractéristiques sociodémographiques, et l'usage et l'exposition au tabac du ménage. L'analyse bi-variée et la régression logistique ont été utilisées pour explorer les associations et les prédicteurs.

Résultats: La majorité des mères avaient soit des études Coraniques 194 (48,5%) ou pas d'éducation formelle 137 (34,3%) et étaient principalement des artisans / commerçants 123 (30,8%) ou des femmes ménagères 221 (55,3%). Seulement 79 (19,8%) avaient plus de deux familles vivant ensemble, 16% des pères étaient des fumeurs quotidiens actuels alors que dans 31,3% des ménages, le tabagisme est fait sur une base quotidienne. Environ un quart (24,8%) des enfants de l'étude avaient souffert d'otite moyenne alors que seulement 11,7% avaient plus d'un épisode. Le tabagisme quotidien des ménages augmente la probabilité d'avoir une otite moyenne jusqu'à cinq fois (OR 4,8; IC 95% 2,5 - 9,2).

Conclusion: L'exposition à la fumée de tabac au niveau du ménage était significativement associée à l'otite moyenne. Les mères et les enfants n'ont souvent aucun contrôle sur la décision de fumer à la maison, par conséquent une sensibilisation proactive de la communauté devrait être encouragée.

Mots clés: *Tabagisme, otite moyenne, tabagisme domestique, enfants*

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Introduction

Otitis media is one of the commonest illnesses in the pediatric age group and it is responsible for great distress and considerable out of pocket expenditures on health. Across countries, prevalence can range from 6.7% in China to 9.2%, in India and Nigeria and 10% in Egypt [1]. However, Lasisi *et al* in their hospital based study in Ibadan reported that 72% of the children studied had suffered from otitis media during the 1st year of life [2].

The occurrence of otitis media is associated with considerable social and economic cost. Ibekwe *et al* in their review noted that in Low-and Middle-Income Countries (LMIC), poverty, ignorance, inadequate specialists contribute to the worsening of its clinical course [3]. A study in Northern Nigeria estimated that the initial cost of treatment is usually higher than the minimum wage of $47.5 USD; thus placing effective treatment out of the reach of many households [4]. Otitis media may also result in hearing impairments which are associated with the complications of chronic suppurative otitis (CSOM); defined as otorrhea lasting six weeks or more [5]. The onset of these complications may require prolonged treatment and/ surgery which may be difficult to access especially in resource poor settings.

Risk factors that have been associated with this condition include: male gender, orofacial abnormalities, feeding in a supine position, passive smoke exposure and young age of onset; before the age of 6months, allergies, being formula fed and having siblings [6, 7]. Another risk factor commonly associated with otitis media is tobacco smoke which increases the development of otitis media and respiratory tract infections in infants and children [8, 9]. However, breastfeeding protects infants exposed to tobacco smoke from infections [9]. Another study evaluating exposure to cigarette smoke and development of otitis media with effusion, found a statistically significant association [10]. Despite these studies, a review of existing evidence averred that the association can be faulted on the basis of methodological issues such as small sample sizes and failure to delineate fathers from mothers smoking [11].

In the Nigerian context, only a few community based studies had been done on otitis media. However, one of such community based study found otitis media occurring more amongst children of mothers with lower educational status, children exposed to wood smoke and in situations where more than four children sleep in the same room [12]. The paucity of such studies makes it expedient to conduct more community-based studies in Nigeria to properly document the true prevalence of otitis media associated with tobacco smoke and to investigate the contribution of preventable causes such as tobacco smoke.

Methods

This study is part of a larger study on integrated management of childhood illnesses and was located in Konduga Local Government Area (LGA) of Borno State in the North-east region of Nigeria. As at the time of the study, the LGA had a population of 189,745 according to the 2016 census and factoring in the annual growth rate of 3% [13]. Konduga is a rural LGA and majority of the inhabitants are Muslims with few Christians and traditionalists. Sample size for the cross sectional study was calculated using the proportion of children (0.37) exclusively breastfed from a study by Ebuehi [14]. Degree of precision was set at 5% and 'no response' rate anticipated not to exceed 10%.

The calculated effective sample size was 397; which was rounded off to 400. Mother-child dyads were selected using a multi-stage sampling technique. By simple random sampling, four out of eleven wards were selected in Konduga LGA, namely: Konduga, Kawuri, Malari and Dalori with estimated under-five population of 9689, 3741, 3924 and 5431 respectively [15]. In Kawuri and Malari, the settlements were estimated to have 40 households each while in Dalori and Konduga, the settlements were estimated to have 80 and 160 households respectively. The number of questionnaires to be administered in each ward were proportionally allocated based on the estimated number of households. The number of households defined as a 'unit consisting of people who eat from the same pot' were selected in each ward through a systematic sampling technique. We included all mothers in each selected household with under-five children and the reference child was the youngest child if mother had more than one under-five children.

Interviewer administered questionnaires were used to obtain information from mothers on socio-demographic characteristics, child based characteristics (including immunization history by recall), personal smoking history, smoking within households and history of otitis media in children. Current cigarette smoking was defined as smoking within the last 30 days preceeding interview while otitis media was defined as presence of cloudy or pus-like ear discharge with or without fever.

Ethical approval was obtained from the Research and Ethical Committee of University of Maiduguri Teaching Hospital. Permission was also sought from village head and head of houses in each individual house visited.

Analysis was done using SPSS. Univariate and bivariate analysis was done. Outcome measure was history of otitis media (dichotomous outcome). Otitis media associations identified from literature were explored using Chi-Square test at the 5% level of significance. Likely predictors of otitis media were examined using binary logistic regression. The regression model was built by considering factors significant at the 25% level and factors known to be associated with or confounders for otitis media. The final model had a good fit and explained 19.5% of the variation in outcome as well as predicted 75.3% of the outcomes (Nagelkerke R2 - 0.195; Predicted - 75.3%).

Results

As shown in table 1, respondents consisted of 400 mothers. Almost all (95.0%) were married, majority had either Quranic education 194 (48.5%) or no formal education 137 (34.3%) and were predominantly artisans/traders 123(30.8%) or full housewives 221 (55.3%).

Table 1: Parental socio-demographic characteristics

Variable	N=400	n (%)
Marital Status		
Single		2 (0.5)
Married		380 (95.0)
*Others		18 (4.5)
Mothers education		
No formal		137 (34.3)
Quranic		194 (48.5)
Primary		33 (8.3)
Secondary and above		36 (9.0)
Mothers occupation		
Civil servant		23 (5.8)
Farmer		33 (8.3)
Artisan/trading		123 (30.8)
Full housewife		221 (55.3)
Number of families in household		
1 – 2		321 (80.3)
>2		79 (19.8)
Fathers current smoking pattern		
Daily		64 (16.0)
Less than daily		13 (3.2)
Not currently/never		323 (80.8)
Frequency of smoking within household		
Daily		125 (31.3)
Less daily		20 (5.0)
Never		255 (63.7)

Majority (80.3%) of the households had 1-2 families living together as part of a household while only 79(19.8%) had more than 2 families living together as part of a household. Only 64 (16%) of the fathers were current daily smokers while 13 (3.2%) do not smoke every day, even though they were current smokers. Up to 125 (31.3%) reported a history of at least somebody smoking within the house on a daily basis.

Table 2: Child related characteristics

Variable	N=400	n (%)
Age in months		
0 – 11		125 (31.3)
12 – 23		93 (23.3)
24 – 59		182 (45.5)
Sex		
Male		201 (50.2)
Female		199 (49.8)
Number of Under-fives in household		
1 – 3		190 (47.5)
3 - 4		210 (52.6)
Exclusive Breastfeeding at current age		
Yes		48 (12.0)
No		352 (88.0)
Had immunization appropriate for age		
Complete immunization for age		18 (4.5)
Incomplete immunization for age		382 (95.5)
Otitis Media		
Yes		99 (24.8)
No		301 (75.2)
Episodes of ear discharge		
Only once		52 (13.0)
Recurrent (> 1)		47 (11.8)
None		301 (75.2)

Table 2 reveals that up to 182 (45.5%) of the children under study belonged to the 24-59months age group and 210 (52.6%) households had up to 4 under-fives and above living within. In addition, only 48(12%) of the children were exclusively breastfed and even a smaller number (18; 4.5%) had complete immunization for age. Furthermore, 99 (24.8%) of the children under study had suffered from otitis media with 47 (11.8%) having more than one episode. Only one mother reported ever smoking.

In table 3, the associations with otitis media are shown. More children within the age group 12-23months, 25(26.9%) were reported to have experienced otitis media compared to other age groups. Similarly, a greater proportion of children of civil servants (30.4%) had otitis media compared to children whose mothers had other occupations.

Table 3: Associations with Otitis Media

Variable	Otitis Media Yes n (%)	No n (%)	P- Value
Age			
0 – 11	32 (25.6)	93 (74.4)	
12 – 23	25 (26.9)	68 (73.1)	0.76
24 – 59	42 (23.1)	140 (76.9)	
Sex			
Male	50 (24.9)	151 (75.1)	
Female	49 (24.6)	150 (75.4)	1.00
Mothers education			
No formal	39 (28.5)	98 (71.5)	
Quranic	45 (23.2)	149 (76.8)	0.38
Primary	5 (15.2)	28 (84.8)	
Secondary and above	10 (27.8)	26 (72.2)	
Mothers occupation			
Civil Servant	7 (30.4)	16 (69.6)	
Artisan/Trader	33 (26.8)	90 (73.2)	0.72
Farmer	9 (27.3)	24 (72.7)	
Full housewives	50 (22.6)	171 (77.4)	
Number of families in household			
1 – 2	77 (24.0)	244 (76.0)	
More than 2	22 (27.8)	57 (72.2)	0.47
Number of Under-Fives in household			
1 – 3	44 (23.2)	146 (76.8)	
≥4	55 (26.2)	155 (73.8)	0.49
Exclusive breastfeeding at current age			
Yes	8 (16.7)	40 (83.3)	
No	91 (25.9)	261 (74.1)	0.21
Complete immunization for current age			
Yes	9 (17.6)	42 (82.4)	
No	77 (25.3)	227 (74.7)	0.29
Husbands current smoking history			
Does not smoke currently	60 (18.6)	263 (81.4)	
Husband currently smokes	39 (50.6)	38 (49.4)	<0.001
Smoking frequency within household			
Daily	61 (48.8)	64 (51.2)	
Less than daily	2 (10.0)	18 (90.0)	<0.001
Never	36 (14.1)	219 (85.9)	

Likewise, more children of mothers with no formal education 39(28.5%) had experienced otitis media compared to children of mothers with other forms of education. The same pattern was reported for children from households with more than 2 families 22 (27.8%) compared to those from single family households, children from households with up to 4 or more under-fives 55 (26.2%) compared to those from households with 1-3 under-fives, children who were not exclusively breastfed 91(25.9%) compared to those exclusively breastfed, and children with incomplete immunization for current age 77(25.3%) compared to those who completed appropriate immunization for current age. All aforementioned associations were not statistically significant at the 5% level.

However, children whose fathers currently smoked 39 (50.6%) at the time of interview were more likely to be reported as having experienced otitis media compared to those whose fathers did not currently smoke 60 (18.6%); this difference was statistically significant. Also children from households where smoking was done in-house on a daily basis 61(48.8%) had otitis media more than households with less than daily smoking and households where no smoking was done. These differences were statistically significant.

Table 4 shows that after adjusting for age and sex, households where smoking was observed in-

Table 4: Predictors of Otitis Media

Variable	AOR	P value	95% CI
Immunization appropriate for age			
Complete immunization	1.0		
Incomplete immunization	1.97	0.58	0.40 – 5.47
Exclusive breastfeeding at current age			
Exclusive breastfeeding	1.0		
Non-exclusive breastfeeding	1.50	0.36	0.64 – 3.53
Smoking frequency within household			
Never	1.0		
Daily	4.80	<0.001	2.50 – 9.20
Less than daily	0.64	0.56	0.14 – 2.89
Husband's current smoking history			
Does not smoke currently	1.0		
Currently smokes	1.36	0.40	0.67 – 2.75

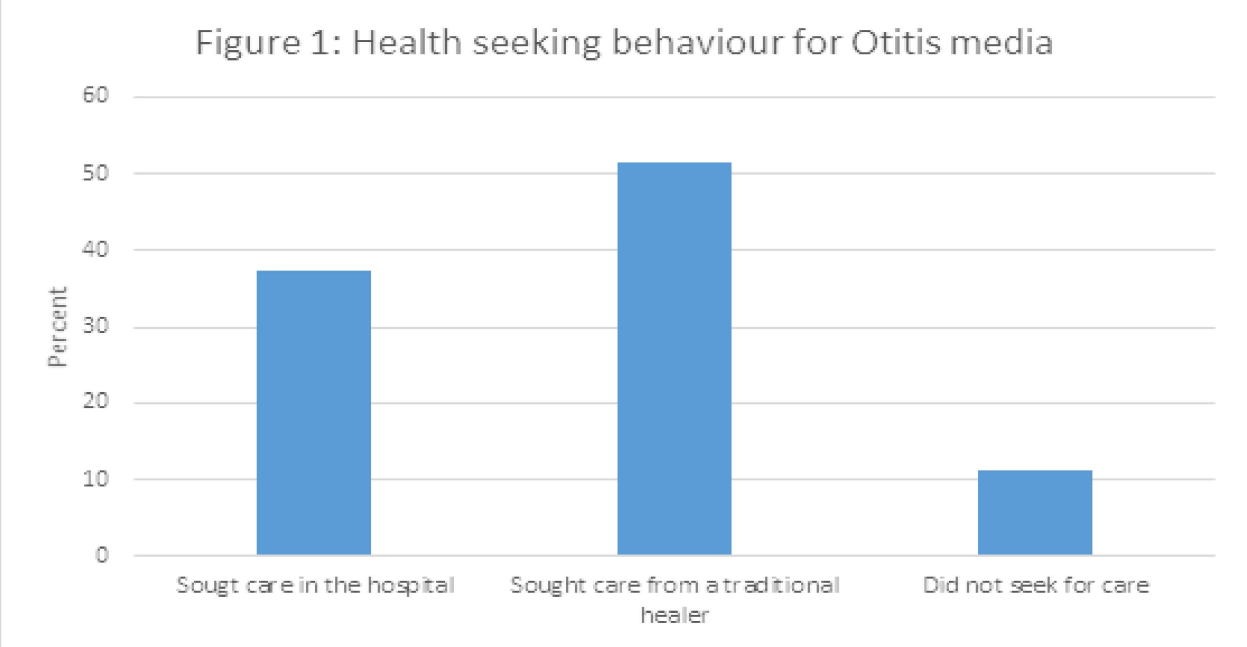
Nagelkerke R^2 - 0.195; Predicted - 75.3%

house on a daily basis were up to five times more likely to have children come down with otitis media compared to households where smoking in-house was not observed. The model was well fitted and up to 19.5% of the observed variation was explained by the model

Figure 1 shows that slightly more than half (51.5%) of the mothers sought care for their children's otitis media from traditional healers, 37.4% sought for care in the hospital while 11.1% did not seek any care.

majority of the mothers interviewed in the study had less than primary education. The National Demographic Survey 2013 documents that in the North Eastern region, up to 61.1% of females have no formal education [16]. More than half of the respondents were also full housewives which reflects the power structure of the community studied which is not different from that in most northern part of the country [16].

Amongst the children constituting the mother-child dyad studied, only 12% had been exclusively



Discussion

The study was conducted in the Northeastern part of Nigeria, and as such, it was not surprising that

breast fed at their current age which was lower than the national average of 17% in children less than 6 months [16]. Similarly, less than 5% had received

complete immunization appropriate for their age which is much far lower than that documented by the NDHS [16]. The Boko Haram insurgency in Konduga Local Government around the time of the study may account for the observed pattern.

A quarter of the respondents affirmed that their index child had experienced at least one episode of otitis media. This is lower than the 72% reported by Lasisi et al in their hospital based study [2]. However, it is higher than the 14.7% from a community based study conducted in Osun State [12]. The difference may be due to the different age of children (0-12years) considered in the Osun based study [12]. Slightly higher than a tenth of the children in our study had repeated episodes which is in keeping with the evidence that up to 17% of children will have a minimum of three episodes of acute otitis media (AOM) during the first year of life [17].

Contrary to other studies [18,19] which found exclusive breastfeeding and immunization to be protective factors against otitis media, we could not demonstrate a statistically significant association in this study probably due to the small numbers of children who had complete immunization for age and those who were breastfed exclusively [18,19]. Although, more mothers who were employed had children with otitis media compared to those unemployed, the difference was not statistically significant. However, it has been documented that mothers employment status is a risk factor for otitis media [20]. This is likely linked to the higher probability of children of employed mothers attending day care centres; a factor that increases the risk of otitis media in children [21]. Tobacco smoke has been associated with the development of otitis media in children and this had been established in several studies done elsewhere [22-24]. Our finding was not different from that of the aforementioned studies; we found that smoking exposure within households was significantly associated with otitis media. Additionally, smoking exposure on a daily basis within households increased the odds of having otitis media by almost five times compared to no exposure within the household. The relatively large effect size seen in this study may be due to the young age of those exposed i.e., 0-59months.

Self-report alone may be fraught with misclassification of events. We therefore urge that this likely misclassification be taken into consideration in the interpretation of our findings. However, mother's positively-reported child symptoms have been found to be moderately sufficient for a diagnosis of otitis media [25].

Conclusion

Exposure to tobacco smoke at a relatively young age has a negative effect on the health of children. Our study documented the association of otitis media with the exposure to tobacco smoking within households in Konduga Local Government Area. Children have no control over what happens within households; therefore, it becomes important that a pro-active community awareness programme be launched in this locality and other similar backgrounds to protect the health of children from the deleterious effects of exposure to tobacco smoke.

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Discordance between apolipoprotein B, calculated low density lipoprotein-cholesterol and non-high density lipoprotein cholesterol measurements in plasma

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Résumé

Contexte: L'estimation routinière de la majorité du risque athérogène attribuable aux lipoprotéines est réalisée par la mesure de la teneur en cholestérol de la lipoprotéine de basse densité (LBD) sous forme de LBD-cholestérol (LBD-C). Les mesures du cholestérol des lipoprotéines de non-haute densité (n-HDL-C) et d'apolipoprotéine B (Apo B) ont également été utilisées comme indices de risque car elles représentent d'autres molécules athérogènes au-delà des LBD. Nous évaluons pour la discordance entre ces indices.

Méthodologie: Le cholestérol total plasmatique à jeun, les triglycérides, le cholestérol des lipoprotéines de haute densité, l'Apo B et le glucose ont été mesurés sur des sujets non diabétiques sains. Les lipoprotéines de basse densité, le cholestérol non HDL et l'IMC ont été calculés. Les lipoprotéines de basse densité, le cholestérol LBD-C, l'apolipoprotéine B et le cholestérol non-HDL ont été regroupés en percentiles. Les individus étaient discordants si leurs valeurs LBD-C ou non-HDL appartenaient à une catégorie de percentile différente de leur catégorie percentile pour Apo B.

Résultats: Un résultat discordant (apolipoprotéine B / LBD-C ou apolipoprotéine B / non-HDL-C) a été observé chez 55 (22%) des 252 participants. La discordance était plus fréquente entre l'apolipoprotéine B et le cholestérol non HDL, survenant chez 50 (20%) personnes qu'entre apolipoprotéine B et LBD-C, 21 (8,4%). La discordance était associée à un indice de masse corporelle (IMC) $\geq$ 25 kg/m^2 (p = 0,039) et $\geq$ 30 kg/m^2 (p = 0,008) et l'IMC médian des personnes discordantes était également plus élevé que celui de ceux qui n'étaient pas 26,2 kg/m^2 contre 25,0 kg/m^2, p = 0,018, respectivement.

Conclusion: La discordance entre l'Apo B et le LBD-C calculé et non-HDL est fréquente chez les personnes en surpoids et obèses. Il peut fournir un aperçu utile de la présence de petites particules de LBD dense athérogènes parmi ces personnes.

Mots clés: *Discordance, Apolipoprotéine B, LBD-cholestérol, non-HDL-cholestérol*

Introduction

The Framingham Heart Study provided strong evidence that there are risk factors for the development of atherosclerotic cardiovascular disease (ASCVD) [1]. Amongst these risk factors, disorders of lipid and lipoprotein metabolism are especially critical in the pathogenesis of atherosclerotic disease. The fatty streak, which is thought to be the initial lesion in atherosclerosis, is an accumulation of lipid-containing foam cells in the endothelium of the arterial wall [2]. The progression of this streak to form an atheroma is also a function of the inability of the cholesterol reverse transport mechanisms to remove lipids from the developing lesion at a rate that exceeds that at which they enter the arterial wall [3]. In view of this central role of lipids in the pathogenesis of CVD, it has been recommended that lipid screening be done for all adults after 20 years of age. This should involve the fasting measurement of total cholesterol, triglycerides, LDL cholesterol and HDL cholesterol [4].

LDL – Cholesterol is the primary target of cholesterol lowering therapy [4]. This is because it is a surrogate marker of the lipoprotein LDL, which is considered the most atherogenic of all the lipid carrying lipoproteins [5]. LDL is however a heterogeneous group of molecules consisting of distinct subclasses which vary in size, density and chemical composition [6]. Two distinct phenotypes have been described. Majority of healthy persons have phenotype A which is characterised by large buoyant LDL (lbLDL) particles. Phenotype B, which is seen in a small subset of healthy people have small dense LDL (sdLDL) particles [7]. The sdLDL particles are thought to be more atherogenic compared to the lbLDL particles.

The lbLDL particles contain more cholesterol than the sdLDL particles implying that at a given level of LDL-Cholesterol, persons with a predominance of sdLDL have more of the atherogenic LDL particles and are at a higher risk of CVD, than individuals with more of the lbLDL [8]. This underlines a weakness in using LDL-C measurements as estimates of CVD risk. In addition to the aforementioned reason, this residual risk may also be further explained by the fact that LDL itself is not the only atherogenic lipoprotein. Other pro-atherogenic lipoproteins include chylomicron remnants, VLDL remnants, IDL and Lipoprotein (a). The contribution of these other lipoproteins is neither accounted for nor adequately estimated by LDL-C measurements.

To improve the risk prediction of the traditional lipid profile and capture the contribution of the non-LDL pro-atherogenic lipoproteins, the calculation of non-HDL-C has been used [9]. Non-HDL-C is calculated as total cholesterol minus HDL-C and reflects the cholesterol content of all the atherogenic lipoprotein particles. Several studies have highlighted the increased capability of non-HDL-C over LDL-C in predicting increased risk of CVD[10-12]. These have resulted in its inclusion in the newer recommendations of the National Lipid Association as a co-primary target along with LDL-C. However, similar to LDL-C, the accuracy of this calculated index is influenced by the heterogeneity of VLDL and LDL particles. When these particles are either cholesterol enriched or depleted, its ability to act as a surrogate of the sum of all atherogenic lipoproteins is affected.

Unlike the indirect measurement of all the atherogenic lipoproteins provided by non-HDL-C, Apolipoprotein B provides a direct assessment of these macromolecules. This is because it is an integral part of all atherogenic lipoprotein particles with each carrying a single apolipoprotein B particle on their surface. This fact underlies the clinical utility of apolipoprotein B as a marker of cardiovascular risk. Several studies have shown the superiority of apolipoprotein B over both LDL-C and non-HDL-C in predicting likelihood of cardiovascular events. Sniderman *et al*, performed a meta-analysis of published epidemiological studies with estimates of the relative risks of non-HDL-C and apolipoprotein B of fatal or nonfatal ischemic cardiovascular events. They concluded that over a 10-year period, an apolipoprotein B strategy would prevent 500 000 more events than a non-HDL-C strategy. This suggests that cardiovascular risk is more closely related to the number of atherogenic particles than to the total mass of cholesterol within them [13].

The above evidence suggests that despite the strong correlation that is frequently observed between LDL-C, non-HDL-C and apolipoprotein B, they are not of equivalent clinical value. This would further mean that there are circumstances where there is significant disagreement between values obtained by these 3 parameters in an individual. This is defined as discordance. Assessments of the degree of discordance, including descriptions of prevalence and associations, in a population should inform risk assessment for CVD. The present study aims to define the level of discordance that exists between LDL-C, and non-HDL-C with apolipoprotein B. This

may give an estimate in the degree of over or under-estimation of CVD risk that may be present in the use of these parameters among an apparently healthy Nigerian population.

Materials and methods

Study population

This was a cross-sectional study. Participants were recruited from the staff of the University College Hospital, Ibadan. They were apparently healthy and aged between 30 and 65 years. Persons with diabetes, on hypolipidemic agents or oral contraceptives were excluded. After consent for participation was obtained, a structured questionnaire was used to obtain information on demographic and social and clinical characteristics.

Laboratory measurements

Venous blood was obtained into EDTA bottles for fasting TC, TG, HDL–C and Apoprotein B 100 measurements. LDL – C was calculated using the Friedewald formula (LDL-C = TC minus [HDL-C plus TG/5]) while non-HDL – C was calculated as TC – HDL–C. Fluoride oxalate specimens were also collected for fasting glucose studies.

All analyses were carried out on the Landwind C100 plus automated analyzer (Landwind Medicals, Schenzen, China). Total Cholesterol, LDL Cholesterol, HDL Cholesterol and Triglycerides were measured by enzymatic methods while apolipoprotein B was measured by immunoturbidimetry.

Statistical analysis

Statistical Analysis was performed using Statistical Package for Social Sciences (SPSS) version 21. Statistical significance was set at $p< 0.05$.

Ethical approval was obtained from the University of Ibadan/University College Hospital, Ibadan Ethics Committee.

Results

Two hundred and fifty two (252) apparently healthy adults were recruited for the study. They included 89 males (35.3%) and 163 females (64.7%) with mean (SD) ages of 42.0 (8.5) years and 47.3 (10.3) years respectively. The difference in the ages of the 2 genders was not statistically significant. The mean age (SD) for all the participants was 45.4 (10.0) years. Twenty six persons (10.4%) were hypertensive and 52.7% were either overweight or obese.

Table 1 shows the distribution of the lipid and lipoprotein indices in the study population. The range of values for LDL-C, non-HDL-C and apolipoprotein B were 1.24 – 5.9mmol/L, 1.37 – 6.44 mmol/L and 0.62 – 2.57 µmol/L respectively. Values greater than the 75th percentile were observed in 191 (76.4%), 188 (75.2%) and 188 (75.2%) of the values for LDL-cholesterol, apolipoprotein B and non-HDL cholesterol respectively. Table 2 shows the Spearman's correlation of LDL-C, non-HDL-C and apolipoprotein B with clinical and biochemical parameters. The correlation studies show that these 3 parameters had significant associations with age, BMI, Total Cholesterol and Triglycerides. Non-HDL-C was the only parameter significantly associated with systolic blood pressure, diastolic blood pressure and fasting plasma glucose while LDL-C and apolipoprotein B were significantly associated HDL-C.

Table 1: Distribution of Lipid and Lipoprotein metrics

	LDL-C (mmol/L)	non-HDL-C(mmol/L) (mmol/L)	Apo B (µmol/L)
Mean,(SD)	3.34 (0.82)	3.71 (0.92)	1.88 (0.5)
Range	1.24 – 5.9	1.37 – 6.44	0.62 – 3.55
Median	3.23	3.59	1.79
Interquartile Range	2.74 – 3.83	3.05 – 4.28	1.52 – 2.17

Definition of discordance

Discordance was defined as used in previous reports.[14, 15] Values for LDL-C, apolipoprotein B and non-HDL cholesterol were grouped into 2nd, 20th 50th and 80th percentile. Individuals were considered discordant for if either their LDL-C or non-HDL values belonged to a percentile category which was higher or lower than that for the Apo B.

A discordant result (apolipoprotein B /LDL-C or apolipoprotein B /nonHDL-C) was seen in 55 (22%) of the participants. Table 3 shows the pattern

Table 2: Correlation of Lipid and Lipoprotein metrics with Clinical and Biochemical Parameters

	LDL-C	non-HDL-C	Apo B
	rho p value	rho p value	rho p value
Age, years	0.196, 0.002	0.215, 0.001	0.194, 0.002
BMI, kg/m^2	0.193, 0.002	0.221, 0.000	0.183, 0.004
Systolic BP	0.079, 0.211	0.125, 0.048	0.088, 0.168
Diastolic BP	0.102. 0.109	0.143, 0.023	0.107, 0.091
Total Cholesterol	0.954, 0.000	0.972, 0.000	0.949, 0.000
Triglycerides	0.228, 0.000	0.368, 0.000	0.230, 0.000
HDL-C	0.133, 0.035	0.104,0.102	0.129, 0.041
LDL-C	-- --	0.972, 0.000	0.994, 0.000
non-HDL-C	0.972, 0.000	-- --	0.967, 0.000
Apolipoprotein B	0.994, 0.000	0.967, 0.000	-- --
FPG	0.111, 0.080	0.139, 0.027	0.107, 0.092

of discordance between values of apolipoprotein B and those of LDL-Cholesterol while Table 4 shows that of apolipoprotein B and non-HDL cholesterol. Discordance was more frequent between apolipoprotein B and non-HDL cholesterol, occurring in 50 (20%) persons. The number of persons with discordance between apolipoprotein B and LDL-C was 21 (8.4%). 16 (6.4%) persons had a discordant percentile classification for both Apolipoprotein B and LDL-C as well as Apolipoprotein B and nonHDL-C. Of the persons with discordance between Apolipoprotein B and LDL-C, 13 (61.9%) had LDL-C values occurring in a lower percentile and for persons with discordance between Apolipoprotein B and non-HDL cholesterol, 27 (54%) were due to non-HDL-C values occurring in a lower percentile. In both comparisons, discordance was more frequently observed for values within the 20th and 80thpercentiles, occurring in 9.2% and of values obtained in this range. This corresponds to a concentration of 2.66 and 3.93 mmol/L for LDL-C and 2.97 and 4.40 mmol/L for non-HDL-C.

There was a strong association between Apolipoprotein B /LDL-C discordance and Apolipoprotein B /non-HDL-C discordance (p <0.0001). Discordance (either ApoB/LDL-C or

Table 3: Discordance of Apo B and LDL-C percentiles

Apolipoprotein B percentiles		≤ 2nd	> 2nd - ≤ 20th	> 20th - ≤ 50th	> 50th - ≤ 80th	>80th	Total
	< 2nd	5 (83.3)	1(16.7)	0 (0.0)	0 (0.0)	0 (0.0)	6 (100.0)
	> 2nd - < 20th	0 (0.0)	41 (97.6)	1 (2.4)	0 (0.0)	0 (0.0)	42 (100.0)
	> 20th - < 50th	0 (0.0)	4 (5.3)	69 (90.8)	3 (3.9)	(0.0)	76 (100.0)
	> 50th - < 80th	0 (0.0)	0 (0.0)	3 (4.0)	68 (90.7)	4 (5.3)	75 (100.0)
	>80th	0(0.0)	0(0.0)	0 (0.0)	5 (9.8)	46 (90.2)	51 (100)

Values are n (%)

Table 4: Discordance of Apo B and nonHDL-C percentiles

Apolipoprotein B percentiles		≤ 2nd	> 2nd - ≤ 20th>	20th - ≤ 50th	> 50th - ≤ 80th	>80th	Total
	< 2nd	5 (83.3)	1 (16.7)	0 (0.0)	0 (0.0)	0 (0.0)	6 (100.0)
	> 2nd - < 20th	0 (0.0)	35 (83.3)	7 (16.7)	0 (0.0)	0 (0.0)	42 (100.0)
	> 20th - < 50th	0 (0.0)	10 (13.2)	69 (90.8)	3 (3.9)	(0.0)	76 (100.0)
	> 50th - < 80th	0 (0.0)	0 (0.0)	7 (9.3)	58 (77.3)	10 (13.3)	75 (100.0)
	>80th	0(0.0)	0 (0.0)	0 (0.0)	10 (19.6)	41 (80.4)	51 (100)

Values are n (%)

ApoB/non-HDL-C) was associated a body mass index (BMI) $\geq$ 25kg/m^2 (p = 0.039) and $\geq$ 30kg/m^2 (p = 0.008). The median BMI of persons who were discordant was also significantly higher than persons who were not discordant, 26.2 kg/m^2 vs. 25.0 kg/m^2 , p = 0.018, respectively.

Discussion

Appropriate estimation of an individuals' CVD risk allows for the appropriate interventions, whether lifestyle modification or pharmacologic therapy as indicated by risk category. A discordance between Apolipoprotein B and the more routinely used LDL-C and nonHDL-C indicates inappropriate risk estimation (under- or overestimation) and inappropriate interventions. About one out of every five (22%) of our study participants had a discordant result with either an LDL-C and/or nonHDL-C value that occupied a different percentile category with the correspondingly measured Apolipoprotein B value. In more than 50% of these persons with discordant results, Apolipoprotein B results were in a higher percentile when compared to either LDL-C or nonHDL-C. This suggests that risk estimation using either of the latter 2 parameters in these persons will result in an underestimation of risk and inappropriate intervention. This has consequences for long-term cardiovascular health of these persons. This is supported by the longitudinal CARDIA (Coronary Artery Risk Development in Young Adults) study which followed up persons aged between 18 and 30 years for 25 years[16]. It reported that persons with Apolipoprotein B values greater than median and with LDL-C or nonHDL-C values lower than median (discordant) had a higher likelihood of having year 25 evidence of coronary artery calcium than in those persons in whom all the parameters were below the median (concordant). While this may provide evidence of the better predictive value of ApolipoproteinB, it also implies that the management of CVD risk in these persons would have been suboptimal if dependent on just LDL-C or nonHDL-C alone.

Our data also suggests that individuals are likely to have discordant results if they were overweight and yet more likely if they were obese. This may guide the selection of persons who in addition to the routine and traditional lipid studies should have apolipoprotein B measurements performed for optimal risk assessment. That a raised BMI may serve as a clinical predictor of discordance was also suggested by the results of Mora et al among participants in the Women's Health Study [14]. They noted that individuals who had Apolipoprotein B values greater than the median value and LDL-C lower than the median value of their study population had a higher BMI compared with individuals who had both Apolipoprotein B and LDL-C concordantly below the median. These findings are consistent with changes in the structure/composition of LDL that is observed in obesity, particularly an increase in the number of small dense LDL particles [17]. Ohmura *et al* [18] demonstrated that, relative to their ApolipoproteinB content, small dense LDL particles had significantly lower free cholesterol and cholesterol ester when compared to large buoyant LDL. This would provide a pathophysiological explanation to our observation. Thus the presence of ApoB/LDL discordance may guide the management of dyslipidaemia by helping to identify individuals who despite having desirable LDL-C cholesterol values may have increased concentrations of the atherogenic small dense LDL particles. These persons may then be offered appropriate lipid lowering interventions which they may not have received if LDL-C alone was the main guide for therapy.

There are methodological reasons for a using a surrogate marker to detect the presence of small dense LDL particles. The conventional approach has relied on either analytical ultracentrifugation (UC) or gradient gel electrophoresis (GGE). Also previously used in LDL class separation are tube gel electrophoresis, nuclear magnetic resonance, high performance liquid chromatography with gel filtration columns, ion mobility analysis, dynamic light scattering and direct homogenous assays [19]. The low cost options (UC, GGE) may require up to 72 hours of separation time and 10 mls of plasma while the ones with shorter duration of analysis are typically high costing. In addition, there is significant heterogeneity in the identified LDL subclasses as to make comparison across methods difficult due to current poor standardization across the different methods [19]. This in contrast to Cholesterol and Apolipoprotein B methods that have had international reference preparations/methods available for over 2 decades [20, 21]. This suggests that discordance as an index for assessing for the presence of small dense LDL may provide a reproducible index.

In conclusion, discordance is common among apparently healthy adults, especially those who are overweight and obese. It may provide an insight in to the presence of the atherogenic small dense LDL particles in circulation.

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Reasons for non-utilisation of eye care services among adults in a rural West African population.

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Abstract
Background: To describe the reasons for non-utilisation of eye care services among adults aged 40 years and above in a rural population of West Africa.
Methods: During a population-based cross-sectional survey, an interviewer administered questionnaire was used to obtain information on respondents' demographic characteristics, personal medical history, previous use of eye care services, ocular symptoms and reasons for not utilising eye care services.
Results: A total of 643 participants were studied. Majority of the respondents (547; 85.1%) had a history of ocular symptoms, either in the past or at the time of the study. One hundred and twenty-two respondents (19.0%) had previously consulted orthodox facilities to seek eye care; and 23.9% of the respondents with presenting visual acuity worse than 6/18 in the better eye had previously sought eye care. Reasons given by the respondents with ocular symptoms for not seeking eye care included a perception that the problem was not important in 188 (44.2%) respondents and financial constraints in 139 (32.7%) respondents. Barriers encountered by respondents who had sought eye care include financial constraints in 30 (24.6%) respondents, long distance in 21(17.2%) and strikes by hospital workers in 3 (2.5%) respondents.
Conclusion: A significant proportion of people in need of eye care services in this rural adult population are not utilising or seeking eye care services. Reasons given for non-utilisation include the perception that the eye problem was not important, financial constraints, ageism, fear and not knowing where to go for help. Barriers encountered were long distance, long waiting time, repeated appointments, strikes by hospital staff and poor service delivery.

Keywords: *Barriers, Eye care services, Utilisation, Rural community, West Africa.*

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Résumé
Contexte: Pour décrire les raisons de la non-utilisation des services de soins oculaires chez des adultes âgés de 40 ans et plus dans une population rurale de l'Afrique de l'Ouest.
Méthodes: Au cours d'une enquête transversale, un questionnaire administré par un intervieweur a été utilisé pour obtenir des informations sur les caractéristiques démographiques, les antécédents médicaux personnels, l'utilisation antérieure des soins oculaires, les symptômes oculaires et les raisons à ne pas utiliser les services de soins oculaires.
Résultats: Un total de 643 participants ont été étudiés. La majorité des répondants (547, 85,1%) avaient des symptômes oculaires antécédents, soit dans le passé, ou au moment de l'étude. Cent vingt-deux répondants (19,0%) avaient auparavant consulté des établissements orthodoxes pour obtenir des soins oculaires; et 23,9% des personnes interrogées présentant une acuité visuelle inférieure à 6/18 dans le meilleur œil avaient précédemment consulté pour des soins oculaires. Les raisons fournir par les répondants ayant des symptômes oculaires pour ne pas avoir consulté pour des soins oculaires était que le problème n'était pas important chez 188 répondants (44,2%) et des contraintes financières chez 139 répondants (32,7%). Les obstacles rencontrés par les répondants qui ont demandé des soins oculaires comprennent les contraintes financières chez 30 répondants (24,6%), les longues distances chez 21 (17,2%) et les grèves des agents hospitaliers chez 3 (2,5%) répondants.
Conclusion: Une proportion importante de personnes ayant besoin de services de soins oculaires dans cette population adulte rurale n'utilisent pas ou ne recherchent pas de services de soins oculaires. Les raisons données pour la non-utilisation incluent la perception que le problème oculaire n'était pas important, les contraintes financières, l'âgisme, la peur et ne sachant pas où aller chercher de l'aide. Les obstacles rencontrés étaient les longues distances, les longs délais d'attente, les rendez-vous répétés, les grèves des agents hospitaliers et la mauvaise prestation de service.

Mots-clés: *Barrières, Services de soins oculaires, Utilisation, Communauté rurale, Afrique de l'Ouest.*

Introduction

Health care utilisation is an important factor that influences the level of health or otherwise of a population. If available health care facilities are not utilised by the population, the level of health remains low irrespective of any efforts to provide more well-equipped facilities. It is therefore important to ensure that available health facilities are utilised maximally by reducing barriers to the barest minimum. In developing countries, where availability of health care facilities and resources are sub-optimal [1], it is even more imperative to understand the reasons for non-utilisation of health care facilities.

Eye care services are not exempted from this phenomenon, and indeed, several studies have been carried out to evaluate the factors that affect the uptake of eye care services [2-14]. Understanding these factors is expected to contribute towards the goal of reducing the burden of avoidable blindness significantly by the year 2020 (VISION 2020: The Right to Sight). This is due to the fact that people must first utilise the available eye care resources before preventable blindness can be minimized [15]. Moreover, monitoring and evaluation which are important components of the VISION 2020 initiative, involve the assessment of the uptake of services offered to the communities.

When ophthalmic services in different populations are being planned, the level and types of services required by the target population are based primarily on estimates of the prevalence and incidence of eye disease in the community. It is usually assumed that all the people with ocular morbidity will attend for treatment. It is clear that in practice not all those requiring evaluation and treatment attend [16], but the reasons for non-attendance are poorly understood [17].

If programmes for blindness prevention are to be effective then the reasons for suboptimal utilisation need to be identified and appropriate strategies implemented to improve utilisation. Providing such information would assist in the design of programs that may supply more meaningful services to those who have underutilised them[18].Therefore, this study was designed to describe the reasons for non-utilisation of eye care services among adults in in a rural community in South Western Nigeria.

Methods

This was a descriptive cross- sectional survey conducted in Akinyele Local Government Area of Oyo State in the southwestern region of Nigeria. It has a population of 211,359 people and is divided into 12 political wards, 10 of which are made up of rural settlements. The local government area has an agriculture based economy and farming is the main occupation. With regards to health facilities, there are 15 health districts, each with a primary health centre; and one government owned general hospital. None of these facilities is well equipped for eye care service delivery. They offer only basic primary eye care services and patients who require secondary care are referred to a tertiary hospital, University College Hospital, Ibadan, which is about 15 kilometres away.

Ethical approval for the study was obtained from the University of Ibadan/ University College Hospital Institutional Ethical Review Board. Consent was obtained from the local government authority, community heads as well as the participating individuals. Using a multistage sampling technique and probability proportional to size procedure, 660 participants were selected from 40 settlements in the 10 rural wards. Eligible participants were individuals aged 40 years and above who had been living in the study area for a period of at least one year and were willing to participate in the study.

Data collection was preceded by a house to house enumeration and registration of eligible participants. Thereafter, a face to face interview was conducted by trained research assistants using a structured questionnaire to obtain information including sociodemographic data, medical history, previous use of eye care services and past or present ocular symptoms. Reasons for non-utilisation were sought from respondents who had never used eye care services while enquiry was made about barriers encountered by those who had sought eye care services. Visual acuity testing was then performed using a Snellen chart or an Illiterate E chart. The chart was placed at 6 metres from the participant in a shaded open space in the daylight with each eye tested separately. The last completely read line on the chart was recorded as the visual acuity for that eye. The visual acuity of each eye was then tested with a pin hole for those with presenting visual acuity less than 6/9.

Ocular examination was subsequently conducted by an ophthalmologist (BO) in a darkened room inside the subject's house or a suitable alternative place. Each subject's ocular adnexae and anterior segment were examined using a pen torch and direct ophthalmoscopy was performed to ascertain lens clarity and to examine the posterior segment. Pupillary dilatation was performed when there were media opacities precluding a good view of the fundus or if the pupils were too small.

Dilatation was achieved with the use of 1% tropicamide and 2.5% phenylephrine eye drop.

Collected data was entered into a data base and analysed using Statistical Package for Social Sciences (SPSS version 17; IBM Corp., New York, NY, USA). Proportions and means were used to summarise the data.

Results

A total of 643 people aged 40 years and above completed the face to face interview and ocular examination out of the 660 people who were enumerated and registered giving a response rate of 97.4%. The mean age of the respondents was 58.9 ±12.3 years (Range: 40 - 120 years). There were 340 males (52.9%), the remaining 303 respondents were females.

Only 237 (36.9%) respondents had attained at least primary school level education while the remaining respondents had not received any formal education. Majority of the respondents (547; 85.1%) had a history of ocular symptoms, either in the past or at the time of the study. The symptoms included poor vision in 467 (72.6%) respondents, eye pain in 133 (20.7%), itching of the eyes in 66 (10.3%) and red eye in 14 (1.2%) respondents. One hundred and eighty eight (29.2%) respondents reported difficulties with their daily routine activities as a result of poor vision. Ninety-six (14.9%) respondents had never had eye symptoms, neither in the past nor at the time of the study.

Fifty-eight (9.0%) respondents had presenting visual acuity less than 3/60 in the better eye, 87 (13.5%) had presenting visual acuity less than 3/60 in at least one eye, while 230 (35.8%) respondents had presenting visual acuity less than 6/18 in their better eye.

With regards to previous utilisation of eye care services, only 122 (19.0%) respondents had previously consulted any facility to seek eye care and 521 (81.0%) respondents reported that they had never sought eye care at any orthodox facility. Fifty-five (23.9%) respondents out of the 230 individuals with presenting visual acuity worse than 6/18 had previously sought for eye care.

Various reasons were given by the respondents for not seeking eye care despite having ocular symptoms (Table 1). They include the fact that the problem was not important in 188 (44.2%) respondents and financial constraints in 139 (32.7%) respondents. Forty-one (9.6%) respondents reported that they did not seek eye care because of their belief that eye problems are closely associated with ageing, and should be accepted as an unavoidable feature of growing old.

Table 1: Reasons given by respondents for not seeking eye care

Reason	Number of respondents (n)*	Percent (%) (N = 425)
Problem not important	188	44.2
No money	139	32.7
Did not know where to go	72	16.9
Eye problems are associated with ageing	41	9.6
No time	28	6.6
Used OTC drugs‡	20	4.7
Symptoms just started	14	3.3
Fear	12	2.8
Advised by others to do something else	12	2.8
No escort	10	2.4
Used local herbal remedies	2	0.5

** 109 (25.6%) respondents gave more than one reason*
‡ OTC drugs – Over the counter drugs

The respondents who had previously sought eye care services reported the various barriers they had encountered. These include financial constraints in 30 (24.6%) respondents, long distance in 21(17.2%) and strikes by hospital workers in 3 (2.5%) respondents. Forty eight respondents (39.3%) out of those who had utilised services said that they did not encounter any barriers (Table 2).

Table 2: Barriers encountered by respondents who had previously consulted facilities for eye care

Barrier	Number of Respondents (n)*	Percent (N=122)
No barrier	48	39.3
Financial constraints	30	24.6
Long distance	21	17.2
Long waiting time	12	9.8
Poor service	6	4.9
Repeated appointments	4	3.3
Strikes by hospital staff	3	2.5
Difficult access	3	2.5
Fear	2	1.6
Lack of visual improvement	2	1.6
Too many patients	1	0.8

**10 respondents encountered more than one barrier*

Those respondents who had never had eye symptoms and did not seek eye care were asked about their thoughts on the need for routine eye check-up in the absence of perceived eye problems. Sixty-eight (70.8%) of them said that routine eye check-up was necessary while eight (8.4%) felt there was no need for such. The remaining 20 (20.8%) did not know if there was a need for routine eye check-up or not.

Discussion

In this study the rate of utilisation of available eye care services, as evidenced by previous consultation for eye problems by respondents, was markedly low. This is similar to the findings of previous studies that the utilisation of eye care services among rural populations ranges from 7% to 35% [13, 14, 19]. Furthermore, the utilisation of eye care services among those with visual acuity less than 6/18 in the better eye (24%) is comparable to the World Health Organisation (WHO) estimate that only a quarter of those who need eye care globally actually utilise eye services [20].

Low eye care service utilisation would have an adverse effect on the achievement of the goals of Vision 2020 in this local government area as well as similar rural communities in Africa. Moreover, the burden of eye disease and blindness would likely increase rather than decrease in magnitude if appropriate measures are not instituted to improve uptake of services.

Barriers or obstacles to uptake of eye care services are those factors that prevent or militate against would be seekers of eye care from receiving such services. Numerous studies have been conducted to investigate these barriers in various populations, although majority of them were focused on the barriers to the uptake of cataract surgery [17, 21-31]. Most of these studies observed similar factors or reasons preventing utilisation of eye care services.

Dandona *et al* [21] classified these reasons as personal, economic, and social. The reasons directly related to the individual were classified as personal; those relating to family members were classified as social; and those directly related to money were classified as economic reasons. Lewallen and Courtright [23] grouped the barriers to cataract surgery as being related to cost of surgery; distance to the hospital, cultural and social barriers, knowledge of services and trust in outcome of surgery.

A significant proportion of those who knew they had eye problems felt that the problem was not important enough to seek help. These subjects may have adjusted to their disability with little evident handicap or their responses may actually mask some hidden barriers such as problems with access and finances. It is also possible that this is a reflection of the existing gap between the medical community's perception of patient needs and patients' own perceptions of their needs. Eye care providers often assess patients' needs based upon visual acuity while the patients tend to assess their needs based upon their own perceived level of disability.

Currently, the explanation for the perception that the problem is unimportant is not clear, and requires further exploration. Nonetheless, increasing the level of awareness of the rural population about the importance and benefits of seeking treatment for visual impairment is essential in order to facilitate utilisation of services.

Financial constraints and the opportunity cost of seeking eye care are also important and the reduction of both the direct and indirect costs of accessing eye care services should result in increased utilisation.

Other reasons such as symptoms just starting, using alternative treatment options and not knowing where to go, all reflect the potential effect that awareness campaigns could have on increasing utilisation of eye care in this rural population. Fear, which relates mainly to surgical outcome, portrays the need for patient counselling as well as better monitoring and evaluation systems for cataract surgical services.

The belief that eye problems are inevitable with age and care for such is, therefore, unnecessary reflects a type of negative discrimination against elderly individuals which may impair the "felt need" for eye care services in old age [32]. This form of ageism has been previously reported as a barrier to the uptake of cataract surgical services [19, 20, 22, 33]. Awareness campaigns with specific emphasis on the importance and benefits of seeking treatment for eye problems in old age should lead to increase in utilisation of eye care services.

The other barriers encountered by respondents were related to the quality of service i.e. repeated appointments, waiting time, and strikes embarked upon by hospital workers. This emphasizes the role of poor quality service delivery as a barrier to uptake of services.

Limitations of this study include the fact that recall bias might have negatively influenced the accuracy of respondents' reports with respect to utilisation of services and medical history. Secondly, only previous visits of respondents to orthodox facilities were considered, and no enquiry was made regarding the utilisation of unorthodox methods of

health care. Consequently, it is possible that the efforts made by the respondents to seek eye care may have been underestimated, since it is known that people would most likely first seek help from alternative sources [34, 35]. Finally, the actual use of treatment remedies was not evaluated. Thus, subjects who had accessed the services may, in fact, not have utilised those services, in the real sense, if they did not use the remedies prescribed.

In conclusion, a considerable proportion of people in need of eye care services in this rural adult population of southwest Nigeria are not utilising the available services. Various reasons were given for not utilising eye care services. These include the perception that the eye problem was not important, financial constraints, ageism, fear and not knowing where to go for help. Barriers encountered were long distance, long waiting time, repeated appointments, strikes by hospital staff and poor service delivery. Therefore, during the planning and provision of eye care services in rural parts of West Africa, these reasons and barriers need to be addressed in order to optimise the utilisation of such services by the recipient communities.

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Enabling and demotivating factors associated with handwashing practices: A case study of undergraduate students in a Nigerian University

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Abstract

*Background***:** Improvement in hand hygiene behavior is one of the most important and cost- effective barriers to infectious diseases. This study described the practice, frequency of practice and identified factors associated with handwashing practice of undergraduate students in a Nigerian tertiary institution.

Methods: A descriptive cross-sectional study was conducted among 345 undergraduate students in South-west Nigeria selected through multi-stage sampling technique. Data collection was done using a semi-structured, self–administered pre-tested questionnaire. Standard handwashing technique was determined using the total scores for handwashing under running water; with soap; for at least 15 seconds and washing the palms, back of palms, fingers, web spaces and wrists. Data collected were analyzed using SPSS version 17. Descriptive and inferential statistical tests were done with p-value set at <0.05.

Results: Majority 280 (81.9%) of the students wash hands regularly but only 146 (52.5%) practiced standard handwashing technique. A higher proportion of female students practiced standard handwashing (p=0.034). Enabling factors significantly associated with handwashing practices included imitation of friends (p=0.021); knowledge that handwashing prevents diseases (p=0.011); teachings from parents (p=0.034); disgust for feces (p=0.020) and handwashing practice believed to enhance social status (p<0.001) while statistically significant de-motivational factors included forgetfulness (p=0.028), lack of soap (p=0.012) and lack of time to spare (p=0.034).

Conclusion: The practice of standard handwashing is poor amongst undergraduate students in south-west Nigeria with significant gender disparities. University communities need to initiate programs and develop strategies that will encourage the practice and remove all possible barriers.

Keywords: *Handwashing practice, undergraduate students, enabling factors, de-motivational factors*

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Résumé

Contexte: L'amélioration du comportement en matière d'hygiène des mains est l'un des obstacles les plus importants et les plus rentables aux maladies infectieuses. Cette étude a décrit la pratique, la fréquence de la pratique et les facteurs identifiés associés à la pratique du lavage des mains chez des étudiants en licence dans un établissement d'enseignement supérieur nigérian.

Méthodes: Une étude transversale descriptive a été menée auprès de 345 étudiants en licence au sud-ouest du Nigéria sélectionnés à l'aide d'une technique d'échantillonnage à plusieurs étapes. La collecte des données a été réalisée à l'aide d'un questionnaire semi-structuré auparavant testé et auto-administré. La technique standard de lavage des mains a été déterminée en utilisant les scores totaux pour le lavage des mains sous l'eau courante; avec du savon; pendant au moins 15 secondes et laver les paumes, l'arrière des paumes, les doigts, les espaces de la bande et les poignets. Les données collectées ont été analysées à l'aide de la version 17 de SPSS. Les tests statistiques descriptifs et déductifs ont été effectués avec une valeur p fixée à <0,05.

Résultats: La majorité (280) (81,9%) des élèves se lavent les mains régulièrement, mais seulement 146 (52,5%) pratiquent la technique de lavage des mains standard. Une proportion plus élevée d'étudiantes pratiquait le lavage des mains standard (p = 0,034). Les facteurs favorables significativement associés aux pratiques de lavage des mains incluaient l'imitation des amis (p = 0,021); savoir que le lavage des mains prévient les maladies (p = 0,011); enseignements des parents (p = 0,034); dégoût pour les excréments (p = 0,020) et les pratiques de lavage des mains censées améliorer le statut social (p <0,001) tandis que les facteurs démotivants statistiquement significatifs incluaient l'oubli (p = 0,028), le manque de savon (p = 0,012) et le manque de temps (p = 0,034).

Conclusion: La pratique du lavage des mains standard est médiocre chez les étudiants en licence au sud-ouest du Nigeria, avec d'importantes disparités entre les sexes. Les communautés universitaires doivent lancer des programmes et développer des stratégies qui encourageront la pratique et élimineront tous les obstacles possibles.

Mots clés: *Pratique du lavage des mains, étudiants en licence, facteurs favorables, facteurs de démotivation*

Introduction

Absenteeism due to illnesses from transmissible infections is a major problem in educational institutions [1-3] . Hands are the primary mode of transmission of many infectious diseases, particularly among those living and working in compact residential and work environment such as in markets, schools, military barracks, college dormitories, and summer camps. Group living environments, such as students' halls of residence, make the spread of transmissible diseases and upper respiratory illnesses more likely. The occurrence and severity of hygiene related disease outbreaks in endemic areas has been documented in literature to be greatly enhanced by human behavior with regards to their healthy hygiene practices [4] . Poor hygiene practices such as inadequate handwashing have caused many people to fall ill and even to die [5] . Improvement in hand hygiene behavior is the most important and cost effective barrier to many infectious diseases even among students [5, 6] .

The World Health Organization [7] defines hand hygiene as any action of hand cleansing which may include handwashing, antiseptic handwashing, or antiseptic hand rubbing [7, 8] . The Global Handwashing day on October 15 yearly was initiated by the Public Private Partnership for Handwashing (PPPHW) at the annual World water week since 2008 [9] . The main objective was to motivate and mobilize millions around the world to improve their handwashing habits. This simple and cost-effective practice, according to research, can reduce the rate of mortality from these diseases such as diarrhea and pneumonia by 50% or more[10, 11] . Appropriate hand hygiene practices, especially by handwashing can potentially result in the reduction of the spread of infection and the resulting lost days due to absenteeism [1] . Nonetheless, some people merely wash hands. Hence, it is important to know how standard their practice is.

Students in the tertiary institution are an important population to be studied. They are people in the preparatory phase for the independent adult life. They are expected to continue to pass on the right ideals as well as ethical norms in the society if these have been truly imbibed by them. However, these students are often also young people, full of life and involved in several adventurous activities. Their busy lifestyle may make them overlook this basic healthy practice which improves health and life. They are also at high risk of rapid spread of infectious diseases such as the latest Ebola infection in the West African countries. This is because they live in hostels, some of which are over-populated with the occupants closely relating with one another. Unfortunately, there is a paucity of literature on the hand hygiene practices of Nigerian university students, especially in non-medical professions. The study, therefore, described the handwashing practices of university students in diverse professional training, determined if their practice was standard or not; assessed the frequency of handwashing practices to critical events and factors associated with their type of handwashing practice. Findings from this study will provide evidence on the prevailing handwashing practices of students' in Nigerian universities and identify basic intervention packages to enhance their practice, health and livelihood.

Methods

The study was descriptive cross-sectional in design and was conducted among undergraduate students of the Joseph Ayo Babalola University, a faith-based private institution in Southwest Nigeria. The school had a total population of about 3000 students with a male to female ratio of 1.02:1 showing a slight preponderance of male students as at the time of conducting the study. The study was conducted across all departments within the seven faculties namely Humanities, Agriculture, Natural Sciences, Law, Environmental Sciences, Social Sciences and Management Sciences. There was no medically related faculty in the institution as at the time of conducting this study. There are varied numbers of Departments across all these faculties offering courses with duration of four or five years in each department. A sample size of 359 was determined using the Cochran's formula for determining single proportions based on an assumed 50 percent prevalence rate for handwashing practice of undergraduate students in Nigerian universities. Then, adjustment for a possible 5% percent attrition and a total population less than 10,000 was done. A multi-stage sampling technique was employed which entailed initial selection of two departments from each of the seven faculties in the university studied. This was followed by the selection of seven students by simple random sampling technique at all levels of study in all the selected departments using their year of study sample frame obtained from the university registrar. Interview appointments were then fixed with these students by sending text messages to their mobile phone numbers. If anyone refused to consent to the study, he was replaced from the sample frame.

Data was quantitative in nature and collected using a semi-structured, self–administered pre-tested questionnaire administered by four trained graduate research assistants. The outcome variables were 'regularly practicing handwashing or not' and 'standard handwashing practice or not'. A standard handwashing practice for this study was assessed by asking if respondents (1) washed hands under running water, (2) with soap (3) for at least 15 seconds and (4) if they washed the palms, back of palms, fingers, web spaces and wrists. The response to each of these practices which was one of always, sometimes, or never were scored. Always was scored 2, sometimes 1 and never had a score of zero. The total score to all four questions was then summed up. The obtainable scores ranged from 0 to 8. A standard handwashing practice was defined as scoring > 50% of the total score. Scoring $\geq$ 50% was defined as a non-standard practice. Of those, who practiced standard handwashing, the frequency for which this was done for selected events was determined. However, only those respondents that practiced handwashing aside from when they are or took their bath were subjected to this scoring and grading. Independent factors included the socio-demographic factors as well as selected enabling and demotivating factors to handwashing practice. The faculties of the study were regrouped into Pure and Applied Sciences (consisting of the Faculties of Agriculture, Natural Sciences, and Environmental Sciences) and Social, Humanities, and Management Sciences (consisting of Faculties of Law, Humanities, Social Science and Management Sciences). The level of study was also regrouped into those in 200 levels of study and below and those above 200 levels.

Data was analyzed using the SPSS version 17 statistical software. Univariate analysis such as frequency distribution of students who practiced standard handwashing and the frequency of their practice was done. Summary statistics was done for the socio-demographic variables. The bivariate level of analysis was done by assessing factors associated with handwashing practice using a chi-square statistics with the level of statistical significance set at $p<0.05$.

Permission to conduct the study was granted by the school authorities. Informed verbal consent was also obtained from the respondents after being assured of the confidentiality of the data provided. The authors adhered to the Helsinki Declaration principles in the conduct of this study.

Result

Three hundred and fifty students were recruited for the study and 345 responded giving a 98.6% response rate. There were more female students in the population studied with a female to male ratio of 1:1.4. The mean age of respondents was 22.4±2.3 years. Almost all the respondents, 333 (96.5%) had parents with formal education. (Table 1).

Table 1: Socio-demographic characteristics of respondents (n = 345)

Socio-demographic characteristics	Frequency	%
Sex		
Male	144	41.7
Female	201	58.3
Age		
d" 24 years	257	74.5
>24 years	88	25.5
Marital status		
Single	321	94.0
Married	21	6.1
Faculty		
Natural and Applied sciences	146	42.3
Humanities Social and Management Sciences	199	57.7
Year of study		
100	60	17.4
200	119	34.5
300	113	32.8
400	53	15.3
Religion		
Christians	337	97.7
Islam	5	1.5
Traditional	3	0.9
Education level of mother		
No formal education	12	3.5
Formal education	333	96.5
Occupation of parents		
Farming	21	6.1
Trading	34	9.9
Government employees	129	37.4
Self-employees	99	28.7
Corporate employees	62	18.0

The Frequency of Handwashing

Two hundred and eighty, (81.9%) of respondents often practiced handwashing while 65 (17.1%) reportedly washed their hands only when they want to eat or take their bath. Of those who often practiced handwashing, 203 (72.5%) did so <5 times a day. The mean handwashing frequency was 4.3±0.9 SD with a modal frequency of 3 times as presented in Table 2. Of the 280 respondents who reportedly often washed their hands, a little more than half, 158 (56.4%) always did so under running water, less

than half 119 (42.5%) did so with soap and a much lower proportion 84 (30.0%) reportedly always did so for at least 15 seconds (Table 3).

Table 2: Practice and Frequency of Handwashing by all respondents (n=345)

Response	Frequency	%
Practice handwashing regularly		
Yes	280	81.9
No (occasionally)	65	17.1
Total	345	100.0
Frequency of handwashing		
< 5 times	203	72.5
5-9 times	62	22.1
>10 times	15	5.4
Total	280	100.0

When the responses defining standard handwashing practices were scored and summed up, 146 (52.5%) of the respondents practiced standard handwashing. As regards the frequency and times of practicing standard handwashing, >50% of respondents reportedly always washed their hands before and after taking their meals, after using the restroom, after blowing their nose, after touching animals and before preparing meals as shown in Table 3.

A chi-square analysis was carried out to identify socio-demographic factors associated with the practice of standard handwashing among respondents. As shown in Table 4, being a female student (p= 0.034); a single or unmarried students (p= 0.023); practicing Christianity as a religion (p<0.001); as well as students with educated parents (p= 0.008) were found to be statistically significantly associated with the practice of standard handwashing.

When the respondents' perspectives on some enabling factors that could have informed their handwashing practices were assessed, knowledge from previous school (p= 0.024) was the only enabling institutional factor. All the personal factors assessed were significant which includes imitation of friends (p= 0.021) and knowledge of its prevention of diseases (p= 0.011). Teaching from parents (p= 0.034), societal disgust for dirty hands (p= 0.018) and handwashing practices enhancing students' social status (p<0.001) were the cultural enabling factors found to have statistically significantly informed their handwashing practices. (Table 5). Also, the possible de-motivational factors to handwashing practice by these undergraduate students were assessed. Of these, forgetfulness (p= 0.028); lack of soap (p= 0.012) and lack of time or being too busy (p= 0.034) were the statistically

Table 3: Frequency of standard handwashing practices and critical periods for handwashing among respondents with regular handwashing practice (n=280)

	Always		Sometimes		Never		Total
Standard handwashing practices	Freq.	%	Freq.	%	Freq.	%	
Wash hands under running water	158	56.4	103	36.8	19	6.8	280
Wash hands with soap	119	42.5	152	54.3	9	3.2	280
Wash hands for at least 15 seconds?	84	30.0	140	50.0	56	20	280
Wash palms, back of palm, fingers, web spaces and wrists	166	59.3	99	35.3	15	5.4	280
Critical periods for handwashing practice							
Wash hands before meals	158	56.4	90	32.1	32	11.4	280
Wash hands after meals	148	52.9	96	34.3	36	12.9	280
Wash hands before defecation	78	27.9	80	28.6	122	43.6	280
Wash hands after defecation	154	55.0	118	42.1	8	2.9	280
Wash hands when they get back to the hostel	90	32.1	122	43.6	68	24.3	280
Wash hands after handshaking	35	12.5	87	31.1	158	56.4	280
Wash hands after using public transportation	52	18.6	121	43.2	107	38.2	280
Wash hands after waking up in the morning	167	59.6	95	33.9	18	6.4	280
Wash hands after touching animals	171	61.1	86	30.7	23	8.2	280
Wash hands before preparing meals	154	55.0	87	31.1	39	13.9	280
Wash hands after money exchange	52	18.6	101	36.1	127	45.4	280
Wash hands after blowing the nose	211	75.4	65	23.2	4	1.4	280

Table 4: Socio–Demographic characteristics associated with standard handwashing practices (n=280)

Socio-demographic characteristics	Standard practice (n= 154) Freq (%)	Non-standard practice (n= 126) Freq (%)	Total (n= 280) Freq (%)	Test of Statistical significance; (degree of freedom), p-value
Sex				
Male	58 (45.8)	64 (54.1)	122(100.0)	χ^2=18.448; (df=1); p= 0.034
Female	96 (60.7)	62 (39.3)	158(100.0)	
Age				
<18 Years	74 (54.0)	63 (46.0)	137(100.0)	χ^2=9.4220;(df=1); p= 0.098
>18 years	80 (56.7)	61 (43.3)	141(100.0)	
Marital status				
Single	148 (56.1)	116(43.9)	264 (100.0)	χ^2=24..477; (df=1); p= 0.023
Married	6 (37.5)	10 (62.5)	16 (100.0)	
Faculty of study				
Pure and Applied sciences	88 (62.0)	54 (38.0)	142 (100.0)	χ^2=11.808; (df=1); p= 0.084
Social, humanities & Management Sciences	66 (47.8)	72 (52.2)	138 (100.0)	
Level of study				
≤200 level	76 (60.3)	50 (39.7)	126 (100.0)	χ^2=6.864; (df=1); p = 0.108
>200 level	78 (50.7)	79 (49.3)	154(100..0)	
Religion of respondents				
Christians	151 (55.1)	123 (44.9)	274 (100.0)	χ^2=28.948;(df=1); p < 0.001
Non-Christian	3 (50)	3 (50)	6 (100.0)	
Level of education of parents				
No formal education	2 (33.3)	4 (66.7)	6 (100.0)	χ^2=28.421; (df=1); p=0.008
Formal education	152 (55.5)	122 (44.5)	274 (100.0)	

significant barriers to handwashing practice among the respondents. (Table 6).

Discussion

This study explored the practice of handwashing among undergraduate students in a private university in Nigeria. It attempted to identify those factors that could influence handwashing practices among these students, who for the high level of interaction among them puts them at a high risk of contracting communicable diseases if any should occur.

Frequency of handwashing

More than three-quarters of the students studied (81.9 percent), often practiced some sort of handwashing. However, only 42.5 percent reportedly always washed their hands with soap. This finding is low compared to 66.9 percent of students observed at the Michigan State University (MSU) who did same [12] though higher than the 22.5% undergraduate students in four private universities in Bangladesh who practiced handwashing with soap and water [13] . The reason for the difference with the findings from MSU may be because theirs was a one-time observation compared to the methodology of this study. In Nigeria, there is paucity of evidence in literature on the handwashing practices of undergraduate students in non-medically related disciplines. Rather, evidence abounds on the handwashing practices of students in medically related professions who are incompatible groups with our study population as handwashing is an ethics of their intending professions. Regarding the frequency of handwashing practice, this was low as only 27.5 percent of the 81.9 percent washed hands more than five times. According to Rose-Innes, the recommended daily frequency of handwashing by the Global Hygiene Council was a minimum of six times [14] . This low frequency depicts that more still needs to be done in creating a handwashing culture among students in tertiary institutions.

Findings showed that 30 percent of the students reported that they always washed their hands for at least 15 seconds. This is also low though much higher compared to 2 percent of female American college students observed to have washed their hands with soap for ≤10 seconds [15] and 5 percent of students of MSU who did same for 15 to 20 seconds [12] . This suggests that a self-reported finding may

Table 5: Enabling factors associated with handwashing practice among all respondents (n=345)

Variables	Regular hand washing practice n=280 Freq (%)	Occasional handwashing practice n= 65 Freq (%)	Total n= 345 Freq (%)	Test of statistical significance, χ^2 value; (degree of freedom); p-value
Personal factors				
Imitation of friends				
•Agree	228 (88.4)	30 (11.6)	258 (100.0)	χ^2= 39.003; (df= 1);
•Disagree	42 (55.3)	34 (44.7)	76 (100.0)	p= 0.021
Prevention of diseases				
•Agree	274 (92.9)	21 (7.1)	295 (100.0)	χ2= 42.313; (df= 1);
•Disagree	6 (19.4)	25 (80.6)	31(100.00)	p= 0.011
Personal habit				
•Agree	272 (93.8)	24 (8.2)	296 (100.0)	χ2= 48.229; (df= 1);
•Disagree	8 (18.2)	36 (81.8)	44 (100.0)	p= 0.024
Disgust for faeces				
•Agree	255 (86.7)	39 (13.3)	294 (100.0)	χ2 =46.692; (df= 1).
•Disagree	25 (46.3)	27 (51.9)	52 (100.0)	p =0.020
Disgust for filthy Environment				
•Agree	249 (84.7)	45 (15.3)	294 (100.0)	χ2= 48.248; (df= 1);
•Disagree	31 (64.6)	17 (35.4)	48 (100.0)	p= 0.023
Fear of contracting disease				
•Agree	274 (92.9)	21 (7.1)	295 (100.0)	χ2 =52.811; (df= 1);
•Disagree	6 (19.4)	25 (80.6)	31 (100.0)	p<0.001
Detest filthy latrines				
•Agree	266 (88.7)	34 11.3)	300 (100.0)	χ2 =49.339; (df= 1);
•Disagree	14 (31.1)	31 (68.9)	45 (100.0)	p= 0.031
Protection against infections				
•Agree	278 (86.8)	42 (13.2)	320 (100.0)	χ2 =50.007;(df= 1);
•Disagree	2 (8.0)	23 (92.0)	25(100.0)	p= 0.018
Institutional factors				
Hand hygiene practices from the previous school				
•Agree	242 (88.9)	24 (8.2)	266 (84.6)	χ2= 48.229; (df= 1);
•Disagree	8 (18.2)	36 (81.8)	44 (100.0)	p= 0.024
Knowledge acquired in the university				
•Agree	146 (52.1)	45 (13.3)	191 (55.4)	χ2= 16.429; (df= 1);
•Disagree	134 (27.9)	20 (51.9)	154(44.6)	p= 0.127
Campaign on media and internet				
•Agree	149 (76.8)	45 (13.3)	194 (56.4)	χ2= 18.028; (df= 1);
•Disagree	131 (88.5)	17 (11.5)	148 (42.6)	p= 0.113
Cultural factors				
Teaching from parents				
•Agree	266 (88.7)	34 (11.3)	300 (87.0)	χ2= 43.788; (df= 1);
•Disagree	14 (31.1)	31 (68.9)	45 (13.0)	p= 0.034
Societal disgust for dirty hands				
•Agree	278 (86.8)	42 (12.2)	320 (92.3)	χ2= 48.407;(df= 1);
•Disagree	2 (8.0)	23 (92.0)	25 (7.2)	p= 0.018
Enhances Social Status				
•Agree	228 (88.4)	30 (11.6)	258 (100)	χ2 =51.370; (df= 1);
•Disagree	42 (55.3)	34 (44.7)	76 (100)	p<0.001

be higher than when the respondents are directly observed. Only 52.9 percent of students studied practiced standard handwashing. This is similar to 43 percent of medical students in Austria who performed handwashing according to the WHO guidelines [16] . This suggests that a lot still needs

Table 6: De-motivational factors associated with handwashing practice among all respondents (n=345)

Variables	Regular hand washing practice n=280 Freq (%)	Occasional handwashing practice n= 65 Freq (%)	Total n= 345 Freq (%)	Test of statistical significance, χ^2 value; (degree of freedom); p-value
Forgetfulness				
•Agree	266 (88.7)	34 (11.3)	300 (100)	$\chi2$= 43.621; (df= 1)
•Disagree	14 (31.1)	31 (68.9)	45 (100)	p= 0.028
Inconveniently located handwashing facility				
•Agree	125 (42.5)	45 (13.3)	170 (49.3)	$\chi2$= 11.892; (df= 1)
•Disagree	155 (57.5)	20 (51.9)	175 (50.7)	p= 0.146
Lack of motivation				
•Agree	146 (52.1)	45 (13.3)	191 (55.4)	$\chi2$= 16.429; (df= 1)
•Disagree	134 (27.9)	20 (51.9)	154 (44.6)	p= 0.127
Lack of soap				
•Agree	228 (88.9)	61 (21.1)	289 (83.8)	$\chi2$= 43.002; (df= 1)
•Disagree	42 (64.6)	23 (35.4)	65 (18.8)	p= 0.012
Lack of time (too busy)				
•Agree	274 (88.9)	34 (11.0)	308 (89.3)	$\chi2$= 38.312; (df= 1)
•Disagree	6 (16.2)	31 (83.8)	37 (10.7)	p= 0.034
Lack of water				
•Agree	140 (50.0)	20 (13.3)	191 (55.4)	$\chi2$= 16.429; (df= 1)
•Disagree	140 (50.0)	34 (51.9)	154 (44.6)	p= 0.127
Soap damages skin				
•Agree	146 (52.1)	43 (13.3)	189 (54.8)	$\chi2$= 17.009; (df= 1)
•Disagree	134 (28.4)	20 (51.9)	159 (100)	p= 0.210

to be done to improve the quality of handwashing practice among undergraduate students in Nigeria.

Factors associated with the practice of Handwashing

A higher proportion of female students practiced standard handwashing compared to their male counterparts. This is contrary to the findings of Herbert et al, and Anderson et al who found no gender differences in the handwashing practice of their students [16, 17] . All the personal and socio-cultural factors assessed were significantly associated with the practice of handwashing. Findings showed the role of peer group influence on handwashing as 88.4 percent of the students agreed that imitation of their friends encouraged the practice in them. Also, the knowledge of the students on the importance of handwashing practices in infection prevention and control also informed the practice. The place of the family in encouraging the practice of handwashing cannot be over-emphasized and this was supported by findings from this study. The importance of engendering the practice of handwashing early in life was equally highlighted in this study as a high proportion, 88.9 percent of those who regularly practiced handwashing attributed it to their home-acquired habit before becoming undergraduate students. Very few attributed it to knowledge gained in the university. Forgetfulness was found as a significant barrier to handwashing among the students studied. This was also the main reason given for skipping handwashing when within the universities by 37.5% of undergraduate students studied by Sultana et al in Bangladesh [13] . Hence, university authorities need to institute programs with reinforcements that will enlighten and often remind the students on standard handwashing practices.

Conclusion and Recommendation

A fairly high proportion of the population studied practiced regular handwashing with more female than male preponderance even though, the frequency of this practice among both sexes is regrettably lower than the global recommendation by the World Health Organization. Standard handwashing practice is yet to be generally adopted by the students studied. Personal factors such as disgust for feces, filthy

environments and filthy latrines as well cultural factors such as teaching from parents, societal disgust for feces and perceiving handwashing practice as one that enhances social status were the significant enabling factors of handwashing among the students studied. The significant demotivating factors included forgetfulness, lack of soap and lack of time to spare for practicing handwashing.

To improve standard handwashing practices of the student population, it will be advantageous to adopt the use of emotional motivators such as promoting the perception of disgust for fecal matter, dirt and filthy environments among undergraduate students, as being used by sanitation programs globally in community led total sanitation to stop open defecation. Emotional motivators can be used to promote an emotion that has been found to strongly drive the acceptance or neglect of a behavior. This can be done by developing and deploying appropriate health promotional packages. For the rapid uptake of this practice, it will also be beneficial to relate the practice to an activity that enhances social status in the university community. Various stakeholders such as the family and religious bodies should be engaged and sensitized on promoting the practice. It is also expedient for university communities to initiate programs and develop strategies by which the practice of handwashing can be encouraged. A poster with a simple question such as "Have you washed your hands today" or another showing "the basic steps in standard handwashing" pasted in strategic locations in the school may help remind students to wash their hands at critical periods. The school authorities should also endeavor to enable handwashing by provision of handwashing stations and facilities at strategic locations on campus and hostels and remove all possible handwashing barriers.

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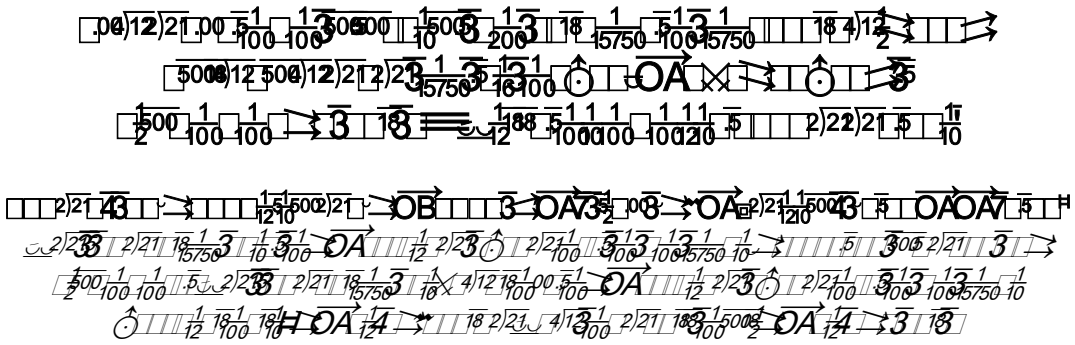

Abstract

*Introduction***:** Tuberculosis (TB) accounts for the death of more than a quarter of people living with HIV. One of the strategies to reduce the incidence of TB among HIV patients is the use of Isoniazid Preventive Therapy (IPT). However, IPT implementation has been low globally. This study aims to identify the challenges facing IPT implementation and strategies to overcoming them.

*Materials and Methods***:** The study involved the use of quantitative and qualitative methods. A cross sectional study design was used to identify the status and challenges confronting IPT implementation. Key informant interviews were conducted to identify strategies to overcome identified challenges.

Results: Inadequate human resources for health and work load were challenges confronting implementation of IPT identified by 91% and 80% of the respondents respectively. Other challenges include; fear of poor adherence, fear of INH toxicity and fear of patients developing resistance to INH. Employment and training of health care workers at the HIV clinic were suggested strategies to overcome current challenges facing the implementation of IPT for PLHIV.

Conclusions: Inadequate human resources is the leading challenge confronting IPT implementation in our setting. Employment of more health care workers, task shifting and the use of volunteers will help to improve access to IPT by PLHIV.

Keywords: *Current status, challenges, implementation, IPT, PLHIV*

Résumé

Contexte: La tuberculose (TB) explique la mort de plus d'un quart des personnes vivant avec le VIH. L'une des stratégies pour réduire l'incidence de la tuberculose chez les patients infectés par le VIH est l'utilisation de la thérapie préventive à l'isoniazide (TPI). Cependant, la mise en œuvre du TPI a été faible au niveau mondial. Cette étude vise à identifier les défis auxquels est confrontée la mise en œuvre du TPI et les stratégies pour les surmonter.

Matériels et méthodes: L'étude a impliqué l'utilisation de méthodes quantitatives et qualitatives. Un plan d'étude transversal a été utilisé pour identifier le statut et les défis auxquels est confrontée la mise en œuvre du TPI. Des entrevues avec des informateurs clés ont été menées afin d'identifier des stratégies pour surmonter les difficultés identifiées.

Résultats: Des ressources humaines inadéquates pour la santé et la charge de travail ont été des défis auxquels ont été confrontés la mise en œuvre du TPI, identifiés respectivement par 91% et 80% des répondants. D'autres défis incluent; la crainte d'une mauvaise adhérence, la crainte de la toxicité de l'INH et la crainte que les patients développent une résistance à l'INH. L'emploi et la formation des agents de la santé à la clinique VIH ont été des stratégies suggérées pour surmonter les défis actuels liés à la mise en œuvre du TPI pour les PVVIH.

Conclusions: L'insuffisance des ressources humaines est le principal défi auquel est confrontée la mise en œuvre du TPI dans notre environnement. L'emploi d'un plus grand nombre d'agents de la santé, le transfert des tâches et le recours aux bénévoles aideront les PVVIH à accéder plus facilement au TPI.

Mots-clés: *Situation actuelle, Défis, Mise en œuvre, TPI, PVVIH*

Introduction

Till date, Tuberculosis (TB) is adjudged a major global health problem responsible for ill health among millions of people all over the world. TB is ranked the second leading cause of death from infectious diseases worldwide after Human Immunodeficiency Virus (HIV) [1]. In the year 2013, it was estimated that there were 9.0 million new TB cases and 1.5 million TB deaths out of which 1.1 million were among HIV negative people and

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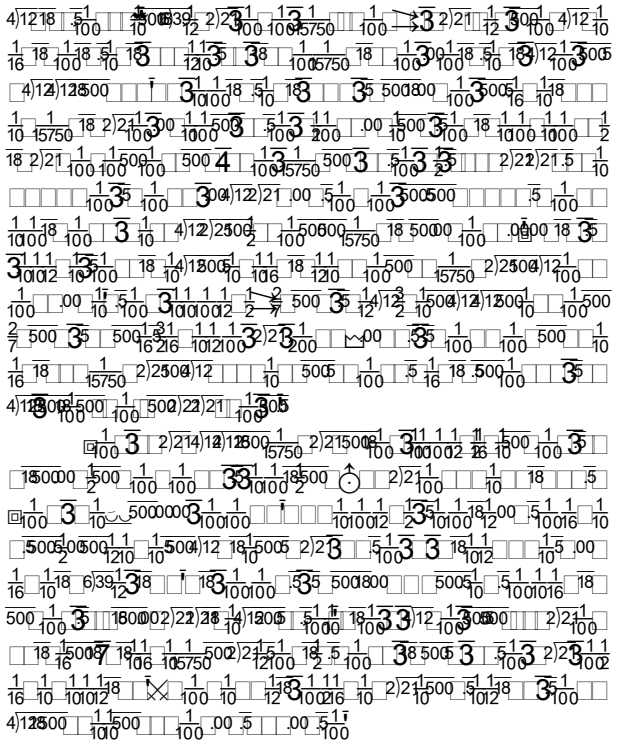
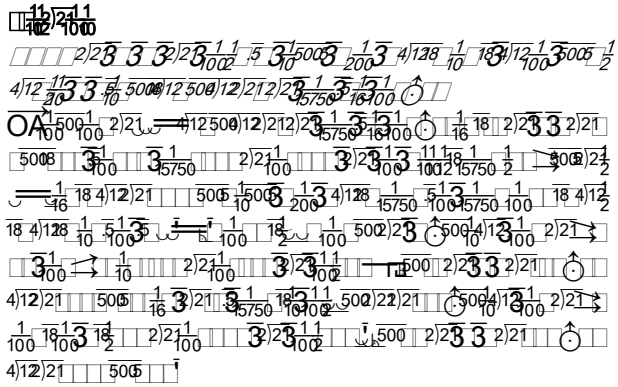
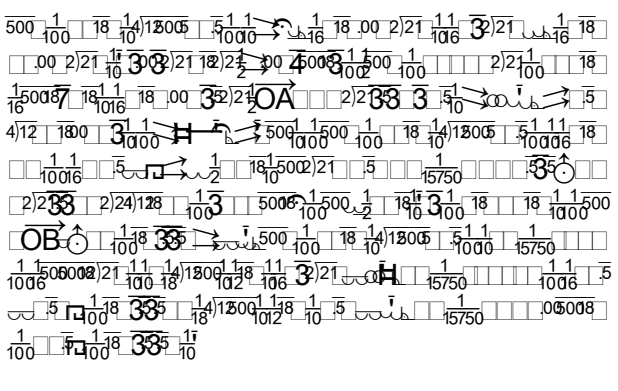
400,000 among HIV positive clients [1]. Tuberculosis has remained the most common opportunistic infection worldwide; causing morbidity and mortality among people living with HIV/AIDS and accounting for over a quarter of AIDS related deaths [2,3]. It has been found that people living with HIV/AIDS are 21-30 times likely to die







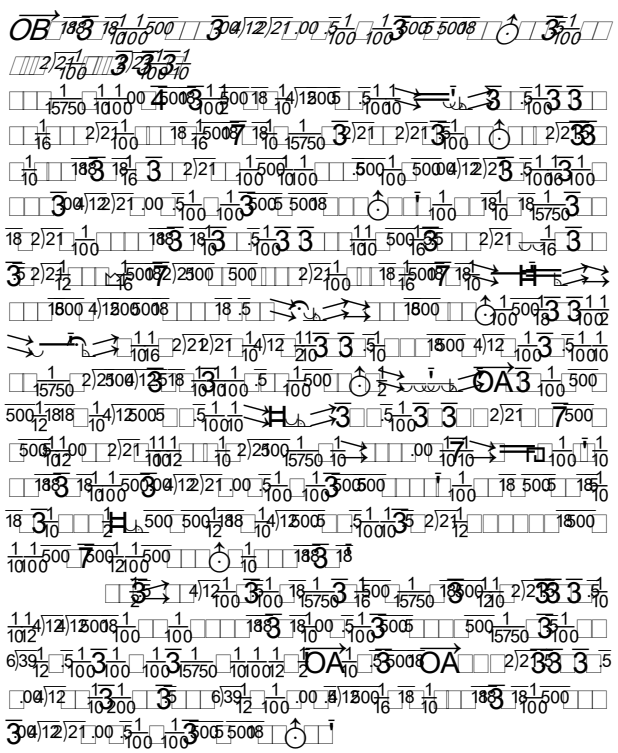
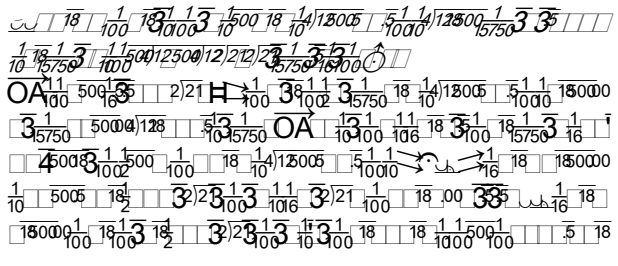


Table 1: IPT eligibility and placement on Isoniazid among PLHIV

Name of Facility	Level of care	Eligible PLHIV	Number placed on IPT	Percentage placed on IPT (%)
University College Hospital	Tertiary	2907	11	0.4%
Adeoyo Maternity Hospital	Tertiary	545	194	35.6%
St Mary Catholic Hospital	Secondary	266	227	85%
General Hospital Ogbomoso	Secondary	258	32	12%
Baptist Medical Center, Saki	Secondary	143	26	18%
Total		4119	490	11.9%



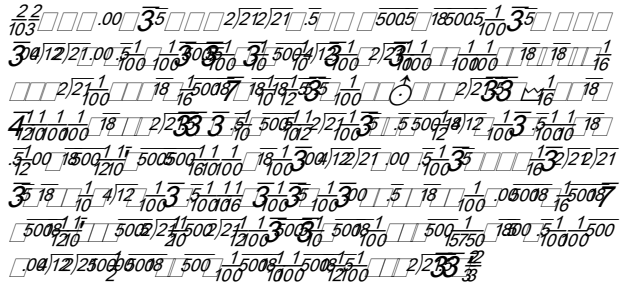
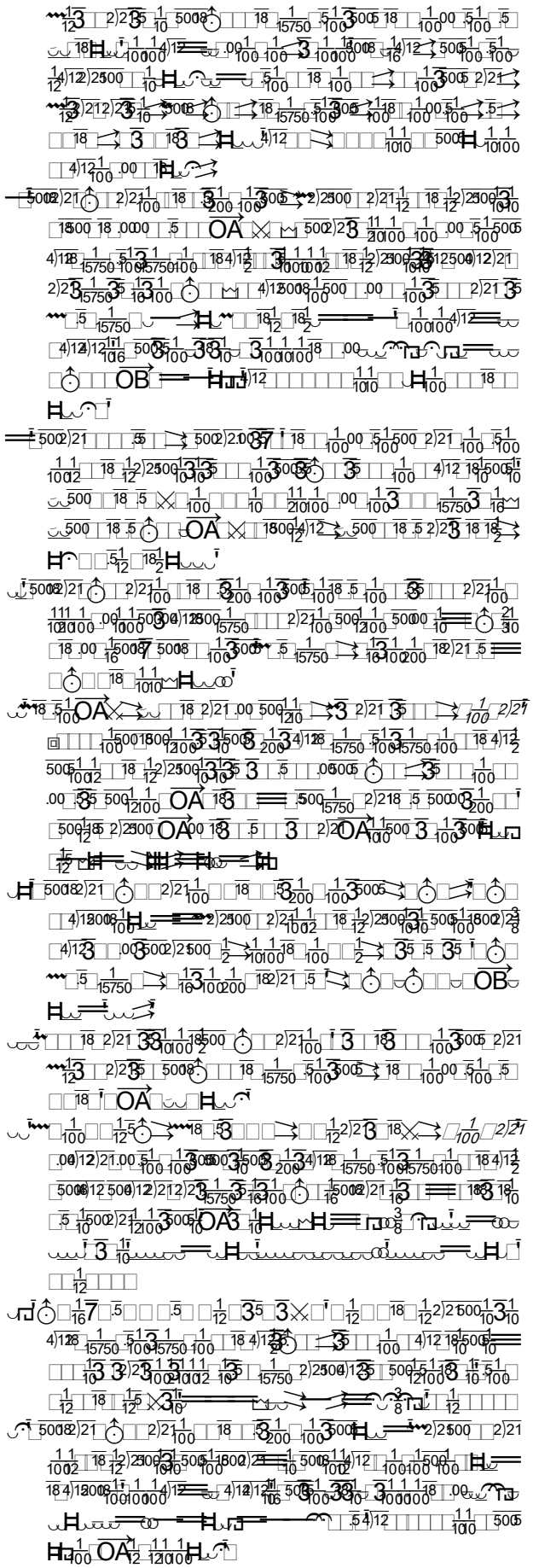


Table 2: Characteristics of respondents providing IPT services to people living with HIV (PLHIV)

Variables	Frequency (N=35)	Percentage (%)
Facility		
Secondary	21	60
Tertiary	14	40
Job description of Health care staff		
ART Clinician	25	71.4
Pharmacy	10	28.6
Sex		
Male	21	60
Female	14	40
Age		
<35	7	20
35-44	17	48.6
>44	11	31.4
Number of years in practice		
5 or less	5	14.3
6-10	11	31.4
11-15	8	22.9
>15	11	31.4
Number of year in HIV/TB program		
5 or less	21	60
>5	14	40
Number of TB/HIV trainings done		
2 or less	11	31.4
3-5	13	37.2
>5	11	31.4

Table 3: Barriers to IPT implementation among eligible PLHIV

Barriers	Frequency	Percentage (%)
Leadership and governance		
IPT implementation was not supported by some experts	3	8.6
No IPT due to lack of support from state ministry of health	2	5.7
Service related		
Fear of patients developing resistance to INH	12	34.3
Fear of poor adherence	21	60.0
Fear of INH toxicity	17	48.6
Work load of health care workers	29	82.9
Supplies and product-related		
Lack of Isoniazid drug	7	20.0
Unavailability of gene expert machine to exclude active TB	8	22.9
Lack of consumables	8	22.9
Heath system financing		
Inadequate finances	9	25.7
Health work force		
Inadequate Health manpower	32	91.4



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A Rural-Urban comparison of the prevalence and factors associated with unintentional home fall injuries in South Western Nigeria

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Abstract

Background: Unintentional home fall injuries contribute to the morbidity and mortality burden in developing countries. Rural-Urban variation on the burden of unintentional home fall injuries in Africa is poorly documented. We compared the prevalence and factors associated with unintentional home fall injuries among household members in rural and urban areas of South Western Nigeria.

Methods: We conducted a community-based cross sectional survey using a three-stage cluster sampling technique to select 4433 individuals from 1015 households from selected settlements in a rural and urban Local Government Areas (LGAs). A structured questionnaire was used to obtain information on household members' characteristics, individual injury experience and nature of injury experienced. Chi square test and logistic regression were used to determine factors associated with unintentional home fall injuries.

Results: Overall, the incidence of unintentional home falls injury was 171/1000 per year with a significantly higher incidence in the urban (195/1000 per year) compared to rural (150/1000 per year) areas. The odds of experiencing unintentional home fall injuries was 1.47 times higher in household members living in urban areas compared to their rural counterparts (OR=1.47; 95%CI: 1.13-1.92).

*Conclusion***:** The burden of unintentional home fall injuries is high with a significantly higher urban preponderance. Enforcement of building codes to ensure safety of the home environment especially in urban areas is also recommended for resource poor countries like Nigeria.

Keywords: *unintentional injury, rural-urban, home injury, falls*

Résumé

Contexte: Les traumatismes involontaires causés par les chutes à domicile contribuent au fardeau de la morbidité et de la mortalité dans les pays en voie de développement. La variation rurale-urbaine du fardeau des traumatismes involontaires dus aux chutes à domicile en Afrique est peu documentée. Nous avons comparé la prévalence et les facteurs associés aux blessures non intentionnelles à la maison chez des membres de ménage dans les zones rurales et urbaines du sud-ouest du Nigeria.

Méthodes: Nous avons mené une enquête transversale en utilisant une technique d'échantillonnage en en trois groupes d'étapes pour sélectionner 4433 individus de 1015 ménages provenant d'établissements sélectionnés dans une zone de mairie rurale et urbaine. Un questionnaire structuré a été utilisé pour obtenir des informations sur les caractéristiques des membres du ménage, l'expérience individuelle des blessures et la nature des blessures subies. Le test du Chi carré et la régression logistique ont été utilisés pour déterminer les facteurs associés aux blessures des chutes non intentionnelles à la maison.

Résultats: Dans l'ensemble, l'incidence des traumatismes de chute non intentionnels à la maison était de 171/1,000 par an, avec une incidence nettement plus élevée dans les zones urbaines (195/1,000 par an) que dans les zones rurales (150/1,000 par an). Les probabilités de subir des blessures de chute involontaires à la maison étaient 1,47 fois plus élevées chez les membres des ménages vivant en zone urbaine que chez leurs homologues ruraux (OR = 1,47, IC à 95%: 1,13-1,92).

Conclusion: Le fardeau des blessures non intentionnelles à la maison est important, avec une prépondérance urbaine significativement plus élevée. L'application des codes du bâtiment pour assurer la sécurité de l'environnement domestique, en particulier dans les zones urbaines, est également recommandée pour les pays à ressources pauvres comme le Nigeria.

Mots-clés: *Blessures non intentionnelles, milieu rural-urbain, blessures à la maison, chutes*

Introduction

According to the World Health Organization, falls have been described as a situation in which an individual unintentionally rests on the floor or a level below the floor [1] . This excludes intentional

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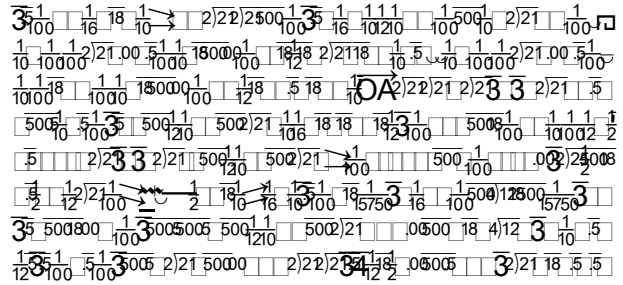
change to a lower position by individuals to rest and intentional self-harm or assault [1, 2]. However most fall injuries are non-fatal. Globally, falls have become a major public health problem. With an estimated 424,000 fatal falls occurring yearly, it is the second leading cause of unintentional injury deaths, after road traffic injuries worldwide [3]. Over 80% of fall-related fatalities occur in low- and



other members of the household who were not present at the time of the interview. Where the injured person was available, information on the injury was also provided by them.

A semi-structured interviewer-administered questionnaire developed based on standard items in the World Health Organization's "Guidelines for conducting community surveys on injuries and violence" [28] and "Injury surveillance guidelines" [29] was developed and used for this study. The questionnaire was in two parts. The first part was used to obtain household and household members demographic information and to determine the household members who had experienced unintentional home falls injury. The second part of the questionnaire was then used to obtain information on type and nature of unintentional home fall injury for all the members of the household who were identified to have experienced injury. Where a member of the household had experienced more than one falls injury, information on the most recent injury episode was then obtained.

Data analysis

Data obtained were entered, cleaned and analysed with SPSS version 20. We used frequencies, proportions and means to summarise descriptive data by location (rural and urban areas).

Outcome: Unintentional home falls injury incidence for recoverable injury was calculated for injury which occurred up to four months prior to the study, while incidence of disability was calculated for unintentional home falls disability which occurred 5 years prior to the study. This was done to reduce effects of recall bias [30]

Independent variables: Age and gender [5].

We used Chi-square tests to compare occurrence of unintentional fall injuries in rural and urban areas and to determine the association between injury occurrences by demographic characteristics.

Measures

Unintentional home injury: We used the ICD-10 definition of an unintentional home injury which is "an injury occurring within or around an individual's own home or another person's private dwelling" [31]. This definition covers the living space within the house and the yard/compound but excludes the sidewalks and street.

Unintentional home falls injury:

A household member was said to have experienced unintentional home fall injury if the individual either had a recoverable injury, disability or death resulting from an unintentional home fall. In the event that a household member had experienced more than one unintentional home fall injury, information of the most recent injury was then obtained. This was done because the denominator was the individual and not the falls injury itself.

Recoverable unintentional home fall injury

A recoverable unintentional home falls injury is one which must have occurred in the four months preceding the study, be apparent (bruise, cut/laceration, dislocation or fracture) or cause pain (sprain or strain) of up to three days duration if it is not apparent. The injured member of the household should be recovering or has recovered from the injury without a disability.

Unintentional fall injury disability

Is a fall-related injury which occurred at home five years preceding the study. The injury would have resulted in anatomical deformity or total/partial limitation of functions of body parts. [32].

Results

Socio-demographic characteristics of household members in study areas

A total of 2340 and 2093 respondents were interviewed in the rural and urban locations respectively. Slightly over half (51.7% in rural and 51.3% in urban) of the respondents were males.

Prevalence, nature and outcome of unintentional home fall injuries

A total of 253 (5.7%) individuals experienced fall injuries, giving an overall fall injury incidence of 17,122 falls/100,000 individuals/year with a significantly higher incidence of fall injuries among urban dwelling household members (19,350/100,000 persons/year) compared to rural dwelling household members (15,128/100,000 persons/year) ($p = 0.044$). Overall, fall-related disability was reported among three household members giving an incidence of 13.5/100,000 persons/year. Household members in the urban areas had a higher fall disability (9.0/100,000 persons/year) compared to those in the rural areas (4.5/100,000 persons/year).

Table 1: Demographic Characteristics (Age and Gender) of Household Members in Rural and Urban Areas

Variable	Rural (2340)		Urban(2093)	
	Male (1209) n (%)	Female (1131) n (%)	Male (1073) n (%)	Female (1020) n (%)
Age of household members in Years				
Under-5	156 (12.9)	159 (14.1)	78 (7.3)	92 (9.0)
5 – 9	173 (14.3)	166 (14.7)	115 (10.7)	96 (9.4)
10 – 14	154 (12.7)	123 (10.9)	110 (10.3)	105 (10.3)
15 – 24	227 (18.8)	207 (18.3)	251 (23.4)	240 (23.5)
25 – 39	221 (18.3)	308 (27.2)	202 (18.8)	236 (23.1)
40 – 64	240 (19.9)	148 (13.1)	274 (25.5)	225 (22.1)
≥ 65	38 (3.1)	20 (1.8)	43 (4.0)	26 (2.5)

The commonest body parts injured were the extremities with a significantly high proportion of household members from urban (73.3%) compared to those in the rural areas (53.4%). Concerning the nature of fall injuries, rural dwelling household members (58.5%) sustained bruises, cuts and deep injuries. However, household members living in urban areas (51.9%) significantly sustained sprains, fractures or dislocations compared to those in the rural areas (27.1%).

5 – 9 years of age experienced fall injury. There were no significant associations in the occurrence of unintentional home fall injury by gender in both rural and urban areas (Table 3). Urban dwellers had a significantly higher risk of fall injury when compared with rural dwellers (OR 1.5; 95%CI 1.1-1.9).

Discussion

This community based comparative study assessed the incidence and nature of unintentional home fall injury.

Table 2: Association between nature, severity and outcome of unintentional home Fall Injury experienced among household members in by location

Variable	Location		Total	Test	p-value
	Ruraln N =118 n (%)	Urban N =135 n (%)	N =253 N(%)	Statistics (χ^2)	
Part of the body injured during fall					
Head / neck and trunk region	55 (46.6)	36 (26.7)	91 (36.0)		
Extremity	63 (53.4)	99 (73.3)	162 (64.0)	10.87	0.001
Injury sustained during fall					
No apparent injuries (Pain)	17 (14.4)	23 (17.0)	40 (15.8)		
Bruise / cut injuries	69 (58.5)	42 (31.1)	111 (43.9)		
Sprain / Strain / Fracture/ Dislocation	32 (27.1)	70 (51.9)	102 (40.3)	20.56	<0.001
Reported severity of the fall injury					
No apparent/mild/superficial	103 (87.3)	110 (81.5)	213 (84.2)		
Moderate severe injury	15 (12.7)	25 (18.5)	40 (15.8)	1.59	0.230
Outcome of fall injury					
Disability-related injury	1 (0.8%)	2 (1.5)	3 (1.2)	0.22*	0.642
Recoverable Injury	117 (99.2)	133 (98.5)	250 (98.8)		

*-fischer's exact

Factors associated with falls injury

In the rural area, a significantly higher proportion (16.2%) of children under five years of age experienced unintentional home falls injury while in the urban area, a significantly higher proportion (8.5%) of those aged

We also determined the factors associated with unintentional home fall injuries in rural and urban communities in the Ibadan and Ibarapa Health Zone.

The overall incidence of fall injury for this study (171/1000/year) was higher than reported

Table 3: Factors associated with fall injury among household members by rural and urban location

Variable	Rural (2340) Fall Injury Yes	Urban (2093) Fall Injury 95% CI	Yes	95% CI
Age of household members in Years				
Under-5	51 (16.2)	12.4 - 20.6	13 (7.6)	4.3 - 12.4
5 – 9	30 (8.8)	6.2 - 12.2	18 (8.5)	5.3 - 12.9
10 – 14	8 (2.9)	1.4 - 5.4	10 (4.7)	2.4 - 8.1
15 – 24	13 (3.0)	1.7 - 4.9	25 (5.1)	3.4 - 7.3
25 – 39	9 (1.7)	0.8 - 3.1	26 (5.9)	4.0 - 8.5
40 – 64	6 (1.5)	0.6 - 3.2	40 (8.0)	5.9 - 10.7
≥ 65	1 (1.7)	0.1 - 8.2	3 (4.3)	1.1 - 11.4
	$\chi^2 = 122.06$	$p<0.001$	$\chi^2 = 7.29$	$p = 0.294$
Sex of household members				
Male	56(4.6)	3.6 - 5.9	78(7.3)	5.8 - 8.9
Female	62(5.5)	4.3 - 6.9	57(5.6)	4.3 - 7.1
	$\chi^2 = 0.88$	$p = 0.348$	$\chi^2 = 2.45$	$p = 0.118$

incidences from an earlier study [33].This incidence was higher in urban areas compared to rural areas. A study by Kobusingye in Uganda also reported a higher fall injury incidence among household members in an urban area compared to those in a rural area [34]. However, another study by Moshiro in Tanzania reported higher incidence of fall injury in rural areas compared to urban areas [35]. The significantly higher incidence of falls injury among household members in urban areas can be attributed to the poorly constructed houses with poor lightening and limited space [36–38]. Furthermore, migration to the urban areas by household members from the rural areas has contributed to the overcrowding of houses that predisposes to falls injuries [39–41].

Overall, children experienced fall injuries than adults in both areas. Fall injury among children was however higher in the rural area compared to the urban area which was similar to a study among children in rural North-Western Uganda [42]. This high fall injury incidence among children in rural areas may be due to peculiar characteristics of rural areas where children's activities are more rigorous and less supervised. Fall injury among adults was however higher in the urban area compared to the rural areas. The communal sharing, helping and togetherness with higher social capital, sedentary attitude, high inactivity rates [43, 44] prevalent in the rural areas might explain the reason for the discrepancy. .

Gender differences were observed in both areas. Females reported higher incidence of fall injury in the rural area while males reported higher incidence in the urban area. Varied reports have been observed from other studies. In Australia, higher incidence of falls was reported among older females [5], but in India, similar fall injury rates was reported in both sexes in India [45] while a higher fall injury rates was reported among males (old and young) in rural part of Iran [46]. The incidence in this study was however not disaggregated by age, therefore, comparability with other age-specific studies might be difficult. In both areas, most of the injuries were recoverable injuries and was similar to a rural and urban study in Iran reported that majority (80.5%) of the injuries were recoverable while 0.05% and 1.5% resulted in disability and death respectively [46].

Unintentional home injury constitutes a major problem of public health significance among household in rural and urban settlements [34, 47, 48]. Interventions involving individuals, communities and regulating government institutions are therefore required to reduce the occurrence [49–51]. These interventions ensure strict compliance to housing codes and the incorporation of public health standards into building houses [52–55].

Further research on: economic impact analysis of home injuries, home environment hazard analysis, home safety knowledge and behaviour, development of home safety ratings and cause-specific prevention can be performed with the aim of developing locally appropriate interventions.

Limitations of the study

A potential limitation of this study was recall bias. This might have been present as is usual in self-reported prevalence surveys especially in injuries that are inapparent, superficial or mild, as seen in unintentional home injuries. However this was

limited by restricting enquiries to injuries in the last four months. The incidence of injury obtained might have been slightly overestimated as some respondents may have report injuries sustained outside the home as having occurred in the home. Efforts were made to ensure that information given about home injuries was accurate by obtaining information on circumstance surrounding the injury and using operational definitions.

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Soil transmitted helminthes infection among pregnant women in peri-urban areas of Ibadan, Nigeria: A cross-sectional study

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Abstract
Background: Soil Transmitted Helminthes (STH) infection is an important public health problem in developing countries which adversely affects pregnant women and their newborn infants. The epidemiology of STH among pregnant women has not been fully explored in Nigeria. We examined the prevalence, intensity and risk factors of STH among antenatal care attendees in Ibadan.
Methods: A cross sectional facility-based study was conducted among the 326 pregnant women attending antenatal care clinics in six selected Primary Health Care centers, in the peri-urban areas of Ibadan Oyo State. An interviewer administered questionnaire was used to obtain information on the socio-demographic, maternal, environmental characteristics and hygiene practices. Kato-Katz method was used to identify the presence of STH from stool samples. Data were analysed using chi-square and bivariate logistic analysis.
*Results***:** The overall prevalence of STH was 13.8%, 95% CI (10.0 -17.7). *Ascaris lumbricoides* 12.8%, 95% CI (9.5 -16.9) was the most prevalent followed by hookworm infection 0.6%, 95% CI (-0.2 – 0.15) and *Trichuris trichuria* 0.3%, 95% CI (- 0.2 – 0.9). Majority of the infection were of light intensity (44 out of 45). Walking bare footed in the home environment increased the likelihood of being infected with STH [OR 1.93 95% CI (1.01 -3.72) p=0.048] compared with women who wore shoes.
Conclusion: STH infection is prevalent among pregnant women in the peri-urban region of Ibadan. Therefore public health interventions like active surveillance of STH and the prescription of deworming drugs will be beneficial tofor pregnant women.

Keywords: *Soil transmitted helminthes, pregnancy, prevalence, intensity.*

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Résumé
Contexte: L'infection par les helminthes transmissibles par le sol (HTS) est un problème de santé publique important dans les pays en voie de développement, qui affecte négativement les femmes enceintes et leurs nouveau-nés. L'épidémiologie des HTS chez les femmes enceintes n'a pas été complètement explorée au Nigéria. Nous avons examiné la prévalence, l'intensité et les facteurs de risque des HTS chez des patientes en soins prénatals à Ibadan.
Méthodes: Une étude transversale a été réalisée parmi les 326 femmes enceintes fréquentant les cliniques de soins prénatals dans six centres de soins de santé primaires sélectionnés, dans les zones périurbaines d'Ibadan, l'État Oyo. Un questionnaire administré par l'intervieweur a été utilisé pour obtenir des informations sur les caractéristiques sociodémographiques, maternelles, environnementales et les pratiques d'hygiène. La méthode de Kato-Katz a été utilisée pour identifier la présence d'HTS à partir d'échantillons de selles. Les données ont été analysées en utilisant l'analyse chi-carré et la logistique bi-variée.
Résultats: La prévalence globale d'HTS était de 13,8%, IC 95% (10,0 - 17,7). Ascaris lombricoïdes 12,8%, 95% CI (9,5 -16,9) était la plus fréquente suivie par Ankylostomiase 0,6%, IC 95% (-0,2 - 0,15) et Trichuris-trichuria 0,3%, IC 95% (- 0,2 - 0,9). La majorité des infections était d'intensité faible (44 sur 45). Marcher pieds nus dans l'environnement du ménage a augmenté la probabilité d'être infecté par HTS [OR 1,93 95% CI (1,01 - 3,72) p = 0,048] par rapport aux femmes qui portaient des chaussures.
Conclusion: L'infection par l'HTS est prévalent chez les femmes enceintes dans la région périurbaine d'Ibadan. Par conséquent, les interventions de santé publique comme la surveillance active des HTS et la prescription de médicaments antihelminthiques pour les femmes enceintes.

Mots-clés: *Helminthes transmissibles par le sol, grossesse, prévalence, intensité, facteurs*

Introduction

Soil Transmitted Helminthes (STH) are the most prevalent Neglected Tropical Disease (NTD)

affecting more than 1.5 billion people worldwide, largely in sub-Saharan Africa, Latin America, China and East Asia [1,2]. The STH is reported to be responsible for about 40% of the health burden of neglected tropical diseases [3]. The STH of public health importance include *Ascaris lumbricoides, Trichuris trichiura* and hookworm (*Necator americanus* or *Ancylostoma duodenale*). Global estimates indicate that there are about 807-1227 million cases of *Ascaris lumbricoides,* 540-700 million cases of *Necator americanus* and *Ancylostoma duodenale* and 604 – 795 million cases of *Trichuris trichiura* [4]. Helminthes infection are majorly attributed to poverty, inadequate water supply, improper sanitation [3, 5]. Children, women of reproductive age, particularly pregnant women, and adults with high risk jobs such as miners [2] are most at risk of the infection. However, children especially school-age children have received more research focus and public interventions because of the associated malnutrition, impairment of growth and cognitive development in the age group [6].

In sub-Saharan Africa, approximately 24 million women become pregnant annually [7]. Pregnancy is associated with hormonal and immune changes that increase their susceptibility to infections including parasitic infections like STH [8, 9]. The prevalence of STH among pregnant women in Africa varies widely, with a prevalence of 76.2% in rural Kenya [10], 54% in Ethiopia [3] and 47.1 % in Cameroun [11] and 70.0% in Thai-Burmese border [12]. Although, the epidemiology of these parasites among pregnant women have not been fully documented in Nigeria, the few available studies have reported a prevalence that ranges from 13.8% - 23.74% [13- 15]. The STH in pregnancy is associated with increased risk of maternal and perinatal morbidity resulting from iron deficiency anaemia, impaired nutrition status, intrauterine growth restriction and low birth weight [7, 8, 11, 15]. Hookworm is a major cause of anaemia in pregnancy by ingesting blood and damaging the intestinal mucosa. Approximately one-third of all pregnant women in low and middle income countries (LMICs) have been estimated to be infected with hookworm infection (44 million out of 124 million pregnancies and 7.5 million pregnant women in sub-Saharan Africa [16]. *Trichuris tricuria* to a lesser degree also contributes to maternal anaemia through blood loss and reduced appetite [17]. *Ascaris lumbricoides* is usually asymptomatic but with heavy infestation, it can cause abdominal distension and pain, lactose intolerance and malabsorption [18].

Intensity of STH infection, measured by the number of eggs per gram of faeces, is the main epidemiological index used to describe STH infection [4]. The risk factors for infestation by STH include demographic, socioeconomic, environmental and behavioral factors but the distribution of these risk factors may differ from one region to another and sometimes within the population or the country itself [3, 7, 10]. Hence the need to understand the epidemiology of these infections in different locations in order to implement targeted and population specific interventions. Furthermore, WHO recommends periodic anti-helminthic medical therapy (deworming) without previous individual diagnosis, to all persons at-risk in endemic areas including pregnant women. Treatment should be given once a year when the prevalence of STH infections in the community is over 20% [19, 20]. Therefore, the aim of this study was to determine the prevalence, intensity and risk factors of STH so as to provide the needed evidence for the control of STH and the effect in pregnancy.

Materials and methods

Study setting

This study was conducted among pregnant women attending selected Primary Health Care Centers in two peri-urban local Government areas (LGAs) - Ido and Akinyele (LGAs) of Oyo state. Oyo state is one out of the 36 states in Nigeria, and it is located in the south western part of the country. Typically, Ibadan experiences dual seasons like most tropical areas - dry season between November to February and wet season between March and October each year. Ido and Akinyele Local Government areas have extensive fertile soil and large hectares of grassland, which are suitable for agriculture hence the predominant occupations of the people are farming and animal rearing.

Study design and data collection

A cross sectional facility-based study was conducted among 326 pregnant women attending antenatal care clinics in six most functional Primary Health Care centers (PHCs) were purposively selected. In each of the PHCs, study participants were serially recruited into the study until the sample size was reached. Although women who had taken anthelminthic drugs within a month prior to study and those who were severely sick were excluded from the study. Pre-tested, semi-structured, interviewer administered questionnaires were used to obtain information on the socio-demographic, maternal, medical and environmental characteristics

as well as hygiene practices of participants. The sample size estimation for single proportion was used based on a 95% confidence interval (1.96), precision level of 5%; α = 0.05; and a prevalence rate of 23.74% of helminthes infection among pregnant women by Omorodion *et al* [13].

Specimen collection and processing

Fresh stool samples were obtained from the study participants using in screw capped labeled leak proof stool containers (universal bottles) and applicator sticks. The stool samples were transported in ice packs in order to maintain the viability of the helminthes ova to the laboratory. The stool samples were collected in the morning between 9am and 11am and were transported immediately to the Department of Medical Microbiology and Parasitology laboratory for examination. These stool samples were examined microscopically using the direct wet preparation method and Kato-Katz technique of quantification of ova according to the WHO 2002 guidelines [22]. Egg counts (in eggs per gram of stool, epg) was used to classify infection intensities into light, moderate, or heavy infections respectively as follows: *Ascaris lumbricoides*: 1 – 4,999 epg, 5,000 – 49,999 epg and > 50,000 epg; *Trichuris trichiura*: 1 – 999 epg, 1,000 – 9,999 epg and > 10,000 epg; Hookworms (*Ancylostoma duodenale/Necator americanus*): 1 – 1,999 epg, 2,000 – 3,999 epg and > 4,000 epg [23].

Data analysis

The data was analysed using Stata version 12, quantitative variables were analyzed using mean and standard deviation, while categorical variables were presented with frequencies and proportions. The

Table 1: Socio-demographic and maternal characteristics of the pregnant women by soil transmitted helminthes

Characteristics	Total (N=326)	Soil-transmitted helminthiasis Yes (n=45)	No (281)	p-value
Age group				
<20	11 (3.4)	1 (9.1)	10 (90.1)	
20 -35	266 (81.8)	36 (13.5)	230 (86.5)	0.759
>35	48 (14.8)	8(13.9)	40 (86.1)	
Marital Status				
Married	290 (89.0)	42 (14.5)	248 (85.5)	0.313
Not married	36(11.0)	3 (8.3)	42 (91.7)	
Education				
Primary or less	61(18.7)	6 (9.8)	55 (90.2)	
Secondary	176 (54.0)	24 (13.6)	152 (86.4)	0.471
Tertiary	89 (27.3)	15 (16.8)	74 (86.1)	
Occupation				
Unemployed	109 (33.4)	15 (13.8)	94 (86.2)	
Self employed	118 (36.2)	16 (13.6)	102 (84.4)	0.992
Employed	99 (30.4	14 (14.1)	85 (85.9)	
Ethnicity				
Yoruba	254 (77.9)	33 (13.0)	221 (87.0)	
Non Yorubas	72 (22.1)	6 (16.7)	30 (83.3)	0.425
Religion				
Christianity	154 (47.2)	19 (12.3)	134 (87.7)	
Islam	168 (51.5)	25 (14.9)	143 (85.1)	0.789
Others	4 (1.2)	1 (25.0)	3 (75.0)	
Monthly income				
<10,000	218 (66.9)	6 (9.8)	55 (90.2)	
10000 – 20000	61 (18.7)	24 (13.6)	152 (86.4)	0.952
>20000	47 (14.4)	15 (16.8)	74 (86.1)	
Gravidity				
Primigravida	88 (27.0)	12 (13.6)	76 (86.4)	
Multigravida	238 (73.0)	33 (13.9)	205 (86.1)	0.958
Gestational age				
1st trimester	42 (12.9)	4 (9.5)	38 (90.1)	
2nd trimester	110 (33.7)	16 (14.6)	94 (85.4)	0.689
3rd trimester	174 (53.4)	25 (14.4)	149 (85.6)	

overall prevalence of STH as well as age and gravidity specific prevalences and the 95% confidence intervals were determined. The associations between various risk factors (socio-demographic, maternal, environmental and hygiene practices) and STH were examined using chi-square statistic. Bivariate logistic regression was used to compute unadjusted odds ratio and also to identify independent determinants of STH in pregnancy. The level of significance for this study was set at $p<0.05$.

Ethical standard: Ethical approval to conduct the study was obtained from the Oyo State Ministry of Health Ethical Review Board and permission to carry out the study was obtained from the Medical Officers of Health in charge of the LGAs. Informed consent was obtained from each respondent in this study, after the procedure of the study had been explained.

Results

The socio-demographic and maternal characteristics of the respondents by their STH status are shown in Table 1. The mean age of the respondents was 28.4 ± 5.6 years. Majority of these women were within the 20 – 35 age bracket (81.8%), married (89.0%), belonged to Yoruba ethnic group (77.9%) while about two-thirds (66.9%) earned less than 10,000 naira per month. Primigravida made up about a quarter (27.0%) of the population.

However, there was no statistical difference in the distribution of socio-demographic and maternal characteristics by their STH status ($p > 0.05$). Prevalence (95% confidence interval) and Intensity of Soil transmitted Infections are shown in Tables 2 and 3. The overall prevalence of STH was 13.8%, 95% CI (10.0 -17.7). *Ascaris lumbricoides* 13.2%, 95%CI (9.5 -16.9) was the most prevalent

Table 2: Prevalence and 95% confidence intervals of soil transmitted helminthes among pregnant women by age and gravidity

	STH	Ascaris lumbridcoides	Hookworm	Trichuris trichura
Overall	13.8(10.0 -17.7)	12.8 (9.5 -16.9)	0.6 (-0.2 -0.15)	0.3 (-0.2 – 0.9)
Age				
<20	9.1 (-8.8 – 27.0)	9.1 (-8.8 – 27.0)	-	-
20 -35	13.5 (9.4 – 17.7)	13.5 (9.4 – 17.7)	3.7 (-3.7 – 1.1)	0.4 (-0.3 -1.1)
35	16.7 (6.0 – 27.3)	14.5 (4.4 – 24.7)	2.0 (-2.0 – 6.2)	-
Gravidity				
Primigravida	13.6 (6.4 – 20.8)	13.6 (6.4 – 20.9)	-	-
Multigravida	13.9 (9.4 – 18.3)	13.0 (8.7 – 17.3)	0.8 (-0.3 – 2.0)	0.4 (-0.4 – 1.2)

Table 3: Intensity of soil-transmitted helminthiasis among the pregnant women

Type of STH	Intensity classification	Intensity	Number	Frequency (%)
Ascaris lumbricoides				
	< 5000	Light	41	
	5000 – 49,999	Moderate	1	
	≥50,000	Severe	0	
			42	**93.4%**
Trichuris trichiura				
	<1,000	Light	1	
	1,000 – 9,999	Moderate	0	
	≥10,000	Severe	0	
			1	**2.2%**
Hookwarm				
	<1,000	Light	2	
	1,000 – 9,999	Moderate	0	
	≥10,000	Severe	0	
			2	**4.4%**

Table 4: Environmental characteristics and hygiene practices of the pregnant women by the status of soil transmitted helminthiasis

Characteristics	Soil-transmitted helminthiasis		p-value
	Yes (n=45)	No (281)	
Washing hands with soap			
Yes	35 (14.5)	205 (85.4)	
No	10 (11.6)	76(88.4)	0.495
Type of toilet facility			
Pit latrine	5 (9.4)	48 (90.8)	
Water closet	38 (15.3)	211 (84.7)	
Open defaecation	2 (8.3)	22 (91.7)	0.387
Wearing of shoes at home			
Yes	6 (9.9)	145 (90.1)	
No	129 (17.6)	136 (82.4)	0.046
Roofing types			
Thatched roof	6 (15.8)	32 (84.2)	
Corrugated iron	39 (13.5)	24 (96.5)	0.706
Rearing animals at home			
Yes	18 (15.4)		
No	27 (13.0)	182 (87.1)	0.769
Pets			
Yes	8 (15.1)	45 (84.9)	
No	37 (13.6)	182 (87.1)	0.536
Use of human feces as fertilizers			
Yes	6 (15.4)	33 (84.6)	
No	39 (13.6)	248 (86.4)	0.76
Geophagy			
Yes	0 (0.0)	16 (100.0)	
No	44 (14.1)	267 (85.5)	0.101

followed by hookworm infection 0.6%, 95% CI (-0.2 – 0.15) then *Trichuris trichuria* 0.3%, 95% CI (-0.2 – 0.9). The prevalence of STH increased with age. However, the prevalence was similar between primigravidae [13.6%, 95% CI (6.4 -20.8)] and multigravidae [13.9%, 95%CI (9.4 -18.3)]. Majority of the infection were of light intensity (44 out of 45): 41 (12.6%) *Ascaris lumbricoides*, one (0.3%) *Trichuris trichiura* and two (0.6%) of hookworm infections.

Environmental characteristics and hygiene practices of the pregnant women by STH status are shown in Table 4. Wearing of shoes in the home environment was the only variable significantly associated with STH with the women who walked bear footed having higher proportions of STH compared with those who wore shoes (17.6% versus 9.9%, p=0.046). Although, use of thatched roofing sheets (15.8% versus 13.5%), rearing animals at home (15.4% versus 13.0%) and use of human faeces as fertilizers (15.4% versus 13.6%) were higher among women with STH, these associations were not statistically significant (p> 0.05). Factors associated with soil transmitted infections are presented in Table 5 along with the odds ratio and 95% confidence interval. Walking bare footed in the

Table 5: Odds ratio and 95% confidence Interval of factors associated with soil transmitted helminthiasis among pregnant women

Factor	Odds Ratio	95% Confidence Interval	p-value
Shoes at home			
Yes	1.00	-	
No	1.93	1.01 – 3.72	0.048

home environment was only variable tested in the bivariate logistic model. These women were found to be almost twice at risk [OR = 1.93; 95% CI (1.01 – 3.72) p=0.048] of being infected by STH compared with women who wore shoes.

Discussion

Soil transmitted helminthes is the most prevalent Neglected Tropical Disease (NTD) to which pregnant women are vulnerable. In this study, we investigated the prevalence, pattern, intensity and risk factors of STH among 326 pregnant women attending selected antenatal clinics in the peri-urban areas in Ibadan. The overall prevalence of STH was 13.8% which increased with age as adolescent women recorded the lowest prevalence of 9.1% and women 35 years and older had highest prevalence of 16.7%. However, primigravida and multigravida had similar vulnerabilities towards the infections. Our findings are similar to those of some other investigators such as Shrinivas *et al* (2014) who reported a prevalence of 12.4% among pregnant attending antenatal clinic in a tertiary facility in India [19] and Wekesa *et al* (2014) who similarly reported a prevalence rate of 13.8% among the pregnant women attending antenatal clinic at Kitale district hospital, Kenya [20]. Conversely, other studies that have examined STH in pregnancy have reported much higher prevalences: 32.4% in Nigeria [14], 41% in Southwest Ethiopia [3] and 76% in rural Kenya [10]. Remarkably, most of the studies reporting higher prevalence rates were conducted in the rural areas [10, 14, 17] which are likely to have higher level of poverty coupled with poor sanitary facilities and hygiene practices. Laroque and co-workers in Peru [19] noted women living in rural areas had significantly higher prevalence of hookworm infestation compared with those living in the peri-urban areas. Our study was conducted in the peri-urban areas of Ibadan where sanitary facilities are likely to be better compared with those found in the rural areas. For example, while only 7 percent of our study participants practiced open defaecation, 76 percent reported using water closet. Furthermore, the application of different methods for the detection of helminthes infection could also partly contribute to the variations in the prevalence rates. While some authors had used fecal concentration, others used the Kato-Katz method [3, 10, 14, 15], even though the sensitivity of these methods for detecting STH have been noted to vary widely [18, 26]. The other plausible explanation might be the difference in the geographical location of the studies as soil types and climatic conditions have been attributed to STH endemicity [3].

Specifically *A. Iumbricoides* had the highest prevalence (12.8%), followed by hookworms (0.6%) and *Trichuris trichiura* (0.3%) as reported by studies from Venezuela and Kenya [20, 27]. In Nigeria, Egwunyenga *et al in 2001* [15] reported the prevalence of 19.1%, 14.2% and 7% for *A. Iumbricoides*, hookworm and *T. trichiura* respectively. In addition, single specie infection (monoparasitism) was the predominant pattern in our study population. This is unlike other studies that have reported multiple parasite infection (polyparasitism) [3, 11, 15, 18].

Furthermore, the Peruvian study highlighted the importance of measuring the STH intensity since higher intensity of infection was associated with higher proportion of anaemia among 1,042 second trimester pregnant women while there was no association found with the mere presence of infection [17]. This implies that adverse effects of STH infections are related to the intensity of infection. Intensity of infection, a measure of burden of worms harboured in the host, is the main epidemiological index used to describe soil-transmitted helminthic infection and is measured by the number of eggs per gram of faeces [4]. Most of the respondents in this study had light intensity infection for STH, and one person with moderate intensity infection. The intensity of *Ascaris lumbricoides* and *T. trichura* infection tends to decrease with age, such that heavy intensity infections are commonly found in children aged 5-15 years [17].

Generally, several determinants influence the occurrence of STH, but from our study the environmental characteristics and hygiene practices seem to be most significant. Particularly, women who walked bare footed were twice at risk (OR = 1.93) of having STH compared with those who wore shoes, and this is similar to previous reports [11, 17, 25]. Faecal pollution of soil has been implicated in the transmission of STH as walking bare-footed can facilitate the spread of infection by increasing the exposure to helminthic eggs and larvae in the soil. Nevertheless, Ascaris lumbricoides, the most predominant STH in our study, is transmitted primarily by faeco-oral route in which eggs are ingested through contaminated food or water. Therefore hygiene practices like hand washing before eating and after defecation has been found to lower the odds of STH infection (3, 28) although the association was not statistically significant in our study. Moreover, walking bare footed may also be a marker for other environmental and hygiene practices

related to STH. In this study, it was noted that rearing of animals at home and the use of human faeces for fertilizers were higher among women with STH compared with those without STH. Humphries *et al* (1997) had equally shown that the use of human faeces for fertilizers was associated with intensity of hookworm infection among Vietnamese women [29].

The main limitation of this study is the low prevalence of soil transmitted helminthes among the study population which perhaps is due to the low endemicity of STH in the study area. However, a larger sized, community-based study that will give a higher yield of the study outcome, will more precisely investigate the relationship between the risk factors of STH among pregnant women. On the other hand, since that data was collected over a period of 4 months particularly during the dry season when transmission was lower, the prevalence might be been underestimated as the effect on the seasonal variation could not be ascertained while the use of a cross section study design precluded the examination of causal relationships. In addition, Kato-Katz method of quantification was used which has been reported to be unsuitable for hookworm egg identification [26]. These limitations notwithstanding, our study has provided information on the local epidemiology of STH among pregnant women in attending antenatal clinic in the PHCs in the peri-urban region in Ibadan Nigeria. Future studies exploring STH among pregnant women need to be conducted in areas of higher endemicity like the rural areas as comparative studies involving the urban, semi-urban and the rural settings would offer better information.

In conclusion, the prevalence of STH infection among pregnant women resident in Ido/Akinyele LGAs of Ibadan was 13.8%. This was below the cutoff point of 20% recommended for implementing antihelminthic therapy. Light intensities were reported for the three major STH (*A. lumbricoides*, hookworms and *T. trichiura*) in this study. The factors that were associated with STH in this study were majorly environmental and hygiene practices particularly walking bare footed around the home environment.

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