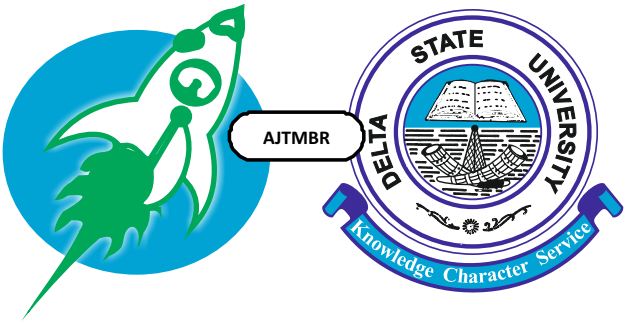
African Journal of Tropical Medicine and Biomedical Research (AJTMBR)



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Focus and Scope

The *African Journal of Tropical Medicine and Biomedical Research* is a multidisciplinary and international journal published by the College of Health Sciences, Delta State University of Abraka, Nigeria. It provides a forum for Authors working in Africa to share their research findings on all aspects of Tropical Medicine and Biomedical Sciences and to disseminate innovative, relevant and useful information on tropical medicine and biomedical sciences throughout the continent. The journal will publish original research articles, reviews, editorials, commentaries, short reports, case reports and letters to the editor. Articles are welcome in all branches of medicine and dentistry including basic sciences (anatomy, biochemistry, physiology, pharmacology, psychology, nursing etc) and clinical sciences (internal medicine, surgery, obstetrics and gynaecology, dental surgery, child health, laboratory sciences, radiology, community medicine, etc). Articles are also welcome from social science researchers that document the intermediating and background social factors influencing health in countries of Africa. Priority will be given to publication of articles that describe the application of the principles of primary health care in the prevention and treatment of diseases.

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Original Research - The journal welcomes articles reporting on original research, including both quantitative and qualitative studies. Full-length articles should generally not exceed 3000 words, excluding abstract, tables, figures, and references. The subject matter should be organised under appropriate headings and sub-headings as itemised above.

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All tables and figures should be submitted on separate sheets of paper and should be clearly labelled. Coloured tables and figures may be reprinted in black and white. Authors should especially take care that all tables are clear and understandable by themselves, independent of the text. A reader should be able to read only the tables and easily grasp all information without the text.

Acknowledgments

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References

References should be in the Vancouver style and numbered consecutively in the order in which they are mentioned in the text. Titles of journals should be abbreviated according to the *Index Medicus* style. Authors must cross-check and make sure that all information provided in the reference list is complete and correctly written. Reference numbers should be inserted above the line on each occasion a reference is cited in the text, e.g., ... as reported in other studies [1-3]. Numbered references should appear at the end of the article and should include the names and initials of all authors. The format of references should be as published by the International Committee of Medical Journal Editors in the British Medical Journal 1988, volume 296, pages 401-405. The following are sample references for an article published in a journal and for a book: Ahmed Y, Mwaba P, Chintu C, Grange JM,

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Editorial

Getting Research Evidence into Policy: The Need for Strengthening Linkages and Partnership between Health Policy Makers and Researchers in the Health Sectors of Developing countries

Oyibo PG[1]

Introduction

Getting research evidence into policy in many developing countries remains a very challenging task and huge gaps still exist between health policy makers and researchers.[1-3] Health outcomes in these countries have been described as unacceptably low and at the centre of this crisis is a failure of health systems.[4,5] The health systems performance in many developing countries has been described as grossly suboptimal due to increased burden of underdevelopment, political instability, weak institutions, inadequately developed social sectors, scarcity of resources and marked social inequalities.[6] Within the last decade the World Health Organisation (WHO) and many other international agencies have intensified technical and financial support to developing countries to promote evidence informed strategies to improve the performance of their health systems.[7,8] Subsequently, a considerable number of developing countries are increasingly recognising the importance and necessity of evidence-based health policies as a critical requirement for the improvement of their health systems.[5,9,10] Nigeria is one of the countries in sub-Saharan Africa making deliberate efforts to institutionalise evidence informed health policy making process. The Nigerian evidence-based health system initiative (NEHSI) was established in recognition of the importance of evidence informed health policy making as a critical requirement for comprehensive health sector reform.[11] Similar evidence informed policy making initiatives exist in many sub-Saharan African countries such as EVIPNET (Evidence informed policy network) Africa; Regional east African community health (REACH) policy initiative; supporting the use of research evidence (SURE) for policy in African health systems; and getting research into policy and practice (GRIPP) program. [12,13]

Several studies have shown that evidence

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from research can enhance health policy development by identifying new issues for the policy agenda, informing decisions about policy content and directions or by evaluating the impact of policy.[14,15]

In spite of the recognition of the value of research evidence in policy making, most policy makers in developing countries have not actively been employing research evidence in the policy making process. Policy decisions are often made more on the basis of political ideology, structural and situational contextual factors, cost savings as opposed to cost effectiveness, pressure from interest groups and media attention than research evidence. [3,16] One of the major factors responsible for the problem of translating research evidence into policy is the huge gap existing between researchers and policy makers. [17]Research evidence rarely gets into policy as researchers and policy makers appear to lead separate lives, "travelling in parallel universes." Additionally, most researchers in developing countries lack the knowledge of the policy making process and are producing research evidence that is irrelevant to the policy making process and even when policy relevant evidence is produced they are often inaccessible to policy makers.[3,17] Furthermore, health policy needs, neither drives nor determine the research priority setting process, thus there is lack of ownership of health research agenda by policy makers and other major stakeholders in the health sector.[18] Adding to the complexity of these challenges in the health policy making process in developing countries is the grossly deficient capacity to use information, communication and technology (ICT), particularly the use of computer and the internet by many individuals in policy making positions. Reports from several studies have revealed that policy makers and other stake holders in developing countries are faced with major constraints and challenges in using ICTs effectively in the health sector. [19,20]This is not surprising as the arrival of computer system and technology in many developing countries preceded the availability of computer skill and knowledge in the educational system of these countries. The dearth of ICT and mass internet connectivity in most African settings have limited the capacity of the national health management information systems to generate, analyse and disseminate information for use in decision making.[21] A number of studies have clearly demonstrated that the lack of ICT competence among policy makers to acquire, assess, adapt and apply research evidence is a major factor hampering the uptake research evidence into health policy particularly in developing countries.[19-21]

Getting research evidence into policy and practice will therefore entail strengthening of linkages and fostering partnership between health policy makers and researchers. Theses links are limited by the lack of awareness of the important contribution research can make to the policy making process, the failure on the part of researchers in communicating research evidence to policy makers and the existence of various barriers or conflicting interests. These barriers in linking evidence to policy have been categorised into four major gaps. These are the supply gap, information or communication gap, demand gap and governance gap.[22] These gaps can be bridged via improving the capacity of policy makers to uptake research evidence and educating

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Original Research Articles

Histological Effects of Chronic Consumption of Soft Drinks on the Intracranial Visual Relay Centres of Adult Wistar Rats

Adjene, JO[1]; Nwose, EU[2] & Igbigbi, PS[1]

ABSTRACT

Background: Effects of chronic consumption of cola drinks on the intracranial visual relay centres namely superior colliculus and lateral geniculate body of adult wistar rats were studied.

Methods: Rats of both sexes with average weight of 200g were equally assigned into three groups of n=8 each. The rats in groups [A] and [B] were respectively given [Brand A] and [Brand B] of different brands of cola drink for thirty days liberally. The group C (control) received equal volume of distilled water as placebo for the same period. On day thirty-one of the experiment, the animals were sacrificed by cervical dislocation. The superior colliculus and lateral geniculate body were carefully dissected out and quickly fixed in 10% formal saline for histological study.

Results: The rats in the treated groups showed some cellular degenerative changes, hypertrophy, sparse cellular population, pyknotic nuclei with some microcystic changes, edema and vacuolation in the stroma of the superior colliculus and lateral geniculate body as compared to the control group.

Conclusion: Chronic consumption of cola drinks may therefore have adverse effect on visual sensibilities by affecting the microanatomy of the superior colliculus and lateral geniculate body. It is recommended that further studies aimed at corroborating these observations be carried out.

Keywords: *soft drinks, histological effects, superior colliculus, lateral geniculate body, wistar rats*

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Introduction

Cola soft drinks are dark amber colored carbonated soft drink with a sweet bubbly taste. It is flavored with caffeine hence it belongs to the cola category of the family of soft (non alcoholic) drinks commonly referred to as soda pop. Soda pop contains mainly water, sugar and chemicals in the form of flavors, colorings, preservatives and sweeteners. The rate of consumption of these drinks is alarming especially in the affluent countries. For instance, the American and Australian consumes about 562mL and 310mL per day per person, while 63% of Irish children consume about 375mL per day per person [1,2].

Similar to the perception on herbal medicines, most people view soft drink consumption as fairly innocuous. However, there are number of serious health issues associated with regular consumption of soft drinks. One peer-reviewed study has reported 25 separate harmful effects associated with the consumption of carbonated soft drinks [3]. Numerous scientific studies have shown that soft drinks have a deleterious effect on bone health including mineralization problems in children [4].

Consumption of soft drinks containing sugar has been linked to weight gain and an increased risk for development of diabetes mellitus, possibly due to caloric imbalance along with the provision of large amounts of rapidly absorbable sugars. There is a probable link between the consumption of sugar-sweetened soft drinks and excess weight gain as well as cardiovascular disease [5-7]. There is also the associated risk of cancer[8-10], the formation of kidney stones[11], and a strong correlation with dental caries and erosion of teeth[12]. Aspartame is a synthetic sweetener and preservative which is of low caloric value added to soft drinks, of which one of the principal metabolites and deleterious effects is acute intoxication by methanol in humans and animals [13-15]. Although there is argument it is consumed low the toxicological dose [16], it has a potent to cause blindness, headaches and neurolog al changes amongst others [17].

The superior colliculus and lateral geniculate body constitutes the intracranial visual relay centres. The lateral geniculate body in mammals process visual informatio and participates in the regulation of circadian function through its projection to the circadian pacemaker of the hypothalamus [18,19].

The superior colliculus is a paired structural component of the mid-brain. It is concerned with ocular movement. It acts as an integrative center sub-serving visual perception. It co-ordinate responses evoked by a variety of sensory signals with behavioral movements that direct the head, eyes and ear towards the environmental stimulus. Thus, the superior colliculus has a critical role in visual localization, orientation tracking movements, accommodation and pupillary reflex [18, 20, 21]. Any pathology of superior colliculus may impair vision and vision-dependent responses.

Further, the cognitive functions of the superior colliculi have been documented to include a critical role in the ability to direct behaviors toward specific objects, even in the absence of the cerebral cortex [22]. Whether there is any toxic effect on the histology of superior colliculus has not been reported. This study investigates the histological effects of chronic consumption of cola drinks on the superior colliculus of adult Wistar rats. Also, it appears that soft drink consumption is not as harmless as generally believed. It would therefore be worth while to examine the effects of excessive cola drinks consumption on the superior colliculus in animal model such as wistar rat. This study is based on the premise that any histological distortion of the superior colliculus could impact on cognition [23].

Materials and Methods

Ethics: The School of Basic Medical Sciences, University of Benin granted approval for the care and use of laboratory animals before the work began. The rats were obtained and maintained in the Animal Holdings of the Department of Anatomy, School of Basic Medical Sciences, University of Benin, Benin

City, Edo State, Nigeria. The animals were liberally fed with grower's mash (obtained from Edo Feeds and Flour Mill Limited, Ewu, Edo State, Nigeria), which was made available at all times.

Animals: Twenty-four adult wistar rats of both sexes with average weight of 200g were equally and randomly assigned into three groups (A, B and C). Groups A and B were assigned into 'Brand A' and 'Brand B' cola drink that the group was going to be given, while group C (control) was given water liberally.

Brand [A] & Brand [B] cola drinks administration: The rats in Groups A and B were given different de-identified cola drinks respectively labeled brand A and brand B. The cola drinks were given liberally, as the control group was given water. That is, the drinks were always there for them daily, but usually changed twice daily for a fresh one after cleaning the container.

The rats were sacrificed by cervical dislocation on the thirty-first day of the experiment. The skulls were opened using bone forceps to expose the brain of the rats. The superior colliculus and lateral geniculate body were quickly dissected out and fixed in 10% formal saline for routine histological study.

Histological study: The tissues were dehydrated in an ascending grade of alcohol (ethanol), cleared in xylene and embedded in paraffin wax. Serial sections of 7 microns thick were obtained using a rotary microtome. The deparafinised sections were stained with routine haematoxylin and eosin procedures. Photomicrographs of the desired results were obtained using research photographic microscope in the Department of Anatomy, School of Basic Medical Sciences, University of Benin, Benin city, Edo State, Nigeria.

Results

The sections of the superior colliculus and lateral geniculate body from the control animals showed normal histological features with the neurons appearing distinct and of various sizes. The neuron and glial cells appeared normal and showed no vacuolation in the stroma of the superior colliculus and lateral geniculate body.

The section from [Brand A] and [Brand B] treated groups with cola drinks revealed some cellular degenerative changes, hypertrophy, sparse cellular population, pyknotic nuclei

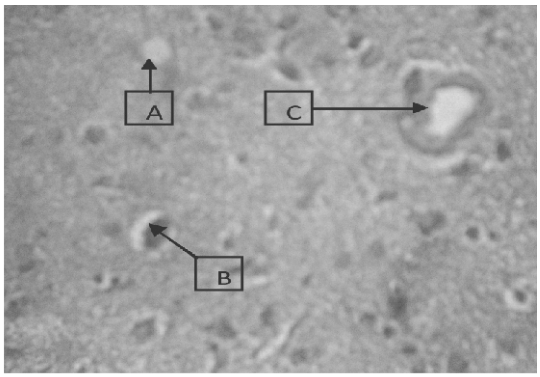

Fig.1A: Treated brand A section of the superior colliculus showing A=vacuolation, B=hypertrophied cell C=pyknotic nucleus (H & E method x400)

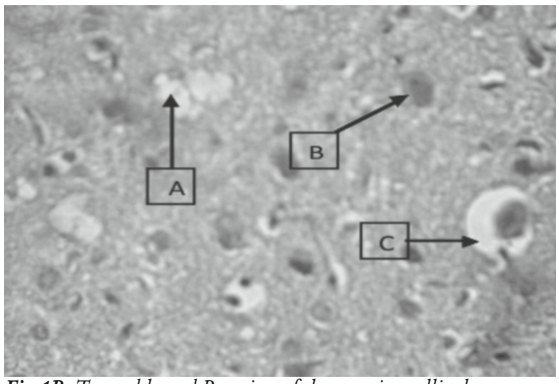

Fig.1B: Treated brand B section of the superior colliculus showing A=vacuolation, B=hypertrophied cell C=pyknotic nucleus (H&E Method x400)

with some microcystic changes, edema and vacuolation in the stroma of the superior colliculus and lateral geniculate body as compared to the control group with that of the Brand B cola a bit more remarkable.

Discussion

The results of this experiment showed some cellular degenerative changes, hypertrophy, sparse cellular population, pyknotic nuclei with some microcystic changes, edema and vacuolation in the stroma of the superior colliculus and lateral geniculate body as compared to the control group of the adult Wistar rats. It could be inferred from this results that chronic consumption of cola drinks resulted in increased toxic effects on the intracranial visual relay centres of adult Wistar rats. There was a decrease in cellular population observed in the treated groups of Brands [A] and [B] cola soft drinks. Neuronal degeneration due to toxic agents could be progressive and may include shrinkage of the neurons [24]. Brands [A] and [B] cola soft drinks may have acted as toxin to the cells of the superior colliculus and lateral geniculate body thus affecting their cellular integrity. It could

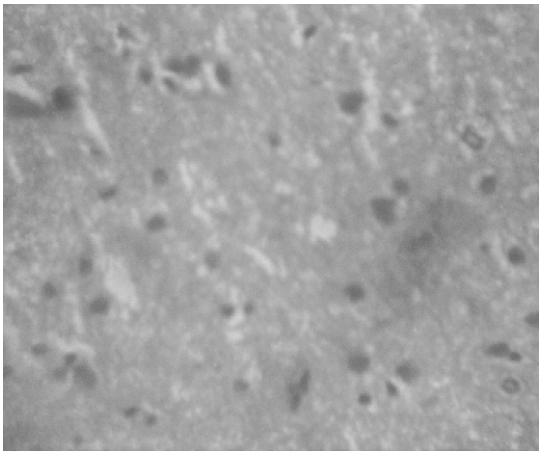

Fig.1C: *Control section of the superior colliculus (H & E method x400)*

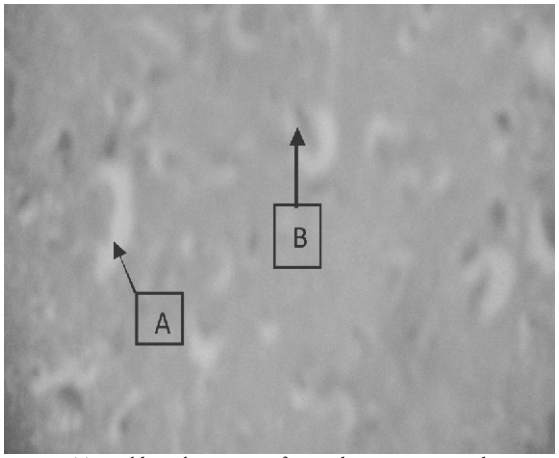

Fig 2A: *Treated brand A section of LGB showing A=vacuolation, B=pyknotic nucleus (H & E method x400)*

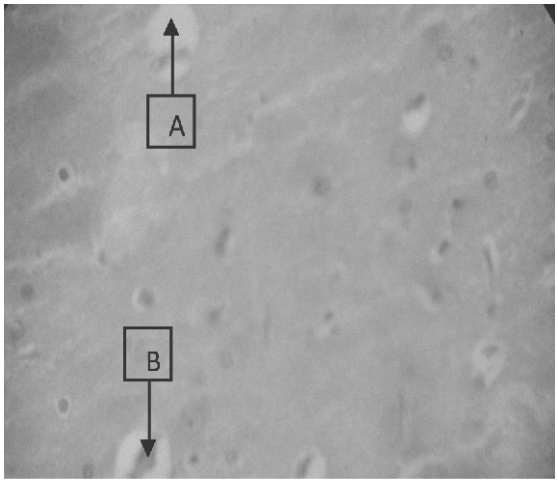

Fig 2B: *Treated brand B section of LGB showing A=vacuolation, B=pyknotic nucleus (H & E method x400)*

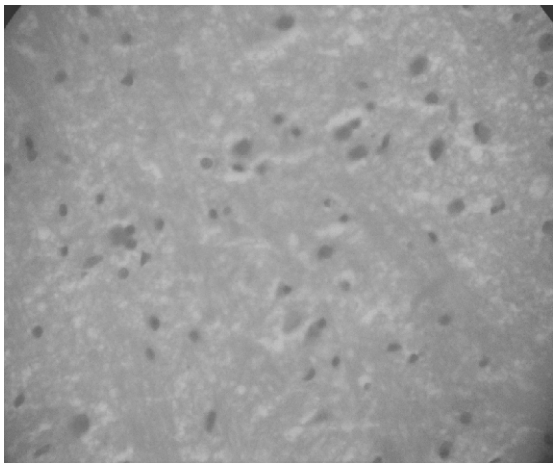

Fig 2C: *control section of LGB (H & E method x400)*

be inferred from this results that prolonged consumption of the soft drink resulted in increased toxic effects on the superior colliculus and lateral geniculate body micro-anatomy. The decrease in cellular population observed in this study may have been as a result of cell death caused by the toxic effect of cola drinks. Beside the aspartame content of cola being an excitoneurotoxic agent [17], excessive sugar in the drink has potential for the development of several diseases, with implication of oxidative damage. Hence, there is now special cola drink formula that is sugar-free.

It has been reported previously that chronic administration of chloroquine resulted in the cellular degenerative changes, sparse cellular population and vacuolation appearing in the brain of adult Wistar rats [25, 26]. This report advances further the vulnerability of the brain, and the intracranial visual relay centre in particular.

Excessive consumption of soda drinks could lead to hyperglycaemia because of the high sugar content. Therefore, one salient factor common to toxic potential of cola soft drinks is the oxidative damage hypothesis. Cognitive functions and neuronal change as in neurodegeneration is impacted by oxidative stress. This triggers insulin secretion and neurons lack the capacity to store glucose. Hence, during hypoglycaemia, the brain experiences an energy crisis and consequences including tissue hypoxia [27]. Further, excessive and prolonged soda drink consumption creates a hyperglycaemic state and can diminish the body's ability to respond to insulin which may enhances brain damage. It has been hypothesized that the importance of considering all co-antioxidants acting within a unified physiological process is that antioxidant interactions are complex and determine whether antioxidant shows a positive or negative effects [28]. Especially, it is possible for administration of even a normal daily dose of an antioxidant to yield pro-oxidant radicals that may not be regenerated early enough. The net effect is increased OS, which is negative and unwanted. The point here is that excessive consumption of soda (sugary) drinks could cause neuronal damage and impaired cognitive functions through oxidative stress. This report presents evidence of the possibility of such micro-anatomical damage. Therefore, we also recommend biochemical analysis as adjunct study to corroborate this report.

Limitations

This study is limited in some ways. The cola drinks used in this experiment contain sugar. Whether they also contain aspartame was not determined and effort to verify this was unsuccessful. We acknowledge that consumption of cola drinks is not as liberally provided to humans as in the experimental animals.

However, our report thus provides indication of toxic potential to cognitive function with a histological perspective that has applicability in post-mortem examinations. To our knowledge, this is the first report on the histological effect of soft drinks on intracranial visual relay centres.

Conclusion

The study revealed that chronic consumption of soda pop drinks could cause some morphological changes in the stroma of the

superior colliculus and lateral geniculate body of adult Wistar rats. These histological changes may affect the visual sensibility functions of the superior colliculus and lateral geniculate body in the adult Wistar rats. We suggest further studies aimed at corroborating these observations in humans.

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Assessment of Health Workers' Knowledge, Perception and Compliance Following a World Health Organisation Multimodal Hand Hygiene Intervention Campaign an a Nigerian Teaching Hospital

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ABSTRACT

Background: The transmission of health care-associated infections (HCAI) in hospital environment constitutes a significant major public health problem worldwide and health-care workers are potential source of these infections. This study assessed the knowledge and perception of health workers in a Nigeria Teaching Hospital following the implementation of the World Health Organization (WHO) hand hygiene intervention strategy.

Methods: The study participants were physicians, nurses and other health workers involved in direct patient care. The intervention included training/education; use of reminders in the workplace; and introduction of 70% isopropyl alcohol hand rub in strategic 'points of care' places. The WHO hand hygiene evaluation and feedback tool was used for the assessment of the health workers perception.

Results: A total of 71 (65.7 %) out of 110 respondents participated in the hand hygiene training conducted during the period of the study; however only 58 of the respondents (53.7 %) routinely use alcohol-based hand rub. In the assessment of the knowledge of the main route of cross contamination and the most frequent source of germs responsible for HCAI, 45.9% and 43.9 % of the respondents respectively answered correctly. The follow-up perception survey conducted among the participants indicates that 63.2% of them admitted that the training/educational activities they participated in were very important to improve their hand hygiene practices.

Conclusion: Hand hygiene campaigns using the WHO tools and methodology can improve hand hygiene knowledge, perception and compliance of the health workers.

Keywords: *knowledge, perception, compliance, health workers, hand hygiene*

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Introduction

The transmission of health care-associated infection (HCAI) in hospital environment constitutes a significant major public health problem worldwide and health-care workers are potential source of these infections.[1-3] The World Health Organization (WHO) defined HCAI as an infection occurring in a patient during the process of care in a hospital or other

health-care facility which was not present or incubating at the time of admission, this includes infections acquired in the hospital but appearing after discharge, and also occupational infections among staff of the facility.[3] HCAI affects hundreds of millions of people worldwide and is a major global issue for patient safety. In modern health-care facilities in the developed world, 5–10% of patients acquire one or more infections. In developing countries the risk of HCAI is 2–20 times higher than in developed countries and the proportion of patients affected by HCAI can exceed 25%. In intensive care units, HCAI affects about 30% of patients and the attributable mortality may reach 44%.[1-3]

There is sufficient evidence indicating that most HCAIs can be transmitted from patient to patient via the hands of health-care workers.[4,5] Hand hygiene therefore is the simplest proven method to reduce the incidence of health care-associated infections.[6]

Although hand hygiene is generally acclaimed to be a very important strategy in the prevention of HCAI, it is one of the most neglected HCAI control practices among health workers.[3] Therefore the identification of effective methods to improve the practice of hand hygiene among health worker would greatly enhance patient safety and result in a significant decrease in HCAIs. In recent times the WHO through its Patient Safety Initiative has been promoting and supporting efforts to improve hand hygiene compliance among health workers worldwide.[3,7] According to the World Health Organisation,[3] successful and sustained hand hygiene improvement is achieved by implementing multiple actions to tackle different obstacles and behavioural barriers. Based on the evidence and recommendations from the WHO Guidelines on Hand Hygiene in Health Care,[3,8] the following components make up an effective multimodal strategy for hand hygiene: System change; Training/Education; Evaluation and feedback; Reminders in the workplace; and Institutional safety climate.

There is no documented systematic study in Nigeria on the use of the WHO hand hygiene intervention strategy to improve hand hygiene compliance among health workers. There is also no study on the perception of the health workers following the implementation of the WHO hand hygiene intervention strategy in a tertiary health facility. This study therefore provides scientific information that can aid in the development of hand hygiene intervention programme implementation. It also provides a baseline measurement on which future interventions can be monitored and evaluated.

Materials and methods

Setting: The study took place from January 2010 to April 2011 at Ebonyi State University Teaching Hospital (EBSUTH) and its training extension facility the Federal Medical Centre, located in Abakaliki the capital of Ebonyi State, south-eastern Nigeria. The study targeted physicians, nurses and other health workers involved in direct patient care. The study was approved by the Ethics Committee of the Ebonyi State University Teaching Hospital and by the Ethical Review Committee of the World Health Organisation.

Hand hygiene intervention:

This involved the implementation of strategies that promoted hand hygiene compliance as health care facility priority and included the following:

(i).Training/education sessions: The training/education sessions were conducted separately for nurses and doctors. The training was conducted by the Research Team at the Hospital's conference hall using Power Point presentation, and training handouts given to each participant. The training on hand hygiene focused on: background to WHO Patient Safety and the First Global Patient Safety Challenge; definition, impact and burden of HCAI; major patterns of transmission of health care-associated pathogens, with a particular focus on hand transmission; prevention of HCAI and the critical role of hand hygiene. The tools for the training sessions were downloaded from the WHO URL (http://www.who.int/gpsc/5may/tools/training_education/en/index.html). A total of 202 health workers (39 doctors and 163 nurses) were trained in a series of workshops.

(ii). Use of reminders in the workplace*:* After the completion of all training activities, materials used as reminders were downloaded from WHO Patient Safety website (http://www.who.int/gpsc/5may/tools/workplace_reminders/en/index.html) and were reproduced in the forms of posters, prescription notebooks, and computer screen savers. The hand hygiene posters were then pasted in all the hospital wards at strategic locations such as: near wash hand sink, beside beds, consultation rooms, etc.

*(*iii). Introduction of alcohol hand rub: A 250ml 70% isopropyl alcohol hand rub was placed at strategic 'points of care' places within the hospital and were constantly replaced throughout the project period.

Assessment of health workers' perception

The tools used for the assessment of health workers perception were the WHO hand hygiene evaluation and feedback tools downloaded from the WHO URL

(http://www.who.int/gpsc/5may/tools/evaluation_feedback/en/index.html). The tools used included: Hand Hygiene Knowledge Questionnaire for Health-Care Workers, Follow-Up Perception Survey Questionnaire for Health-Care Workers and Ward Infrastructure Survey Questionnaire

Data analysis

Data obtained from the study was analyzed using the Epi Info software, version 3.5.3. The analysis was performed according to the recommendations of WHO.

Results

Outcome of Hand Hygiene Knowledge Survey for Health-Care Workers:

The summary of the characteristics of the surveyed health care workers is presented in Table 1. A total of 65.7% of the respondents participated in the hand hygiene training conducted during this research period; however only 53.7% of the respondents routinely use alcohol-based hand rub.

The summary of hand hygiene knowledge survey for health workers is presented in Table 2. In the assessment of the main route of cross contamination, 45.9% of the respondents answered correctly while in the assessment of the most frequent source of germs responsible

Table 1: Post-intervention characteristics of the Health workers surveyed

Parameter assessed	Frequency	Percent (%)
{ śŝ		
Male	30	27.3
Female	80	72.7
Total	**110**	
Profession		
Doctor	26	26.6
Nurse	63	57.3
Midwife	19	17.3
Others	2	1.8
Total	**110**	
Department		
Internal medicine	11	10.0
Surgery	20	18.2
Intensive care unit	6	5.5
Emergency unit	19	17.3
Obstetric	23	20.9
Paediatrics	11	10.0
Outpatient clinic	11	10.0
Others	7	6.4
Total	**110**	
Participated in hand hygiene training		
Yes	71	64.5
No	37	33.6
Indifferent	2	1.9
Total	**110**	
Use alcohol based hand rub		
Yes	58	52.7
No	50	45.5
Indifferent	2	1.8
Total	**110**	

for HCAI, 43.9% of the respondents answered correctly.

Outcome of Follow-Up Perception Survey for Health-Care Workers:

The summary of hand hygiene follow-up perception survey for health workers is presented in Table 3. Of the 109 health workers who participated in the survey, majority of the respondents (53.2 %) noted that the impact of a health care-associated infection on a patient's clinical outcome is high. Similarly about half the proportion of the respondents (50.5 %) also noted the high effectiveness of hand hygiene in preventing health care-associated infections. Up to 67.0 % of respondents noted that leaders at the institution strongly support hand hygiene;

Table 2: **Post-intervention health workers' hand hygiene knowledge survey outcome**

Parameter assessed	Number examined	Frequency	Percent (%)
L `lmqnt sd ne bqnrr			
Contamination			
Colonised surface	109	21	19.3
Health care worker's hand*	109	50	45.9
Hospital air	109	19	17.4
Sharing objects	109	19	17.4
Most frequent source of HCAI			
Gnrohs`k`hq	107	1	0.9
Germs already present on or within the patient*	107	47	43.9
Hospital environment (surfaces)	107	52	48.6
Hospital's water system	107	7	6.5
Minimal time for hand rub to kill most germs on hands			
1 minute	105	20	19.0
20 seconds*	105	49	46.7
10 seconds	105	20	19.0
3 seconds	105	16	15.3
To prevent HCAI transmission to the patient Use hand rub			
Before touching a patient*	104	100	96.2
Immediately after body fluid exposure*	79	29	36.7
After exposure to patient surroundings*	77	28	36.4
Before clean/aseptic procedure*	81	62	76.5
To prevents HCAI transmission to the health worker, use hand rub			
Before touching a patient*	98	92	93.9
Immediately after body fluid exposure*	87	82	94.3
After exposure to patient surroundings*	75	29	38.7
Before clean/aseptic procedure*	84	77	91.7
Correct statements on hand hygiene			
Hand rub more rapid than hand washing*	88	12	13.6
Hand rub dries the skin more than hand Washing*	81	57	70.4
Hand rub is more effective than hand washing*	80	28	35.0
Hand washing & hand rub recommended in sequence *	88	64	72.7
Hand rub and not hand washing is the most ideal method required			
Before palpation of abdomen*	105	72	68.6
Before giving an injection *	104	51	58.7
After emptying bedpan *	106	22	20.8
After removing gloves *	105	22	21.0
After making a patient's bed*	106	43	40.6
After exposure to blood *	107	27	25.2

52.8 % noted that alcohol based hand rub is available at each point of patient care; but only 21.9 % noted that patients were invited to remind HCW to perform hand hygiene. Up to 49.0 % of the respondents noted that the fact they were being observed made them pay more attention to their hand hygiene practices, while 63.2 % admitted that the

Table 3: Post-intervention health workers' follow up perception survey outcome

Parameter assessed	Outcome/findings								
Gender (N= 109)	Male 37(33.9)					Female 72(66.1)			
Profession (N=110)	Doctor 22(20.2)			Nurse 74(67.9)		Midwife 9(8.3)		Others 3(2.8)	
Department (N=109)	Internal medicine	Surgery	Intensive care unit	Medical/ surgical	Emergency unit	Obstetric	Pediatrics	Outpatient clinic	Others
	8(7.3)	22(20.2)	13(11.9)	13(11.9)	12(11.0)	22(20.2)	13(11.9)	14(12.8)	3(2.8)
Hand hygiene training (N=108)	Yes 73(68.2)					No 34(31.8)			
Use of handrub (N=105)	Yes 57(54.3)					No 48(45.7)			
Percentage of patients who will develop HCAI (N=63)	?20% 13(20.6)		21-40% 22(12.2)		41-60% 10(15.9)		61-80% 15(23.8)		81-100% 3(4.8)
Impact of HCAI patient's clinical outcome (N=109)	High 58(53.2)		Low 26(23.9)		Very high 17(15.6)			Very low 8(7.3)	
Effectiveness of hand hygiene (N=107)	High 54(50.5)		Low 10(9.3)		Very high 42(39.3)			Very low 1(0.9)	
Priority of hand hygiene at your institution(N=108)	High priority 40(37.0)		Low priority 4(3.7)		Moderate priority 26(24.1)			Very high priority 38(35.2)	
Situations hand hygiene performed by HCW(N=86)	?20% 3(3.5)		21-40% 10(11.6)		41-60% 24(27.9)		61-80% 35(40.7)		81-100% 16(18.6)
	1	2	3	4	5	6	7		
Leaders support hand hygiene (N=106)	Not effective 2(1.9)	6(5.7)	1(0.9)	2(1.9)	11(10.4)	13(12.3)	Very effective 71(67.0)		
Handrub available at each point of patient care (N=106)	19(17.9)	4(3.8)	6(5.7)	2(1.9)	8(7.5)	11(10.4)	56(52.8)		
Hand hygiene posters are displayed at point of care (N=106)	8(7.4)	4(3.7)	4(3.7)	5(4.6)	9(8.3)	14(13.0)	64(59.3)		
You perform hand hygiene perfectly (N=106)	6(5.7)	0(0)	5(4.8)	8(7.6)	7(6.7)	19(18.1)	60(57.1)		
Patients invited to remind HCW to perform hand hygiene (N=106)	50(47.6)	6(5.7)	6(5.7)	4(3.8)	4(3.8)	12(11.4)	23(21.9)		
Being observed made you pay more attention to hand hygiene (N=100)	**1 Not at all** 11(11.0)	**2** 2(2.0)	**3** 1(1.0)	**4** 4(4.0)	**5** 10(10.0)	**6** 23(23.0)	**7 Very much** 49(49.0)		

training/educational activities they participated in were very important to improve their hand hygiene practices.

Outcome of Ward Infrastructure Survey: The summary of the outcome of ward infrastructure survey is presented in Table 3. Of the 17 health workers who participated in the survey, 13 of the respondents noted that water is regularly available in the ward. A total of nine of the respondents noted that an

Table 4: Post-intervention ward infrastructure survey outcome

Parameter assessed	Outcome/findings								
Department (N=17)	Internal medicine	Surgery	Intensive care unit	Medical/ surgical	Emergency unit	Obstetric	Pediatrics	Outpatient clinic	Others
	2(11.8)	3(17.6)	1(5.9)	1(5.9)	1(5.9)	3(17.6)	3(17.6)	1(5.9)	1(5.9)
Position of respondent (N=17)	Head nurse		Hand hygiene programme co-ordinator			Other infection control team member		Others	
	4(23.5)		6(35.3)			5(29.4)		3(17.6)	
Availability of water (N=17)	Always		Intermittently			Rarely		Never	
	4(23.5)		6(35.3)			5(29.4)		3(17.6)	
kind of taps available (N=17)	Hand-operated		Elbow/wrist-operated			Automatic		Foot-operated	
	17(100)		0(0)			0(0)		0(0)	
Disposable towels available at all sinks (N=17)	Always		Intermittently			Rarely		Never	
	2(11.8)		1(5.9)			1(5.9)		13(76.5)	
Available of soap at all sinks (N=17)	Always		Intermittently			Rarely		Never	
	2(11.8)		1(5.9)			1(5.9)		13(76.5)	
Alcohol-based handrub available (N=17)	Always		Intermittently			Rarely		Never	
	4(23.5)		9(52.9)			4(23.5)		0(0)	
Type of handrub dispensers available (N=17)	Pocket bottle		Bottle affixed to trolley/tray		Bottle affixed to bed	Wall dispenser		Dispenser located on bedside table/trolley	
	6(35.3)		7(41.2)		0(0)	1(5.9)		2(11.8)	
Handrub dispensers replaced when empty (N=17)	Always		Intermittently			Rarely		Never	
	6(35.3)		6(35.3)			4(23.5)		1(5.9)	
Posters illustrating indications for hand hygiene displayed (N=17)			Yes 15(88.2)				No 2(11.8)		
Audits on hand hygiene compliance periodically performed (N=17)			Yes 12(75.0)				No 4(25.0)		

alcohol-based hand rub is intermittently available, while 14 of the respondents admitted that there is an assigned person responsible for the refilling or replacement of empty dispensers. Nearly all the respondents (15) noted that posters illustrating hand wash technique are displayed beside each sink.

Discussion

The outcome of the hand hygiene knowledge survey conducted among the health workers in this study showed a poor level of knowledge related to the main route of cross contamination with germs and the most frequent source of HCAIs among them. This may not be unconnected with the fact that a sizeable proportion of them did not participate in the hand hygiene training intervention conducted during the research period. However, majority of the respondents studied had a good level of knowledge related to some aspects of hand hygiene actions that prevent transmission of HCAI to the patient and health-care worker. What can be inferred from this observation is that there is need for a

more intensive hand hygiene training programme for these health-care workers. Recent studies have provided evidence to support the improvement of health workers knowledge on hand hygiene and compliance through interventional training programmes.[9,10] Compliance is a multifactorial problem that involves knowledge, behaviour and educational awareness; and frequent reminders are critical to maintain high rates of hand hygiene compliance.[10]

The outcome of follow-up perception survey of health workers provided some insight on factors that contributed to the positive impact of the hand hygiene training programme conducted during the research period. The success factors as perceived by the health workers included: high priority importance of hand hygiene at the hospital; the performance of hand hygiene in 61-80% of situations requiring hand hygiene by health-care workers in the hospital; the very strong support of leaders in the hospital to hand hygiene; the display of hand hygiene posters at point of care and the clear instructions for hand hygiene made visible in the hospital. These factors have been reported in many previous studies to be responsible for the improvement in hand hygiene compliance rate in health care facilities in various parts of the world.[9,11]

Interestingly, only about 22 % of the health workers in this study noted that patients were invited to remind them to perform hand hygiene. This is an indication that this is not a common practice in the health facility. There are only a few studies that have evaluated the role of patients in health workers motivation to perform hand hygiene. In a study conducted in Switzerland on Patients' beliefs and perceptions of their participation to increase healthcare worker compliance with hand hygiene, [12] the authors noted that most patients who participated responded that they would not feel comfortable asking a nurse (76 %) or a physician (77 %) to perform hand hygiene. It may be needful for patients to be educated to remind their health care providers to perform hand hygiene as this might help to improve hand hygiene compliance.

In the present study, up to 49 % of the health workers admitted that the fact that they were being observed made them pay more attention to their hand hygiene practices. A number of previous studies have indicated that the effect on the health worker of being observed or monitored (i.e., the Hawthorne effect) tends to significantly increase hand hygiene compliance rate.[13-15] Studies have shown that when health workers are aware they are being observed by recognized observers, the outcome is usually higher rates of hand hygiene compliance, even in a healthcare setting where such observations have become routine.[13]

In another study conducted in Germany, the authors noted that the Hawthorne effect had a marked influence on compliance with antiseptic hand rub use; with a 55% increase in compliance with overt observation.[14] There has been the argument that Hawthorne effect as an unintended consequence of observational studies contributes to altered behaviour that may not be sustained when the period of observation elapses.[16] This is clearly demonstrated by Harbarth et al. who noted in their report that baseline hand hygiene compliance decreased after the first 2 weeks of observation from 42.5% to 28.2% (presumably

because of waning of a Hawthorne effect). These findings therefore suggest that maintaining the Hawthorne effect in health care facilities can sustain the high rate of hand hygiene compliance among health workers. Although many health workers may not be comfortable with this, however it is the view of some researchers that Hawthorne effect should be an integral component of the hand hygiene campaign since obtaining a sustained and never-ending Hawthorne effect is associated with improved compliance with hand hygiene and decreased infection and cross-transmission rates.[14,15]

The outcome of ward infrastructure survey conducted in this study indicates that basic facilities and amenities that can encourage hand hygiene practice were to a large extent available in the wards, though not very optimal. A total of 76% to 94% of the respondents admitted that facilities which enhance hand hygiene performance were always available in the wards. Such facilities included regular visibly clean running water; hand operated taps with sink; soap in all sinks; examination gloves in all wards; and posters illustrating hand wash technique displayed beside each sink. A considerable proportion of the respondents (52.9%) noted that an alcohol-based hand rub is intermittently available, and up to 75% noted that audits on hand hygiene compliance are periodically performed on their ward. The availability of these infrastructures was a major boost to the hand hygiene campaign conducted in the hospital and it is believed to have enhanced the hand hygiene compliance rate recorded in the study. There are numerous reports from developed and developing countries which indicate that the provision of hand hygiene infrastructure and facilities within the reach of health workers in wards can greatly enhance hand hygiene compliance by the health workers.[9,18-21]

The outcomes of this study have shown that hand hygiene campaigns using the WHO tools and methodology can be successfully executed in tertiary health facilities in low income setting with far reaching improvement in the knowledge and compliance of the health workers. Apart from educational intervention and the use of reminders in the work place, findings from this study also indicate that there is need to improve hand hygiene facilities especially the use of alcohol-based hand rubs to encourage compliance.

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A Study of Morphological Patterns of Lip Prints among The Yorubas in Okitipupa, South-western Nigeria

Eboh DEO

Abstract

Introduction: In civil and criminal cases, human identification is a very important process. Analysis of the lip prints left at a scene of crime, and their comparison with those of the suspected person may be useful for identification.

Aim: The purpose of this study was to assess the lip print patterns of the Yorubas of Nigeria, using Okitipupa as a case study.

Materials and Methods: This cross-sectional study adopted the random sampling technique and consisted of 104 individuals (53 males and 51 females), aged between 10 and 50 years. Lipstick was applied uniformly on the lips of each subject, and allowed to dry for about two minutes, after which an impression was made on a plain white paper. The impression was subsequently visualized with a magnifying lens and the patterns of lip prints were noted and recorded. 832 lip prints were recorded and type II was found to be the dominant pattern.

Results: There was no significant association between gender and lip print patterns. This study confirms that lip prints are unique for every individual.

Conclusion: No two lip prints are the same. The sex of an individual cannot be determined from lip prints.

Keywords: *Lip print; Cheiloscopy; Human Identification; Criminology; Forensic Anthropology.*

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Introduction

The vermilion border of human lip is the zone of transition between the inner labial mucosa and outer skin[1,2]. It is covered with a specialized keratinized stratified squamous epithelium which is thin near the skin, increases in thickness slightly as the mucosa is approached, and then thickens abruptly when true mucosa is reached[1]. The vermilion zone has an outer layer of stratum corneum and it is devoid of salivary glands. The skin is thin and has many capillaries, hence the redness[1]. Present in the vermilion zone of human lip are normal lines and fissures. They are identifiable as early as the sixth week in utero, and their patterns are maintained thereafter, surviving many afflictions such as herpetic lesions [3,4].

Lip prints are the imprints produced by these

lines, fissures or grooves, the study of which is termed cheiloscopy [5]. Suzuki and Tsuchihashi [6], carried out a longitudinal study on 107 Japanese families, and reported dissimilarity among individuals and suggested that the lip-groove pattern could be influenced by hereditary factors. It has been reported that even in twins, whose patterns are somewhat similar, no two lip prints are identical in detail [7]. It has also been reported that in a study on lip prints between two identical twins, it was observed that they appeared indistinguishable by every other means but their lip prints were different [2,8]. Lip print is an anatomical characteristic of the human lips.

The study of lip prints has been carried out in some populations across the globe. A curious search of the literature revealed that this study, to the best of the author's knowledge, has not been carried out in Nigeria. Even if it exists, none has been carried out among the Yoruba people resident in Okitipupa. It has also been noted that the size and curvature of the exposed red lip surfaces is subject to considerable individual, gender and ethnic variation[1]. Previous studies noted that lip prints show differences according to the race and the ethnic origins of a person. Like finger prints, lip prints can be instrumental in identifying a person positively and can be used to verify the presence or absence of a person at the scene of crime [9, 10]. Therefore, this study focuses on lip print analysis of the Yorubas in Okitipupa, South-West of Nigeria.

Identification of an individual, living or dead is based upon the theory that all individuals are unique. Personal identification is important in legal medicine, forensic science, anthropology, criminal investigation and identification and in Genetic Research. At the scene of crime, a criminal may leave no traditional evidence for personal identification, like finger prints, but lip prints may be the only clue left behind. With our law enforcement agencies unaware of cheiloscopy as a tool in positive personal identification, this may militate against verifying the presence or absence of a person at the scene of crime. The major problem this study intends to address is to verify the distribution of lip print patterns for individuality and to test the hypothesis that there is no significant association between gender and lip print patterns.

The study will be useful to the criminal investigation department for positive identification of individuals. It will provide useful material in forensic medicine and anthropology. In addition, this study will serve as normative data in this part of the world.

The purpose of this study is threefold: to determine the dominant lip print type among the Yorubas in Okitipupa, South-Western Nigeria; to assess the distribution of lip print patterns among males and females; and to ascertain lip print patterns for their individuality.

Materials and Methods

The descriptive cross-sectional method was used in this study. The study subjects were randomly sampled and consisted of 104 individuals (53 male and 51 females) aged between 10 and 50years, and who are Yorubas resident in Okitipupa, Ondo state, South-West of Nigeria. The study was conducted

between April and May, 2011. Voluntary informed consent was obtained from all prospective subjects and the parents or legal representatives of minor subjects prior to data collection in accordance with International Ethical Guidelines for Biomedical research involving Human Subjects. In addition, the Research and Ethics committee of College of Health Sciences, Delta State University, approved the method employed in the study.

The lips of each subject were thoroughly examined clinically and subjects with any deformity or history of surgery of the lip were excluded. The lips of the subject were first cleaned thoroughly and lipstick was applied uniformly, starting at the midline and moving laterally. The lip stick was allowed to dry for about two minutes, after which an impression was made on a plain white paper which served as a permanent record. The impression was subsequently visualized with the use of a magnifying lens and the combinations of lines, furrows, fissures or grooves with their lengths were noted (fig 1).

Each lip was divided into 2 halves by a midline, giving a total of 4 quadrants analogous to the dental quadrants (fig 2). Each quadrant is further divided into 2 halves, making 8 topographical areas or segments in all: upper right lateral (URL), upper right medial (URM), upper left medial (ULM), upper left lateral (ULL), lower left lateral (LLL), lower left medial (LLM), lower right medial (LRM) and lower right lateral (LRL) (fig. 2). The pattern of lip print observed in each topographical area is recorded in accordance with the classification of Suzuki and Tsushihashi [6,11]. They classified grooves into 6 Types: Type I is longitudinal grooves running through the whole width of the lip; Type $I^{'}$ is partial longitudinal grooves. Type II is branched grooves. Type III is intersected grooves, Type IV is reticular grooves and Type V is undifferentiated grooves (Fig. 3).

The data obtained were subjected to statistical analysis, using frequency and percentage of each type of lip print patterns in the 8 topographical areas. The total groove count for both the upper and lower lips were compared between males and females. Chi-square contigency was used to assess the association between gender and lip print patterns in both upper and lower segments. The analysis was conducted with the aid of

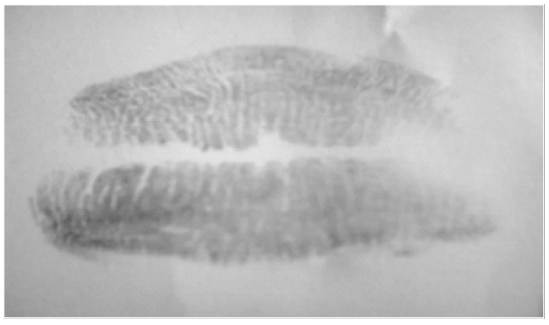

Fig. 1: *Photograph showing the upper and lower lip imprints with different lip print patterns of a Nigerian (Yoruba).*

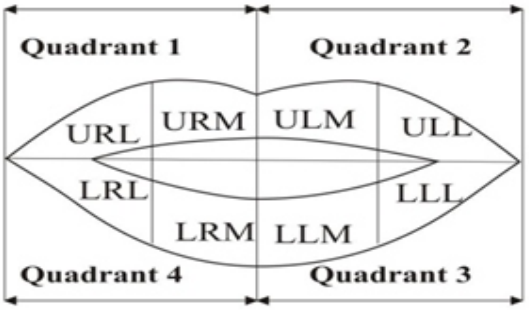

Fig. 2: *Showing partitioning of upper and lower lips into quadrants and segments.*

URL=upper right lateral segment; URM= upper right medial segment; ULM= upper left medial segment; ULL= upper left lateral segment; LLL= lower left lateral segment; LLM= lower left medial segment; LRM= lower right medial segment; LRL= lower right lateral segment.

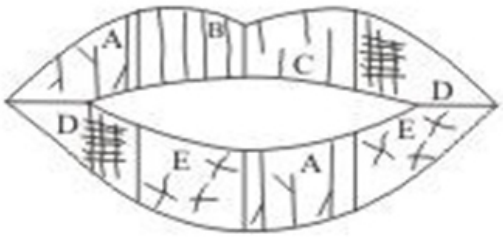

Fig. 3: Showing lip print types found among the Yorubas: type I (B); type I^{I} (C); type II, (A); type III (E); type IV (D).

statistical package of social sciences (SPSS) version 16. P-value ? 0.05 was considered statistically significant.

Results

In this study, it was observed that no two lip prints matched each other. A total of 832 lip prints were recorded, including type I, I^{I}, II, III, and IV. No type V was found (tables 1 and 2). The dominant lip print was type I^{I}, making 48.3% (upper lip = 26.2%; lower lip = 22.1%) of all lip prints in both lips. Type II was the second dominant pattern constituting 26.0% (upper lip = 12.0%; lower lip = 14.0%).

In the upper lip, type I^{I} constituted 53.0% (right side = 26.5%; left side = 26.5%), while in the lower lip, type I^{I} was 45.0% (right side = 24.0; left side = 21.0%). In the upper lip, type II was 13.0% and 11.0% on the right and left side respectively. In the lower lip, type II prints was 14.0% and 13.0% on the right and left sides respectively.

In the upper lip, type I was more dominant in the ULL in male (23.0%) and in female (26.0%). The segments with type I^{I} dominance were URM, ULM in males and URL in females with 14.0% each, followed by ULL in females 13.0%.

The tests of association were also carried out.

Table 1: Distribution of lip print patterns in different segments of the upper lip.

LIP PRINT TYPE	GENDER	N	URL	URM	ULM	ULL	TOTAL
Type I	Male	53	5	4	3	9	21
	Female	51	4	2	2	10	18
Type I^{I}	Male	53	26	29	29	25	109
	Female	51	29	25	27	28	109
Type II	Male	53	18	13	9	15	55
	Female	51	13	11	11	8	43
Type III	Male	53	1	0	2	0	3
	Female	51	3	3	1	2	9
Type IV	Male	53	3	7	10	4	24
	Female	51	3	10	10	3	25
Total	Male	-	53	53	53	53	212
	Female	-	51	51	51	51	204

URL= upper right lateral, URM= upper right medial, ULM=upper left medial,
ULL= upper left lateral.

Table 2: *Distribution of lip print patterns in different segments of the lower lip*

LIP PRINT TYPE	GENDER	N	LRL	LRM	LLM	LLL	TOTAL
Type I	Male	53	6	11	14	7	38
	Female	51	6	10	7	12	35
Type I^{I}	Male	53	27	23	12	26	88
	Female	51	21	26	23	26	96
Type II	Male	53	18	9	24	10	61
	Female	51	22	5	19	5	51
Type III	Male	53	0	0	0	0	0
	Female	51	1	1	0	0	2
Type IV	Male	53	2	10	3	10	25
	Female	51	1	9	2	8	20
Total	Male	-	53	53	53	53	212
	Female	-	51	51	51	51	204

LRL=lower right lateral, LRM= lower right medial, LLM= lower left medial, LLL= lower left lateral.

Chi-square for contingency between gender and lip prints in the different segments of the lips revealed no significant association ($p > 0.05$).

Discussion

This study revealed that of all lip prints registered, no two lip prints matched each other. This confirms the report that cheiloscopy is one of the special techniques to be used for personal identification [2]. It is also in agreement with other studies done on different populations' previously which reported that lip prints had different patterns that were apparently unique to the individuals. Tsuchihashi [12], after examining lip prints of Japanese subjects, came to conclusion that, though the lip print consisted of a combination of various types of grooves, no two lip prints were identical. It has been proved that lip prints could be certainly used in criminal cases [13]. It was also reported in another study that the lip-print characteristics could be used for identification similar to finger prints, palm prints and footprints [14].

It was noted that type I^{I} was dominant in both genders and in all quadrants of the lips (48.3%). This was followed by type II (26.0%), type I (14.0%), type IV (12.0%), Type V was not found. In a related study in Kerala [15], type IV was reported to be the dominant pattern. In another study in Japan [12], type III was the most common pattern, which was corroborated by

yet another study in the Indo-Dravidian population [16]. The different reports on the dominance of lip print types in the various studies could be attributed to racial, environment and genetic factors. The racial differences can make cheiloscopy a useful aid in personal identification.

In a study in Kerala, it was reported that the middle portion of the lower lip showed type IV as the dominant type [15]. The present study noted that type I is the most frequently seen pattern in the middle portion.

In the present study, it was observed that, in males, type I^{I} was the dominant pattern (46.4%), followed by type II (27.4%), type I (13.9%), type IV (11.6%) and type III (0.7%). The sequence is the same in females as type I^{I} was also the most dominant (50.3%) followed by type II (23.0%), type I (13.0%), type IV (11.0%) and type III (2.7%). This supports Singh et al (2011) who reported that partial length groove was dominant in males (31.61%) and in females (43.79%) [17]. In contrast, the present study failed to support Saraswathi et al [2], who reported type IV (intersecting pattern) as most common in males (39.5%) and in females (36.5%). This study also departs from Shilpa [18] in Udaipur, India in which the sequences in both genders were different, as type I was the most prominent pattern in males, followed by type II, type IV, type I^{I} and type III; while the most prominent pattern in females was type II, followed by type I^{I}, type I, type III, type IV and type V. Ghondivkar et al [19] observed type III and type II patterns to be dominant in males and females respectively.

Assessment of the 4 quadrants was made in males and females. Among males, it was observed that type I^{I} lip print was most common in quadrants 1-4 with 52.0%, 51.0%, 48.0%, and 36.0% respectively; while the least common pattern in quadrants 1-4 was type III with 1.0%, 2.0%, 0.0% and 0.0% respectively. Among females, type I^{I} was the most common pattern in quadrant 1-4 having 53%, 54%, 46%, and 48.0% respectively; while the least common type in quadrants 1-4 were types I and type III with (6.0%) each, type I (3.0%), type III (1.0%) and 0.0% respectively. This is not in line with Saraswathi et al [2] who observed that among males intersected groove was the most common in quadrants 1-4, being more common in quadrant 3; while the least common pattern in quadrants 1, 2, and 4 was reticular pattern. They also observed that in quadrant 3, branched groove was the least common. They noted that among females, compartments 1, 2 and 3 showed intersected groove to be most common being most in quadrant 2. In quadrant 4, branched grooved was most common. They also observed that quadrants 1, 3, and 4 of females exhibited reticular groove as least common while vertical lip prints were least common in quadrant 2.

In the present study, the upper lip exhibited a dominance of type I^{I} pattern (52.4%) followed by type II (23.5%), type IV (11.8%), type I (9.4%) and type III (2.9%). This sequence is slightly different in the lower lip. Type I^{I} pattern was also more dominant (44.2%) followed by type II (26.7%), type I (17.5%), and type IV (10.8%) and type III (0.5%). In an Indian study, Augustine et al (2008) [20] reported a dominance of type III followed by type II, type IV, type I, type I^{I} and type V in the upper lip. In that study, lower lip also has dominance of type III followed in order by type IV, type I, type II, type I^{I} and type V. It was also noted in

the study that in the upper lip, type I^{I} and type II were the commonest patterns in that order in the lateral and medial segments. In the lower lip, type I^{I}, type II and type IV were more frequent in the lateral segment, while in the medial segments, frequent occurrence were type I^{I}, type II and type I in that order.

In upper lip, type I^{I} was more common in the lateral segments of females than in males while type I^{I} was more common in the medial segments of males than in females. Augustine et al [20] reported that type IV was more common in the lateral segments of females that in males while type I was more common in the lateral segments of males than in females.

In the lower lip, type I^{I} was more common in the lateral segments of males than in females while type I was more common in the medial segments of females than in males. Chi – square tests for degree of association between gender and lip prints in the respective segments of the upper and lip was not significant ($p > 0.05$). This result agrees with the study of Rubio and Villalain in 1980 as quoted in Augustine *et al* [20] which did not find significant differences in lip prints based on sex. However, our study differs from Augustine *et al*[20] who reported significant difference in chi-square test between the sexes in the lateral segments of upper lip. The reason for this difference could be attributed to the difference in sample size, population difference due to geographic or environmental factors. More important reason for the difference may be attributed to ethnic differences since they represent the gene pool and genotype. It was reported that variations in patterns among males and females could be useful in sex determination[21].

The assessment of lip print patterns among the Yorubas of Nigeria has been undertaken. The Null hypothesis which states that there is no significant association between gender and lip print types in the different segments of the lips is accepted. The patterns exhibited were individual as no two lip prints matched each other. Type I^{I} was the dominant pattern of the entire collection. This pioneer study will provide normative data in this part of the world and it will be useful in forensic science and anthropology.

It is suggested that a great effort should be made to record the lip prints of all individuals in a certain location so as to establish a database that might be of great value in civil and criminal issues. In addition, lip print should be studied in other ethnic groups to establish further facts to give room for comparison, and to make cheiloscopy a basic tool in forensic human identification process.

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Role of Tympanometry in the Diagnosis of Hearing Impairment in Children with Otitis Media and Effusion

Okolugbo Nekwu Emmanuel[1]

Abstract

Background: To determine if Tympanometry can be used to diagnose hearing impairment in children with otitis media with effusion.

Method: A six month prospective study of school children aged between 5 and 7 years in the selected primary schools. Techniques of data collection included otoscopy, tympanometry and screening audiometry.

Results: Showed that tympanometry correctly identified cases without hearing impairment.

Conclusion: That tympanometry may be suggested as screening tool for younger children with Otitis Media with Effusion especially in developing countries thereby reducing cost implications tor these patients.

Keywords: *Tympanometry, Otitis Media with Effusion, Hearing Impairment, Screening Tool*

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Introduction

Otitis media with effusion (OME) is characterized by a nonpurulent effusion of the middle ear that may be either mucoid or serous. Symptoms usually involve hearing loss or aural fullness but typically do not involve pain or fever.

The monitoring of children with otitis media with effusion ties up considerable resources in audiology departments, impedance audiometry is frequently used when monitoring these children. It has been shown to be very sensitive in detecting middle ear effusions, but its value indetecting those children with significant hearing impairment secondary to this is in question because of the wide range of hearing impairments possible with a type B tympanogram[1]

It would be be useful if tympanometry can be used also in monitoring hearing impairment as this will lead to a significant reduction in costs for these patients.

In this paper, a study is presented in which tympanometry was used as a screening tool for school-age children, these children also had screening audiometry done with an audiometer and a comparism was made on the

co-relation between hearing impairment and tympanometrically detected OME.

Methods

This was a prospective study conducted over a period of 6 months. Subjects included in the study were primary 1 pupils in the selected primary schools with an age range of 5 -7 years. Exclusion criteria was tympanic membrane perforation. Data collection techniques included, Personal Identification, Otoscopy, Tymanometry and Screening audiometry.

All examinations were carried out in the school premises, otoscopic findings were noted prior to pure tone audiometric findings or tympanometric recording from the pupils.

For Tympanometric recordings a Welch-allyn microtymp 2 was used with the following specifications, Probe frequency - 226Hz and a sound pressure level of 85 dB.

Pressure range of + 200 to–400 dapa. Fiellau Nikolajsen (1983) modified Jerger's (1970) nomenclature; subdividing tympanograms into 4 types was used.

Type A - Middle ear pressure + 200 to – 99mm of Water.

Type B - Flat traces without a well defined compliance.

Type C_1 - Middle ear pressure – 100 to –199mm of Water.

Type C_2 - Middle ear pressure – 200 to 400 mm of Water

Types C_1 and C_2 associated with a negative middle ear pressure as in Eustachian tube dysfunction and which is also associated with middle ear effusion as well as the type B flat curve which is highly associated with middle ear effusion were used as indicators of OME.

For Screening Audiometry, a Peters AP 6 portable audiometer was used, with a noise exclusion head set. A screening level of 25dB was used in 4 test frequencies of 500, 1000, 2000 and 4000 Hz.

The screening criteria for pass were response at all test frequencies. The child was said to have failed if he or she did not respond to any 1 or more of the 4 test frequencies at 25dB (hearing threshold) level.

The Data obtained were then recoded in a pre-coded Questionnaire and were later analyzed statistically and presented in pictorial and graphical or tabular form.

The various measures of diagnostic accuracy i.e. sensitivity, specificity, false positive and false negative rates were computed.

The School Authorities and Parents teachers association were informed and their consent sought before the study commenced.

Tympanometric results for ears with hearing impairment: 270 children were screened of these, 59 had hearing impairment (21.9%). 60 children had one or both ears tympanometrically diagnosed with OME yielding a total of 86 ears, of these, 32 children had normal hearing (53.3%) while 28 had impaired hearing (46.7%).

Tympanometric diagnosis of OME associated hearing impairment.

$$\text{Sensitivity} = \frac{a}{a + c}$$

$$\text{Specificity} = \frac{d}{b + d}$$

Where

a = impairment present, test positive

b = impairment absent, test positive

c = impairment present, test negative

d = impairment absent, test negative

Using the same notation

The false negative proportion = $\frac{c}{a+c}$

And the false positive = $\frac{b}{b+d}$

The positive predictive value is the proportion of patients with a positive result who actually have the disease.

PPV = $\frac{a}{a+b}$

a = 28

b = 32

c = 31

d = 179

Sensitivity *sensitivexcaa*%5.47%1005928312828==+=+

Specificity *specificxdbd*%8.84%10021117917932179==+=+

False negative proportion %5.521005931312831==+*x*

False positive rate = %2.15100211321793232==+*x*

Positive predictive value

= *baa*+

= %1006028322828*x*=+ = 46.7%

That is 53% of patients with this type of tympanogram had hearing within normal limits.

Discussion

About 46% of the subjects with tympanometric diagnosed OME had impaired hearing; this was close to that obtained by Ogisi who noted that 48% of the subjects used in his study with abnormal tympanograms had significant hearing threshold elevations[2].

The specificity of tympanometry in detecting hearing impairment associated with OME from this study was very high, 84.8%, thus the false positive rate was relatively low (15.2%).

The high degree of specificity implies that tympanometry correctly identified cases without hearing impairment, this is in agreement with a similar study by Kazanas and Maw[3] where their results showed that a type B tympanogram was accurate in detecting hearing impairment, thus a type A tympanogram implies no hearing impairment. The percentage of patients (11.6%) with normal appearance of the tympanic membrane but who however had tympanometric diagnosed OME could be as a result of false positive results.

Another advantage of tympanometry over conventional pure tone audiometry is that most pre-school children will co-operate better with tympanometry[4]

We can therefore suggest from our study that

in smaller children who might not be able to undergo screening audiometry, when the cost is usually unaffordable as in a developing country like ours or in a very busy otolaryngological department, tympanometry may be used as a screening tool for OME associated hearing impairment thereby avoiding the need and cost implication of further audiological testing.

Conclusion:

In this study Tympanometry was found to be highly specific in diagnosing OME associated hearing impairment, thus we suggest that it may have a role in the diagnosis of hearing impairment associated with OME.

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Soft Tissue Injuries Following Motorcycle Accidents in South-east Nigeria Nigerian Hospital

Nw

Abstract

Background: Motorcycle accidents have, in recent years, assumed epidemic proportions. This has prompted increasing interests in the circumstances surrounding the accidents and the management of the victims. Victims of these accidents are subjected to a variety of injuries including significant soft tissue injuries. Proper management of these soft tissue injuries is important in reducing morbidity and mortality in these patients. This study therefore aims to determine the nature of motorcycle accidents and management of soft tissue from such accidents.

Patients and Methods: This is a retrospective study of the victims of motorcycle accidents admitted into and treated at the National Orthopaedic Hospital, Enugu from Jan. 2004 to Dec. 2007. Relevant data were extracted from the patients' case folders at the Medical Records Department.

Results: Most (33.1%) of the patients sustained multiple injuries, 24.8% deep lacerations, 21.2% bruises, abrasions and/ or friction burns, 11.3% had head injury, 6.0% avulsion injuries and 3.6% had crush injuries of the limbs. Plastic surgery services were required in 61.6% of the cases.

The injuries were treated by various methods, 22.2% had wound debridement with primary, delayed or secondary suture and Plaster of Paris (POP) cast. Another 17.2% of the patients' wounds were debrided with primary wound closure, while 3.6% had delayed or secondary closure after debridement and 8.3% had their wounds skin grafted or covered with flaps.

Conclusion: Management of these patients in a center that provides outstanding Plastic and Reconstructive surgery services aided the appropriate and definitive care of the soft tissue injuries as well as the effective management of the Orthopaedic care of the bone injuries.sterectomy compared to its abdominal counterpart, however, other complications were not. Furthermore, the former had the advantage of shorter duration of hospital stay compared to the latter.

Key words: *soft-tissue, injuries, motor-cycle accidents*

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Introduction

Motorcycle accident injuries have long been identified as a major public health concern[1, 2]. A significant proportion of the injuries sustained from motorcycle accidents are major injuries and motorcycles have been identified as the cause of the bulk of road traffic related

injuries in Southern Nigeria.[2, 3] Most of the patients are known to spend long periods of time on hospital beds and/ or at home recuperating leading to loss of funds and revenue, while a good number of them would have spent time at the traditional bone setters' centers before presenting at a medical health care facility.[3] Sometimes loss of vital parts of the body, like the limbs, incapacitate some of them for life.

Many of the patients, who sustain road traffic accidents, including motorcycle accidents, sustain multiple injuries and these multiple injuries have been shown to create a major burden in road related deaths. [3, 4] However, multidisciplinary management of these patients, especially involvement of Plastic (and Reconstructive) Surgeons in our setting has greatly reduced hospital stay, financial losses from accumulated hospital bills and loss of revenue from prolonged absence from work and in the case of Commercial Cyclists, loss of a means of livelihood. This involvement has improved the acute management and enhanced the provision of early definitive care of these patients especially with respect to management of soft tissue injuries, which also play a significant role in the treatment of open bony injuries.

This study therefore aims to highlight the various injuries caused by motorcycle accidents, their effects and the management of the soft tissue injuries by the plastic surgical services of the National Orthopaedic Hospital, Enugu as part of a multidisciplinary team management.

Materials and Methods

A retrospective study of the victims of motorcycle accidents admitted into and treated at the National Orthopaedic Hospital, Enugu from Jan. 2004 to Dec. 2007. Relevant data were extracted from the admission registers and patients' case folders at the Medical Records Department. Information obtained included age, sex, occupation, marital status, position of victim on bike, number of days admitted, the nature and severity of injuries sustained, treatment received and total amount of money spent on admission in Nigerian Naira.

Three hundred and two cases were analyzed and this number excluded some of those with minor injuries that were not admitted and pedestrians that were knocked down. Analysis was done with SPSS statistical package 17.5.

Results

A total of 302 patients were reviewed in the 4 year period out of which 87.4% (264) were males and 12.6% (38) were females. The peak age group involved was 20-29yrs at 52.6% (159) followed by the 30-39yrs age group which made up 21.5% (65) as shown in figure 1. One hundred and sixty-eight (55.6%) of the patients were single while 133 (44.0%) were married and 1 patient (0.3%) was widowed.

Most of the patients (32.5%) were commercial Motorcyclists, 16.9% were Students, while 8.6% were members of the Armed Forces. Other occupations are as shown in figure 2. Of these patients reviewed, 59.6% were riding the motorcycles while 40.4% of them were passengers. Furthermore, 44.4% of the patients were knocked down by different types of vehicles while 21.2% of the motorcycles had head-on collision with vehicles. Another 15.2% collided head-on with

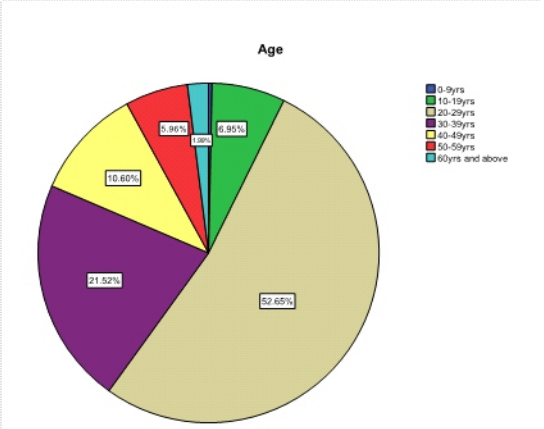

Figure 1. *Age Distribution*

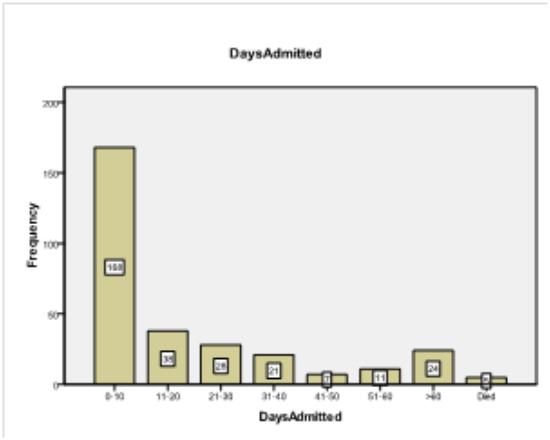

Figure 3. *Days spent on Admission*

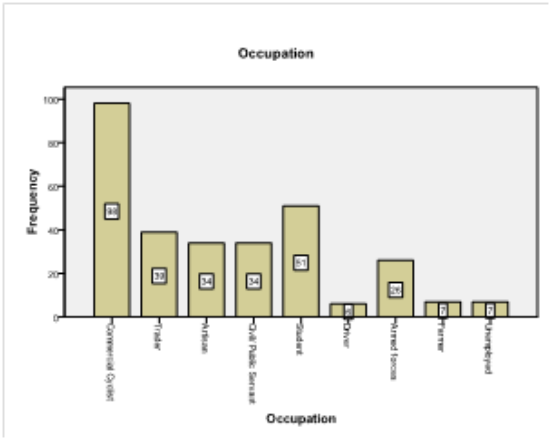

Figure 2. *Occupation*

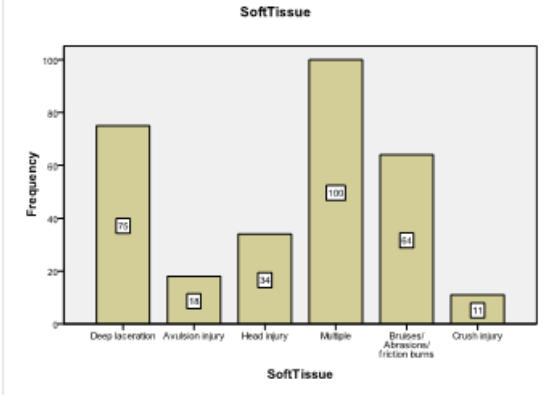

Figure 4. *Types of soft tissue injury*

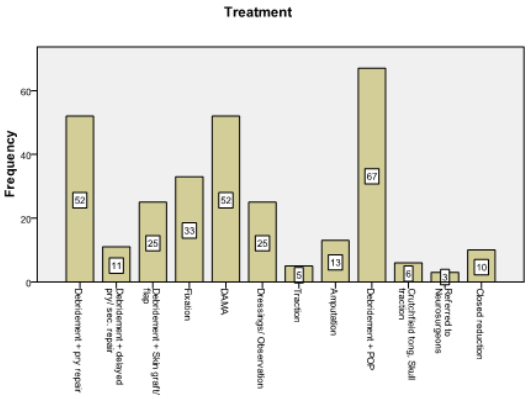

Figure 5. *Distribution of the Types of Treatment given*

other motorcycles, 4.0% were knocked down by other motorcycles, 3.6% fell off the bikes under various circumstances, 4.3% ran into stationary objects and 7.3% of the patients were injured under other circumstances like accidentally putting foot into the spokes of the wheel.

Remarkably, 55.6% of the patients were admitted for 10 days or less, while 12.6% for between 11 and 20 days and 1.7% of the patients died (Figure 3). Majority of the patients (64.9%) sustained various degrees of soft tissue and bone injuries, while 33.1% sustained soft tissue injuries only and 2.0% sustained mainly bone injuries. More specifically, most of the patients (33.1%) sustained multiple injuries as shown in figure

4. For the bony injuries, 23.2% had open fracture of a single bone, 16.6% closed fracture of a single bone whereas 22.2% of the patients fractured multiple sites, 4.0% had dislocations, 1.7% had spinal cord injuries, 1.3% had traumatic amputation, 0.3% skull fracture and 30.8% of the patients did not have any bone injury.

Plastic surgery services were required in 61.6% of the cases. The injuries were treated by various methods, 22.2% had wound debridement with primary, delayed or secondary suture and Plaster of Paris (POP) cast. Another 17.2% of the patients' wounds were debrided with primary wound closure, while 3.6% had delayed or secondary closure after debridement and 8.3% had their wounds skin grafted or covered with flaps. Others are as shown in figure 5 but unfortunately, 17.2% of the patients, some with very severe open fractures, discharged themselves against medical advice.

Over half of the patients (52.6%) spent less than #10,000 (ten thousand naira) in total for their treatment, while 17.2% of the patients spent between #10,000 and #20,000 and 13.2% spent over #50,000. Out of the remaining patients, 7.0% spent #21,000 - #30,000, 5.3% spent #41,000 - #50,000 and 4.6% of them spent #31,000 - #40,000.

Discussion

Motorcycle accidents have assumed epidemic proportions.[1,2,3] In a period of 4 years a total of 302 patients were admitted at the National Orthopaedic Hospital, Enugu and treated for various injuries sustained in motorcycle accidents. This high number of accidents didn't even include those with minor injuries that were not admitted, those treated in other centers and pedestrians that were knocked down. Of this number, 87.4% were males; most of them were in the very active age groups between 20 and 29 years, followed by those 30-39 years of age, a combined percentage of 74.1. This, as well as the fact that most of the patients were Commercial Motorcyclists, is in agreement with previous reports.[3, 5, 6] It has long been noted that the recklessness exhibited by the Cyclists themselves constitutes them into a peculiar risk group that could be likened to a suicide squad, the motorcycle related injuries impact the society negatively, because the young, active and economically productive males constitute the group at highest risk.[3,7]

From our series, emerging issues are also brought to light. Firstly, it is observed that contrary to previous findings where pillion riders were more at risk of injuries than the riders [3, 8, 9, 10], in our series, riders themselves were more at risk of accidents and this is also the finding of Seleye-Fubara and Ekere [4]. This change could be due to a greater level of awareness and personal security of most of the passengers who now look out for themselves, as well as the new sitting position whereby both males and females sit in similar manner when on motorcycles and so can be shielded by the riders, as opposed to the past when women used to sit sideways on bikes and could easily fall off. Secondly, a new occupation at risk is emerging and it is the armed forces. This group is coming to the fore because in recent years many State Government Authorities in Nigeria are increasingly placing various degrees of bans on motorcycles, some States ban motorcycles from 7pm till dawn, others ban movements across city centers while

others restrict movement of motorcycles across certain parts of the cities. The more interesting bit is that these periods of curfew are monitored and enforced by law-enforcement agents and so their colleagues see an opportunity to monopolize this means of transport. So by simple logic, since they are the only ones riding, they and their passengers are the only ones at risk of motorcycle accidents at these odd times.

The skin has long been identified as the most commonly injured tissue[11] and this is also our finding where the skin, along with other soft tissues suffered a myriad of injuries ranging from bruises, through abrasions and friction burns, to lacerations, avulsion injuries and various degrees of crushing. Majority of the patients however, sustained multiple injuries rather than single injuries. We also agree according to previous reports that the treatment of motorcycle injuries can be difficult and may require a multidisciplinary approach if these patients are to recover uneventfully, [11,12,13] but we are happy to report that the treatment of these patients is likely to improve in a center that has Plastic surgery service in addition to Trauma surgeons. In our series with a strong Plastic surgery presence, majority of the patients (55.6%) were admitted for less than 10 days and more than one half of the patients (52.6%) spent only ten thousand naira (#10,000) or less in total for all treatment. The advantage of the Plastic surgery service is that more cases can be sorted out definitively as early as possible, as complex soft tissue injuries can have adequate debridement followed by primary, delayed primary, secondary closure or skin grafting and/ or a wide range of flaps. The early soft tissue repair also enhances appropriate management of bone injuries.

Conclusion

Motorcycle accidents are common in our environment and cause a variety of single and multiple injuries. Soft tissue injuries are numerous and often severe, therefore plastic and reconstructive surgical services are very necessary for prompt, appropriate and adequate management of such patients.

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Comparison of the Clinical and Chest X-ray Features of Smear Positive HIV-positive and HIV-negative Pulmonary Tuberculosis Patients on DOTS-therapy in a Tertiary Hospital in Nigeria

Osagie K S[1] *& E A Dosumu*[1]

Abstract

Objective: The objective of this study is to determine the differences in the clinical and chest x-ray features of HIV-positive and HIV-negative pulmonary tuberculosis patients on DOTS at the National Hospital Abuja.

Methodology: The clinical features of all smear positive pulmonary tuberculosis patients were recorded at diagnosis, completion of intensive phase, at fifth, seventh month and at completion of DOTS. Samples seropositive with both stat-pak and determine were considered HIV positive while Genie was used as tie-breaker. Chest x-rays were done at diagnosis, on completion intensive phase and at the end of DOTS treatment. The results were analysed using SPSS version 13.0

Results: Of the 390 patients studied heemoptysis was found in 68(36.9%) of the HIV-positive patients as against 144(75%) in the HIV-negative patients p=0.001. Lower number of the HIV-negative patients presented with night sweat at diagnosis. (HIV negative versus HIV- positive patients) was 167(84%).versus 160(87.0%) P= 0.130. There was an observed significant difference in the sputum AAFB density between the HIV positive and the HIV- negative patients. 17(7.2%) of HIV positive and 12(5.7%) of the HIV negative patients) had + sputum density (P=0.03. There was similarity in the clinical response in the two groups during the course of therapy. The mean CD4 cell count in the HIV positive patients was observed to rise progressively from (118.79 ± 78.79) cells/mm3 at diagnosis to (203 ± 85.99) cells/mm3 irrespective of whether they are on HAART or not. The chest x-rays features at diagnosis of the HIV positive patients showed fibrosis 59(29.9%), cavitory 41(22.3%), pleural effusion 10 (5.4%) and infiltrates 8(4.3%) as against fibrosis 84(40.7%), cavitary 65(31.2%), 5 (2.4%) and infiltrates 8(3.9%) in the HIV negative patients (p=0.143).

Conclusion: The significant difference in sputum AAFB density in the HIV-positive and HIV-negative patients, underscores the need for high index of suspicion of PTB in HIV-positive patient presenting with cough of >3 weeks. The less fibrosis, cavitory lesions and more infiltrates seen on chest x-rays of HIV positive patients though not statistically significant highlights the relevance of chest x-ray in the management of PTB in the HIV-positive patients.

Keywords: *comparison; Clinical features; Chest xray; HIV-positive; HIV-negative; Smear positive; PTB; DOTS.*

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Introduction

Mycobacterium tuberculosis is the causative organism of pulmonary tuberculosis. About one third of the world's population is affected [1]. Tuberculosis is the commonest opportunistic and is the single most important infectious cause of death on earth.[2] Different types of mycobacterium species have been known to cause disease in man. These include *Mycobacterium tuberculosis*, *Mycobacterium bovis* and *Mycobacterium africanum.* [3] The WHO estimated 9.2 million new cases of TB in 2006 including 4.1 million (44%) new smear positive and 0.7 million (8% of total) HIV-positive cases [4]. Nigeria currently ranks 10th among 22 high-burden TB countries.WHO estimated that 210,000 new cases of all forms of TB occurred in 2010 equivalent of 133/100,000 population [5]. The Human immunodeficiency virus (HIV) and AIDS pandemic has greatly encouraged the spread of TB [6]. The tuberculosis burden in Nigeria is not precisely known. However there has been a steady rise in notification to the WHO since 1995. In principle, only 65% of the Nigerian population could access DOTS facilities. The case detection rate is low (21%) as at 2004 and increased to 40 as at 2010 with treatment success rates averaging 59%. This has been noted to be one of the lowest among the twenty-two (22) high burden countries[7]. In the last decade, reports from studies done tuberculosis prevalence in Nigeria show an increasing trend. This includes the report of Oluboyo [8] in 1998 of 12.6% prevalence of TB in HIV positive patients, Awoyemi [9] in 2002 of a prevalence of PTB in HIV positive subjects as 32.8% .

The key to the diagnosis of tuberculosis is high index of suspicion. Often the diagnosis is entertained when there is chronic cough and chest radiograph showing upper lobe infiltrates and cavities. The immunocompetent host is likely to present typically chronic cough, hemoptysis, weight loss and upper lobe infiltrates and cavities. In contrast; immunocompromised patient may present with 'atypical' presentation.[10]

The diagnostic methods include sputum microscopy (using ZN staining and looking for AAFB), mycobacteria culture (through the use of solid medium like Lowenstein-Jensen medium or the liquid medium like Bactec 460), nucleic acid amplification, serology (Interferon Gamma Release Assay IFGRA) and radiography.

Chest Xray finding of upper lobe infiltrates on routine investigation may raise suspicion of TB and becomes the basis of further investigation to confirm TB infection in a TB suspect. Although the classic picture is that of upper lobe disease with infiltrates and cavitation in the immunocompetent host, virtually any radiologic pattern –from a normal film or solitary nodular to diffuse infiltrates, cavities can be found pulmonary tuberculosis [11]. In the presence of HIV infection, particularly in advanced HIV infection, the chest Xray may show less cavitory, infiltrates and more of lower zones lesions. Also the pattern produced on chest Xray consist of diffuse interstitial or miliary infiltrates without cavitation and often accompanied with lymphadenopathy and pleural effusion.[12, 13] Disseminated and extra-pulmonary forms of tuberculosis are more associated with advanced HIV infection.[14,15]

There is no previous comparative study on the clinical features and chest x-ray characteristics

in the HIV positive and HIV negative patients on DOTS therapy in the hospital.

Methodology; All newly diagnosed smear positive patients who are 15years and above and on DOTS therapy at the chest clinic of the National Hospital Abuja between June 2006 and February 2008 were examined according to the inclusion and exclusion criteria. Patients with acid fast bacilli on stained smears of expectorated sputum were considered to have PTB. Samples seropositive with both stat-pak and determine were considered HIV positive while. Genie was used as tie-breaker.

The clinical features and laboratory results of the HIV positive and HIV negative patients at diagnosis and at end of intensive phase, at 5th month and at end of 8th months on DOTS were compared. The chest x-ray features at diagnosis and end of treatment in the HIV positive and the HIV negative were also compared.

The results were presented in frequency distribution, means, percentages and charts. The results were analyzed using SPSS version 13.8 and subjected to statistical analysis using correlation coefficient. Chi-square was used to determine the relationship between variables.

Data analysis

Demography: total of 390 tuberculosis patients comprising 184(42.7%) HIV positive and 206(57.3%) HIV negative were studied. The mean age of the HIV positive was (30.76 ± 7.91) years and that of the HIV negative was (31.48 ± 8.9) years. The male: female ratio was 1.32: 1 (HIV positive) and 1.45: 1 (HIV negative) patients. There were 56.5%, 40.2%, 2.2% and 1.1% married, single, divorced, widows respectively in the HIV positive group as against 59.2%, 36.9%, 2.4% and 1.5% married, single, divorced, widows respectively in the HIV negative patients.

Clinical features: All patients studied had cough of greater than 3 weeks duration irrespective of their HIV status. Hemoptysis was common in both the HIV positive and HIV negative tuberculosis patients. More HIV negative patients complained of hemoptysis. This difference was statistically significant (P = 0.0001) (See table 2).Night sweat was common in HIV positive (87%) and HIV negative (84.3%) patients. The difference was not statistically significant. (P = 0.130).More HIV positive patients were anaemic at diagnosis than the HIV negative patients 81(44%) versus 78(38%). Digital clubbing was common in both groups; 125(68%) versus 138(67%) in the HIV positive and HIV negative patients respectively.The mean weight of patients at diagnosis for the HIV positive patients was (54.15± 9.37) kg and it was similar to the (54.15± 9.10) kg for the HIV negative patients.

Radiology: All 390 patients studied had a chest X-ray done and 382 were abnormal. The chest Xrays of the HIV positive patients showed less fibrosis 59(29.9%), cavitory 41(22.3%) and infiltrates 18(9.8%) as against 84(40.7%), 65(31.2%) and 13(6.3%) fibrosis, cavitory and infiltrates respectively in the HIV negative TB group.

The location of the lesions on chest Xray showed that 58.9% of the lesions were located in the lower zones of the chest Xrays of the

Table 1: *Demographic Characteristics of all Patients Studied*

Characteristics	HIV-Positive N = 184(%)	HIV-negative N = 206(%)	Total N = 390(%)
Male	105(57.1%)	122(59.2%)	227(58.2%)
Female	79(42.9%)	84(40.8%)	163(41.8%)
Total	184(100)	206(100)	390(100)
Mean ages	30.76	31.48	31.14
± SD	±7.91	± 8.9	± 8.44
Marital Status			
Married	104(58.5%)	122(59.2%)	226(58%)
Single	74(40.2%)	76 (36.9%)	150(38.5%)
Divorced	4(2.2%)	5 (2.4%)	9(2.3%)
Widow	2(1.1%)	3 (1.5%)	5(1.2%)

Table 2: *The Distribution of the Clinical Features of Patients with PTB at Diagnosis*

Dpnpjdbmgfbuvsft	IJW-Positive N = 184	IJW-Negative N = 206	Qwbmvf
Dpvhi !? 4xlt	295)211&*	317)211&*	1/361
Sputum production	184(100%)	206(100%)	0.148
Hemoptysis	68 (36.9%)	144 (75.4%)	0.001
Night sweat	160 (87.0%)	167 (84.3%)	0.130
Digital clubbing	125(68%))	128(67%)	0.136
Palor	81 (44%)	78(38%)	0.124
Mean weight (kg)	54.15	54.15	0.999
± SD	± 9.37	±9.10	

P < 0.05 is significant

HIV positive patients while 44.2% of the lesions seen on chest Xray of the HIV negative patients were located in the lower zones.

Laboratory: The patients' ESR progressively declined during the course of treatment irrespective of their HIV status. In the HIV positive patients, the ESR dropped from 117.06 ± 27.32 at diagnosis to 8.06 ± 4.65 at the end of the continuation phase while that of the HIV negative patients dropped from 113.63 ± 24.09 at diagnosis to 8.33 ± 5.00 at the end of the continuation phase.

Also observed is a progressive rise in the PCV level of all patients studied. The PCV rose from a mean PCV level of 23.53 ± 5.16 % in the HIV positive patients at diagnosis to a PCV level of 34.64 ± 5.34% at the end of the continuation phase. The observation was

Table 3: *Types of Lesions Seen on the Chest Xrays of PTB Patients Studied at Diagnosis and End of Treatment*

	At diagnosis		On completion of treatment	
Type of lesion	HIV-Positive	HIV-Negative	HIV-Positive	HIV-Positive
	N = 184(%)	N = 206(%)	N = 184(%)	N = 184(%)
Fibrosis	59 (32.1%)	84 (40.7%)	46(25%)	48(23.3%)
Cavities	41 (22.3%)	65 (31.2%)	04(2.1%)	06(2.9%)
Infiltrates	18 (9.8%)	13 (6.3%)	08(4.3%)	12(5.8%)
Patchy opacities	16(8.7%)	20(9.7%)	14(6.7%)	22(10.7%)
Fluffy exudates	11 (6.0%)	10 (4.9%)	1(0.5%)	6(2.9%)
Consolidation	10(5.4%)	6(2.9%)	3(1.6%)	4(1.9%)
Reticulonodular opacities	5(2.7%)	7(3.3%)	6(3.2%)	10(4.9%)
Honey combing	3(1.6%)	2(0.9%)	2(1%)	6(2.9%)
Streaky opacities	10(5.4%)	14((6.8%)	13(7%)	83.9%)
Hilar opacities	8(4.3%)	8(3.9%)	6(3.2%)	4(1.9%)
Normal	0 (0%)	8 (3.9%)	81(44.2%)	90(43.6%)
Total	184(100%)	206(100%)	184(100%)	206(100%)

Table 4: *Showing Laboratory Results of all the Pulmonary Tuberculosis Patients at Diagnosis*

Laboratory values	HIV POSITIVE	HIV NEGATIVE	P value
	184(%)	206(%)	
Mean PCV	23 ± 5.1	24 ±4.7	0.235
Mean ESR	117± 27.35	113±24.09	0.126
Sputum density			
+	17(9.2%)	12(5.7%)	0.030
++	138 (75%)	165(80%)	0.146
+++	29(15.8%)	29 (14.3%)	0.234

$P < 0.05$ is significant

similar in the HIV negative patients.

The CD4 cell count in the HIV positive patients was observed also to rise progressively during the course of DOTS therapy irrespective of whether they are on HAART or not.

Discussion

Clinical features

The clinical features of the tuberculosis patients who are HIV positive and negative were compared in this study. There were

Table 5: *The Course of the Symptoms of HIV Positive and HIV Negative Patients with Pulmonary Tuberculosis on DOTS*

Symptoms at the end of 2nd, 5th and 7th month on DOTS	HIV POSITIVE N = 184 (%)	HIV NEGATIVE N = 206 (%)
End of Intensive phase		
Cough	83(45.1%)	87 (39.8%)
Sputum production	76(41.3%)	71 (34.5%)
Night sweat	28(15.2%)	22 (10.7%)
Hemoptysis	20(10%)	28 (13.5%)
5th month on treatment		
Cough	15(7.3%)	18 (8.7%)
Sputum production	14(6.8%)	12 (5.8%)
Night sweat	1 (0.5%)	0(0%)
Hemoptysis	0 (0%)	0(0%)
7th month on treatment		
Cough	1 (0.5%)	1(0.4%)
Sputum production	0 (0%)	0(0%)
Night sweat	0 (0%)	0(0%)
Hemoptysis	0 (0%)	0(0%)

Table 6 *The ESR and PCV Changes Observed During the DOTS Treatment Period*

Character	HIV POSITIVE N = 184 (%)	HIV NEGATIVE N = 206(%)	P VALUE
Mean ESR ± SD			
At diagnosis	117.06 ± 27.32	113.63 ± 24.09	0.189
At end of int. phase	82.17 ± 24.91	78.57 ± 22.85	0.132
At end of 5th month	31.47 ± 14.29	31.09 ± 12.52	0.751
At end of 7th month	8.02 ± 4.65	8.33 ± 5.00	0525
Mean PCV ± SD			
At diagnosis	23.53 ± 5.16	24.31± 4.70	0.118
At end of int. phase	28.02 ± 3.36	28.35 ± 3.49	0.333
At end of 5th month	31.10 ± 4.83	31.2 ± 3.29	0.737
At end of 7th month	34.64 ± 5.34	35.22 ± 3.52	0.205

P value < 0.05 is significant

similarity in the clinical features in that common symptom like chronic cough, sputum production, night sweat and weight loss predominated in the two groups. The reason for this is due to late presentation of TB patients in our environment to the hospital leading to delay in diagnosis.[4]

Since the results from this study showed that HIV positive and HIV negative tuberculosis patients may present with similar symptoms there is the need to screen all tuberculosis patients for HIV infection and also screen all HIV positive patients for tuberculosis, thereby reinforcing the recommendation of the WHO and the IUATLD that all TB patients should be offered voluntary counseling and screening for HIV infection and HIV positive patients should be screened for tuberculosis.[5,6]

Radiology

All 390 patients studied had a chest X-ray done and 382 were abnormal.

In this study the chest Xrays of the HIV

positive tuberculosis patients showed less fibrosis, cavitation and more infiltrates while those of the HIV negative showed more of fibrosis, cavitary lesions and less infiltrat. The results were similar to the finding of Lawson[7] in a recent study in Abuja in which the radiological features of West African patients co-infected with HIV were evaluated and reported that the HIV positive group had less consolidation, apical involvement, broncho-pulmonary spread, volume loss and pleural thickening than the HIV negative patients. It is also similar to report of Nwonwu [14] in a recent study done in Abakaliki, south-eastern Nigeria.

This study shows that more HIV positive tuberculosis patients had cavitation, fibrosis and infiltrates in the mid and lower zones of the chest than the HIV negative patients. This pattern is similar to that described by earlier authors in advanced HIV infection. As stated earlier, the chest Xray features in pulmonary tuberculosis varies from normal to classic radiograph findings showing upper lobe infiltrates with cavities to atypical presentation in immuno-suppressed patients in the late stages in which there are more of lower zones infiltrates and less cavitary lesions. [15-16]

This study showed similarity in the improvement of the chest x-ray features at the end of the continuation in both the HIV positive and HIV negative. The findings from this study and the other studies mentioned above underscores the usefulness of chest x-ray in the management of pulmonary tuberculosis. This study also showed similarity in the improvement of chest x-ray features of PTB patients at completion of the DOTS therapy irrespective of the HIV status of the patients. This finding supports the use of standard DOTS therapy as an effective intervention in the treatment of PTB even in the HIV positive PTB patients.

Laboratory

Sputum smear microscopy was the diagnostic mode used in this study. Other diagnostic methods like sputum culture, nucleic acid amplification and serology are currently not available at the National Hospital, Abuja

All the 390 patients were sputum smear positive for AAFB. However, there was an observed significant difference in the sputum AAFB density between the HIV positive patients and the HIV negative patients P =0.03. This result is similar to that reported by Daniel in Sagamu. This corroborates earlier studies on clinical features in TB/HIV co-infection in which TB patients in late stage of HIV infection produce paucibacillary sputum. [17]

The result showed that HIV positive patients had a greater tendency to be anaemic than the HIV negative patients with tuberculosis. This difference is statistically significant p=0.042. The 44% found in the HIV/ positive patients is higher than 25% reported by Audu [18] in a study done in Zaria in 2004. The reason for this difference may be due to poor nutritional level of the patients in Abuja as the cost of living in Abuja is very high and may also be due to delay before presenting for treatment. It is however lower than 60% reported by Amballi [19] in HIV patients in Sagamu in 2007. Some factors suggested to be responsible for this include nutritional deficiency, intestinal parasites, tuberculosis and other opportunistic diseases, low CD4+ count and low BMI.

Clinical symptoms response

At the end of intensive phase, there was remarkable reduction in symptoms (cough, sputum production, night sweat) in both the HIV positive and HIV negative patients. See table 5. This observed improvement in the symptoms continued till the end of continuation phase (see table 6).

This is in agreement with finding of Ige [20] in Ibadan and it corroborates earlier reports by Dosumu [21] in Iwo and Erhabor [22] in Ile-Ife that DOTS is an effective strategy in the treatment of pulmonary tuberculosis. There were no significant differences in the symptoms response between the HIV positive patients and the HIV negative patients studied.

Conclusion; The clinical features and chest xray finding of HIV-positive and HIV-negative PTB patients are largely similar. Chest Xray remains a useful tool in the diagnosis and follow-up of PTB patients irrespective of the HIV status. HIV counseling and testing (HRT) should be offered to all PTB patients and all HIV positive patients with cough >3 weeks should be screened for PTB.

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Managing Post-Burn Pruritus? – A Review of Current Knowledge among Non-Burn-Specialist Doctors in Delta State, Nigeria

Abstract

Introduction: Pruritus (itching) is a common complication of burn injuries that results in extreme discomfort. There is no consensus on the treatment worldwide but there are generally accepted methods of management. While many burn care specialists in Nigeria are conversant with these methods, most non-burn care specialists and general practitioners are unaware of a significant number of these methods.

This study aims to assess the knowledge and practice of non-burn specialists, who also manage various degrees of burn injuries in our environment, with a view to finding out the deficiencies and educating them and the general public on these modalities for the overall good of patients.

Methods: A structured questionnaire was designed and 82 doctors returned the completed questionnaires and these were analyzed using IBM SPSS version 20.

Results: A vast majority of the Doctors (85.4%) used anti-histamines as first-line treatment while 4.9% would use Ondansetron. Whereas 43.9% of the respondents could not give an answer about the second-line treatment they would give for pruritus, 36.6% of them would give anti-histamines as in first-line treatment and 9.8% would give Gabapentin as second-line treatment while another 9.8% would use other medications not specified.

Conclusion: Many doctors who are not burn-care specialists do not fully understand the enormity of the problem of post-burn pruritus and consequently do not offer adequate care to patients. There is need for more education and re-orientation.

Keywords: *Post-burn pruritus, management*

[1]

Correspondence:

Introduction

Pruritus (itching) is a very common complication of burn injuries that results in extreme discomfort. Itching typically begins in the first 2 weeks after burn injury and may last for an extended period of time.[1] The incidence of persistent, post-burn pruritus is estimated to be about 87%.[2] More common predictors of itch include >40% TBSA and wounds requiring more than 3 weeks to heal.[2] Post-burn pruritus may interfere with sleep, activities of daily living and may even complicate healing when scratching damages

healing or thin epithelium and newly grafted skin.[1]

Twycross *et al*[3] proposed a classification of pruritus into the following four categories:

a. Pruritogenic: arising in the skin because of inflammation, dryness, or other skin damage.
b. Neuropathic: involving disease at any point along the afferent neurologic pathway.
c. Neurogenic: originating centrally but without evidence of neurologic pathology.
d. Psychogenic: associated with psychiatric conditions.

The pruritus associated with burn injuries is deemed to be predominantly pruritogenic but there is increasing speculation of neuropathic involvement in its pathophysiology.[4]

A proposal to classify burns pruritus into 'acute' and 'chronic' types has been put forward recently and is supported by a prospective study in a large number of adult burns victims.[5] 'Acute' itching affects the majority of patients irrespective of the depth of injury and probably relates to a period from wound closure to approximately 6 months into rehabilitation. 'Chronic' itching appears to persist in a subgroup of patients for up to 2 years after injury in survivors with deep dermal injury having undergone a number of surgical procedures and those with early post-traumatic stress disorder symptoms.[6]

The majority of literature reports have nearly exclusively associated pruritic symptoms with histamine release.[7] Histamine is abundant in the healing wound and along with a variety of other mediators including acetylcholine, leukotrienes and prostaglandins act on a subset of selective C-fibers to relay impulses onto the central nervous system (CNS).[4] Various components of the CNS have been implicated in sensory relay, including lamina I of the spinothalamic tract, thalamic and cortical areas. These are intricately involved in signal processing; nevertheless their exact roles remain to be fully elucidated.[8] Over the last few years, researches have turned to central nervous system targets in an attempt to identify an effective anti-pruritic drug (or drug therapy) in burns including the use of gabapentin[9], naltrexone[5] and ondansetron[10].

The successful treatment of post-burn pruritus should be a priority in the rehabilitation of all burn patients. There are many potential treatments available for itching, however, there is no consensus in the best approach for treating post-burn itching.[11] Nevertheless, while many burn care specialists in Nigeria are conversant with most of these methods, including those not readily available to them, most non-burn care specialists and general practitioners are unaware of a significant number of these methods. The most common pharmacologic treatment of post-burn pruritus treatment has been antihistamine therapy.[12-14] Several antihistamines have been tried with none giving complete relief in all patients, as have other non-pharmacologic methods which include use of pressure garments, silicone, laser, massage and so on.[11]

This study has therefore been directed at the study of the knowledge and practice of these non-burn specialists, who also manage various degrees of burn injuries in our environment, with a view to finding out the deficiencies and educating them and the general public on these

modalities for the overall good of patients, more so, as I am not aware of any previous, local or national study on this.

Methods

A structured questionnaire was designed, using a similar format to the one used in a UK study, assessing the physicians' attitudes and management principles in specialist burn units[7]. The questionnaire was however modified to suit the practice of a non-burn specialist working in a developing country.

The questionnaires were distributed, completed and collected at the venue of the annual general meeting (AGM) of the Nigerian Medical Association, Delta State branch, a three day event, open to all the doctors in the state.

One hundred questionnaires were distributed to consenting doctors. Eighty-two doctors returned the completed questionnaires and these were analyzed.

The performance of the respondents was assessed by scoring each respondent for appropriate answers given for the 12 survey questions assessing their knowledge about post-burn pruritus and its management (Table 3).

Data analysis was done using IBM SPSS version 20. A one sample t-test was used to compare the mean scores of selected groups of respondents. The Chi-square test was used for non-parametric tests, (Yates correction for continuity was employed when necessary). Level of significance was set a p value of < 0.05.

Results

Socio-demographics, Experience and Level of Specialization of Respondents

A total of 82 doctors participated in the survey. Majority; 71 (86.6%), were males and only 11 (13.4%) were females. Most of the respondents were already practicing for at least five years (Table 1).

Majority [34 (41.5%)], of the respondents were General practitioners, closely followed by doctors in residency training; 32 (39.0%). Specialist in fields of medicine other than Burns and Plastic surgery were in the minority; 16 (19.5%).

Respondents' Experience with Patients having Post-Burn Pruritus

Seventy two percent of the respondents were

Table 1: *Respondents' Years of Experience in Medical Practice*

Years In Practice	Frequency (%)
< 5	13 (15.9)
5 – 9	34 (41.5)
10 – 14	6 (7.3)
15 – 19	6 (7.3)
≥ 20	23 (28.0)
Total	**82 (100.0)**

Table 2: *How Often Respondents See Patients with Post-Burn Pruritus*

How Often Respondents See Patients with Burn Pruritus	Frequency (%)
RARELY	23 (28.0)
OCCASIONALLY	41 (50.0)
OFTEN	13 (15.9)
VERY OFTEN	5 (6.1)
Total	**82 (100.0)**

already seeing patients with burn pruritus. Only 23 (28%) respondents said they rarely see such patients, (Table 2).

Knowledge about Post-Burn Pruritus and It's Management

The cumulative responses to the questionnaire on post-burn pruritus are presented in figure 1.

1)	**Are children or adults more likely to be troubled by pruritus?**		
	Children: 41.5%		Adult: 26.8%
	No difference: 9.7%		Unable to answer: 22.0%
2)	**Do you have a method/tool to assess severity/frequency of pruritus in daily patent care plans?**		
	No: 90.2%	Yes: 0.0%	Unable to answer: 9.8%
3)	**Which particular time in the day/night do you think pruritus becomes more pronounced?**		
	Day: 36.6%		**Evening/Night: 48.8%**
	No difference: 2.4%		Unable to answer: 12.2%
4)	**During which part of the healing process are patients more likely to complain of pruritus?**		
	Early: 26.8%	Late: 23.2%	**Unable to Answer: 50%**
5)	**Which depth of burn injury is more likely to elicit pruritic response?**		
	Superficial partial thickness: 37.8%		Deep Dermal: 14.6%
	Full thickness: 18.3%		Unable to answer: 29.3%
6)	**Which type of wound is more likely to itch?**		
	Conservatively treated: 30.5%		Grafted: 28.0%
	No difference: 2.4%		Unable to answer: 39.1%
7)	**Do you treat patients using injections, oral or topical agents, as first line?**		
	Oral: 52.4%		Topical: 30.5%
	Injection: 4.9%		Unable to answer: 12.2%
8)	**Which oral agents are used as first line treatment for pruritus?**		
	Antihistamines: 82.9%		Gabapentin: 0.0%
	Steroids: 4.9%	Ondasetron: 4.9%	Unable to answer: 7.3%%
9)	**Which oral agents are used as second line treatment for pruritus?**		
	Antihistamines: 34.1%		Gabapentin: 7.3%
	Steroids: 11.0%	Ondasetron: 0%	**Unable to answer: 47.6%**
10)	**Which other adjunct (if any) are used for the treatment of pruritus?**		
	Psychological support: 83.2%		Massage therapy: 14.6%
	Pressure garments/ silicon therapy: 11.0%		Unable to answer: 7.3%
11)	**Do you have an anti-puritic regimen?**		
	Yes: 0%	**No: 91.5%**	Unable to answer: 8.5%
12)	**Should your medications fail to control patient's pruritus, what will you do next?**		
	Refer to a dermatologist: 25.6%		Psychotherapy: 12.2%
	Refer to a Burn/plastic surgeon: 4.9%		**Unable to answer: 57.3%**

Figure 1: *Presentation of cumulative responses to the questionnaire on burns pruritus (The most popular responses are shown in bold)*

assessing the doctors' knowledge and practice were further grouped as appropriate or inappropriate, based on available literature on the subject matter (Table 3). A score of 1 was assigned to an appropriate answer and a score of 0 was assigned to an inappropriate answer or when unable to answer. The performance of the respondents is as presented in Table 5. Their total scores ranged from 0 – 8 out of the 12 survey questions, with an average score of 4.33 + 1.69. None of them scored up to 70%. Fifty nine (72%) respondents

Table 3: *Appropriate Response to Survey Questions Assessing Knowledge about Post-burn Pruritus and it`s Treatment*

S/N	QUESTION	Appropriate Response[a]
1)	Are children or adults more likely to be troubled by pruritus?	Children[6, 11, 15]
2)	Do you have a method/tool to assess severity/frequency of pruritus in daily patient care plans?	Knowledge/ use of Itch Man Scale[7, 17] 5-point descriptive scale[7, 18] Visual Analogue Scale[7, 19]
3)	Which particular time in the day/night do you think pruritus becomes more pronounced?	Evening/ Night[2, 7]
4)	During which part of the healing process are patients more likely to complain of pruritus?	Late / proliferative phase[1, 2, 4]
5)	Which depth of burn injury is more likely to elicit pruritic response?	Deep dermal[6, 7]
6)	Which type of wound is more likely to itch?	Grafted[23]
7)	Do you treat patients using injections, oral or topical agents, as first line?	Oral[4, 7, 11- 14,]
8)	Which oral agents are used as first line treatment for pruritus?	Antihistamines[4, 7, 11-14]
9)	Which oral agents are used as second line treatment for pruritus?	Second line antihistamines, gabapentin, ondasetron, steroids[4, 7, 11-14]
10)	Which other adjunct (if any) are used for the treatment of pruritus?	Psychotherapy, pressure garments, silicon cream, massage therapy[7, 19, 29-32]
11)	Do you have an anti-puritic regimen?	Practice of a protocol specifying the steps of antipuritic regimen
12)	Should your medications fail to control patient's pruritus, what will you do next?	Refer to a burn/plastic surgeon

[a] *based on current available literature, but lack of concensus is acknowledged*

Table 4: *Distribution of Total Scores of Respondents*

Total score (% score)	Frequency (%)	CF (%)
0 (0.0)	2 (2.4)	2 (2.4)
2 (16.7)	7 (48.5)	9 (11.0)
3 (25.0)	21 (25.6)	30 (36.6)
4 (33.3)	15 (18.3)	45 (54.9)
5 (41.7)	14 (17.1)	59 (72.0)
6 (50.0)	15 (18.3)	74 (90.2)
7 (58.3)	6 (7.3)	80 (97.6)
8 (66.7)	2 (2.4)	82 (100.0)
=9 (=75.0)	0 (0.0)	
Total	**82 (100.0)**	

Table 5: *Distribution of Knowledge Scores of Respondents*

Total score (% score)	Frequency (%)	CF (%)
0 (0.0)	14 (17.1)	14 (17.1)
1 (16.7)	30 (36.6)	44 (53.7)
2 (33.3)	21 (25.6)	65 (79.3)
3 (50.0)	12 (14.6)	77 (93.9)
4 (66.7)	5 (6.1)	82 (100.0)
5 – 6 (83.3 – 100.0)	0 (0.0)	
Total	**82 (100.0)**	

representing majority, had scores of less than 50%.

The survey questions can also be grouped into two. The first six questions assessed knowledge about post-burn pruritus, while the last six questions assessed practice of its management (Table 3).

The average score for knowledge about post-burn pruritus was 1.56 + 1.12, out of the 6 question asked: with almost 80% of the respondents getting less than half of the questions correctly (Table 5).

On performance on practice, 34 (41.5%) respondents got less than half of the questions correctly, while a greater proportion of the respondents 48 (54.5%) scored at least 50% (Table 6). The average performance for practice was however below average: 2.77 + 1.14 (out of 6 questions). Relationship between respondents' knowledge about post-burns pruritus and their practice of its management.

There is no correlation between the respondents' level of knowledge about post-burn pruritus and their performance on the practice. (p=0.27). There is however a positive correlation between knowledge scores and overall performance ($p < 0.01$). Their practice scores also correlated positively with their over-all performance in the survey ($p < 0-01$).

Table 6: *Distribution of Practice Scores of Respondents*

Total score (% score)	Frequency (%)	CF (%)
0 (0.0)	4 (4.9)	4 (4.9)
1 (16.7)	5 (6.1)	9 (11.0)
2 (33.3)	25(30.5)	34 (41.5)
3 (50.0)	20 (24.4)	54 (65.9)
4 (66.7)	28 (34.1)	82 (100.0)
5 – 6 (83.3 – 100.0)	0 (0.0)	
Total	**82 (100.0)**	

Relationship between Years of Experience and Performance in Survey

The respondents were divided into 2 groups using 10 years of medical practice as a cut-off (Table 7). Majority of respondents in both groups scored less than 50%, however, a greater proportion (31.9%) of those with less than 10years of medical experience had scores of at least 50%, unlike those with at least 10 years of experience, having only 22.9% scoring

Table 7*: Relationship Between Years of Experience and Performance in Survey*

		Performance in Survey		Total
		<50%	≥50%	
Years of Experience	**< 10yrs**	**32 (68.1)**	**15 (31.9)**	**47 (100.0)**
	≥ 10yrs	**27 (77.1)**	**8 (22.9)**	**35 (100.0)**
Total		**59 (72.0)**	**23 (28)**	**82 (100.0)**

$X^2 = 0-82$; $p = 0.37$

Table 8: *Relationship between How Often Respondents see Patients with Post-burn Pruritus and Their Performance in Survey*

		Performance in Survey		Total
		<50%	≥50%	
How Often Respondents See Patients	Often	40 (67.8)	19 (32.2)	59 (100.0)
	Rarely	19 (82.6)	4 (17.4)	23 (100.0)
Total		59 (72.0)	23 (28)	82 (100.0)

$X^2_{yates} = 1.80$; $p = 0.29$

50% and above. This difference however is not statistically significant (p = 0.37).

Relationship between Level of Specialization and Performance in Survey

The average score for the respondents who are specialists (in other fields of medicine other than burns and plastic surgery) is 4.00 + 2.13, which is slightly lower than the mean total score of 4.33 for all the respondents. This difference is not statistically significant (p = 0.55).

The average test scores for the general practitioners is 4.44 + 1.52, which is greater than the mean score of 4.33, for all the respondents. This observed difference is also not statististically different (p = 0.67).

Similarly the average score computed for the doctors in residency training was 4.38 + 1.66, which is close to the mean score of 4.33, calculated for all respondents, (p = 0.88).

Relationship between How Often Respondents see patients with Post-burn pruritus and Performance in Survey

Table 8 shows a cross tabulation between how often respondent see patients with post-burn pruritus (often versus rarely) and their performance in the survey. Though both groups, performed poorly in the survey, a greater proportion of those that see these patients rarely scored below 50% compared to those who see these patients more often. (82.6% vs 67.8%). Observed difference is however not statistically significant (p = 0.29)

Discussion

Post-burn pruritus is a very common and distressing condition, the reported incidence being as high as 87% in adults and 100% in paediatric burns patients.[2, 6, 15] With the incidence so high it is no surprise that in a region with a dearth of burn-care specialists, many non-specialists are managing post-burn pruritus as often as is shown in this survey. What is regrettable is the degree of demonstrated limitation of knowledge of the pathogenesis, pathophysiology and management options for itching post-burns. In keeping with higher reported incidences in children in literature,[16] our survey shows that a higher percentage of doctors believe that pruritus post-burn is commoner in children than in adults. This is unlike the Uk-based study[7] that found more care givers claiming no difference in incidence between the adult and paediatric patients.

There is no consensus method for evaluation of the severity or even the presence or confirmation of post-burn itch and as in other reported studies,[7] our survey reflects a complete lack of evaluation methods. However, some workers have reported the use of methods such as, the 'itch man scale'[17], 5-point descriptive scale[18] and a 1-10 visual analogue scale[19]. The 'itch man scale' combines a numerical rating scale from 0 to 4 with a pictorial element to denote interference with daily activities and is used for adult and paediatric patients'. Visual analogue scales (VAS) are commonly used in nociceptive symptom assessment and comprise a horizontal line which patients intercept with a perpendicular mark to rate the intensity of their complaint. They are simple tools which are also sensitive but their main limitation is the need for good patient perceptual skills, which may vary according to age,

psychological and cognitive states.[7,20]

The majority of respondents (48.8%) in our survey believe that post-burn pruritus is most pronounced at night which is in keeping with previous reports,[1,7] followed by the respondents (31.7%) that believe it is commonest in the afternoon. The underlying reasons for the diurnal variation in pruritus intensity are unknown. The nocturnal exacerbation may relate to an enhanced inflammatory mediator release in the evening, as exemplified by an increase in nocturnal urinary leukotriene B4 in atopic dermatitis.[21] In addition, it is well recognized that the central nervous system constantly receives a wide range of excitatory and inhibitory impulses through interconnecting pathways. The cortical registration of nociceptive modalities is greatly influenced by modulations at various levels of these pathways as exemplified by the effect of transcutaneous electrical nerve stimulation (TENS) and distraction methods via segmental and descending inhibitory inputs.[4] A possible explanation for the perceived increase in pruritus in the evening is that painful impulses associated with daytime dressing changes and physical treatments are reduced in the evening making pruritic impulses more likely to register as the predominant unpleasant sensory modalities.[7]

Clinical experience illustrates that itching post-burn is a subacute and late event rather than an acute event, and as a result, the timing of the studies for treatment of burn is important '.[11] Various opinions exist in literature concerning presence and severity of itching and stage of healing of post-burn wounds. There are several reports of itch commencing as soon as wounds start to heal and coinciding with epidermal coverage.[1,7,14] A study involving 58 paediatric patients concluded that burn patients have a significant amount of pruritus within 1 month of the burn with a steady increase in the severity peaking at 6 months and a subsequent decline 1 year after burn.[22] As high as 44% of patients 7 years post-burn are affected by intractable itching for many years.[23,24] Itching during the early stages of healing is attributed to mast cell histamine release directly as part of the inflammatory response to injury and indirectly secondary to collagen formation during the proliferative stage of wound healing.[25] During the late proliferative and remodeling phases, the high prevalence of itching can be accounted for partly by mast cell histamine release, more applicable in patients with hypertrophic scars(known to have higher number of mast cells than normal tissue[7,26] and so, more prone to pruritus[27]. It is also thought that patients with deep dermal injuries may enter a phase of 'chronic' pruritus and the central nervous system is responsible for maintaining these symptoms via sensitization mechanisms.[28]

While majority of our respondents (68.4%) will not use adjuncts and no respondent had a specific anti-pruritic regimen, 5 units in the UK study[7] routinely used adjunctive measures for the relief of pruritus following burn injuries while only one unit had a specified protocol for the management of burn pruritus. Adjunctive methods in use around the world include psychological support,[7] massage therapy,[19,29] silicone therapy,[30] pressure garments[27] and transcutaneous electrical nerve stimulation (TENS)[31]. A few pruritus protocols have been published in the literature and most of them rely on a combination of

antihistamines and moisturizers.[12, 14] The protocol at the Shriners hospitals for children, Galveston is not too different and involves moisturization followed by oral diphenhydramine as the initial steps with hydroxyzine and cyproheptadine as additional agents for symptomatic relief.[32]

Conclusion

Many non-burn-care Specialists manage burn patients and patients with post-burn pruritus in Delta State, Nigeria. Most of the doctors are not conversant with the pathogenesis of post-burn pruritus and also appear not to believe or understand that the problem is real and very distressing to patients. There is need for re-orientation and more education of doctors on the severity and management of post-burn pruritus.

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Discharge against Medical Advice: Ethical and Legal Considerations

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Abstract

Introduction: It appears most healthcare workers do not have a proper understanding of the meaning of discharge against medical advice.

Aim of study: To discuss the ethical and legal implications of discharge against medical advice.

Method of study: Key words, Discharge against medical advice, ethical and legal consequences were search through various databases and search engine to identify scholarly articles and documents on the subject matter. The identified documents were reviewed for suitability for this review. The selected articles and documents were then extensively reviewed.

Results: The meaning of the concept of discharge against medical advice and the ethical and legal challenges associated with the concept has been extensively reviewed in this work.

Conclusion: There is a need to have a proper understanding of the entire concept of discharge against medical advice in order to avoid possible litigations.following albendazole treatment. However, the efficacy of albendazole was poor against Trichuris trichiura infection.

Key words: *Discharge against medical advice, ethical considerations, legal considerations, litigations*

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Introduction

There are often challenges when a patient decides to leave the hospital before the caregiver in charge of his care formally discharges him. Under this circumstance, there are various ways he/she may leave the hospital. At times the patient may leave the hospital premises without informing the caregiver. At other times, the patient may inform the caregiver that he is leaving the hospital but may be unwilling to engage in any other discussion with the caregiver before leaving the hospital. In some instances however, the patient informs the caregiver that he needs to leave the hospital even when the caregiver explains that the patient is not fit for discharge. The caregiver, should under this circumstance, explain the consequences of such discharge without the recommendation

of the caregiver. Ideally, the patient should be made to sign the relevant forms pertaining to discharge against medical advice. The caregiver should explain clearly to the patient the implications of his decision to leave the hospital against medical advice and the patient should demonstrate understanding of such discussion before signing the document. Where the patient is not made to understand the full implication of leaving the hospital against advice, such discharge has not complied with criteria for a proper discharge against medical advice.[1-10] To the extent of non-compliance with the criteria for a proper discharge against medical advice, the caregiver may not have a good defense in the event of a litigation relating to the discharge.[3] Most hospitals have protocols for handling cases of discharge against medical advice.[2,3,5] However, it seems attention is paid mainly to the aspect where the patient signs the forms whether indeed he/she understands the concept or implication of discharge against medical advice. A mere signature on the form without adequate explanation to the patient about the implication of discharging him/herself against medical advice is not a valid discharge against medical advice.[5,10] Patient's understanding of the entire process of discharge against medical advice is a critical requirement that may grant the caregiver a defense in the event of litigations. What then is discharge against medical advice? Discharge against medical advice is a situation when a patient/client who is receiving treatment decides to leave the facility where such care is being rendered for whatever reason but against the informed advice of the caregiver.[1-3,5,9] Several authors have reported varying rates of discharges against medical advice. Udosen *et al* reported a rate of 2.6% with a Male/Female ratio of 2:1.[2] However, the rates depend on the type of cases, location of practice and peculiarities of the patients. In Ohanaka's study, trauma accounted for the highest rates of discharges against medical advice.[7] Thus, the rate of discharge against medical advice may be as high as 20% and may equally be as low as under 1% depending on a number of factors.[5] There may be possible litigations if the process for discharge against medical advice is not properly handled.[5]

The purpose of this paper is to consider the ethical and legal aspects of discharge against medical advice and a discussion on the proper process for handling cases of discharge against medical advice. This is with a view to minimizing chances of litigations related to improper handling of discharge against medical advice.

Meaning of discharge against medical advice and other related terms Discharge against medical advice: Discharge against medical advice implies a situation where a patient who is receiving treatment in a health facility demands that he or she needs to leave the hospital even when the authorized person in charge of his or her treatment duly informs the individual that he/she is not fit to be discharged at the time he/she is requesting for discharge. For it to be a proper discharge against medical advice, the process has to satisfy certain criteria:[1-3,9,10]

1. The patient in question is on admission in a medical facility.
2. The patient is receiving adequate and standard care.
3. The patient is not fit for discharge yet

considering a number of factors.

4. The patient is fully aware of his health status, the various management options and that he receiving adequate and standard care for his condition in a conducive environment.
5. The patient is aware of the implications of and consequences of not receiving the standard care for his condition.
6. The patient make a written request to be discharged against the advice of the person in charge of his care or his authorized representative even after he has been duly informed of the implications and consequences (including death) of discharge against medical advice.
7. The patient demonstrates a full understanding of the discussion and yet insists that he should be discharged against the advice of the care givers.
8. Lastly, the patient or the authorized representative signs the relevant informed documents and leaves the facility.

The patient may or may not give reasons for his decision.

Definition of terms

For a proper and a comprehensive discuss of the subject, it is important at this early stage to define some terms that are closely related to DAMA, but are readily distinguishable.[4-6] These are:

- **Leaving before examination**: A situation where a patient who has already registered to obtain care in a medical facility leaves the facility (usually without informing the physician) before he is examined with a view to commencing treatment usually at the accident and emergency unit. It is important that the attending healthcare worker notes when the patient was last seen at the facility and attempts made to locate him/her. The documented information may become relevant particularly if the patient in question suffers harm after leaving the health facility or becomes involved in a criminal matter or is found dead soon after s/he left the health facility.
- **Escape:** A situation where a patient/client runs away from a health facility against some form of physical restraints. Most patients in this category have some form of mental impairment while others may attempt to escape because they owe bills in the hospital. If the patient must be pursued and brought back to the hospital by the security personnel, this must be done with reasonable force. In addition, the action of the patient must be immediately documented in his case file and reported to the relevant authorities (including the police) making specific mention of the time and mode of escape.
- **Elopement and absconding:** Elopement and absconding are sometimes used interchangeably by some authorities while others think there is a difference in the terms. Basically, "Absconded" means that the patient has left the hospital without permission or information and is not traceable within the hospital premises. This is a very serious situation and calls for immediate information to the police and the relatives. It is found mainly in psychiatric wards even though it may also happen in other wards. For the authors

that distinguish the terms, it is elopement where there was really no reason why the patient should leave the hospital and is absconding when there may be an identifiable reason or when it occurs in a psychiatric ward.[3-6] An identifiable reason in this sense may be that the patient owes hospital bills. The patient may also owe other patients on the ward or cases of theft are being investigated on the ward. Such patients may patients may abscond from the ward so they are not made to pay for what they owe or in order not to be caught with stolen items on the ward. It is also a common finding amongst psychiatric patients. Thus, there seems to be a subtle difference between elopement and absconding. It should be clearly documented when last the patient was seen on the ward while making the report to the police and other relevant persons.

In any form of this situation of leaving hospital without authorization, it is important to inform the security agents because of possibility of theft, protection against malpractice suit, and such persons being investigated for criminal charges or harm/death results.

Why do patients discharge against medical advice?

Several reasons have been adduced by various authors why patients discharge against medical advice.[7-14] Some reasons commonly advanced are family challenges/emergencies, personal obligations, feeling bored, feeling well enough to leave, patients expected a shorter stay, patients are not improving and not receiving adequate nursing/medical care, preference for another hospital, beliefs that the condition was terminal, dislike of the hospital environment and not wanting to be used for learning/teaching purposes or for financial difficulties. Psychiatric, emergency and paediatric cases seem to have higher incidences of discharges against medical advice. [10,11,13,]

There have been instances where a doctor in a government hospital tells a patient to ask for discharge against medical advice so that such a patient can be cared for in the doctor's private clinic.[15] This action is considered gross misconduct in a professional respect.[16] Some studies have also implicated some nurses particularly in paediatric wards encouraging mothers to discharge their children against medical advice hiding under the guise of reducing work load on the ward.[17]

However, with a proper analysis of reasons adduced for discharges against medical advice, is been found that lack of adequate communication between caregivers and the patients seems to be the major underlying factor in most cases. [9,12]

Interplay between doctrine of informed consent/refusal and discharge against medical advice: ethical considerations

Informed consent (or informed refusal) is one of the very core values in medical ethics and occasionally poses a challenge for the healthcare provider where the exercise of such rights by the patient is deemed by the caregiver to portend danger for the patient. Thus, in some instances, the principle of beneficence may be pitched against patient's right to either accept or refuse treatment but patients' wish should prevail while considering the

Table 1: Summary of studies on the efficacy of anthelminthic drugs against soil-transmitted helminth infections in school children in sub-Saharan Africa

Country	Type of Study	Drug used	Hookworm			A. lumbricoides			T. trichiura			Post-treatment assessment	Reference
			P/P (%)	CR (%)	ERR (%)	P/P (%)	CR (%)	ERR (%)	P/P (%)	CR (%)	ERR (%)		
Ethiopia	CI	ALB	NA	84.2	95.0	NA	83.9	96.3	NA	NA	NA	NA	Adugna et al., 2007
		MEB	NA	83.5	94.2	NA	90.6	96.7	NA	NA	NA	NA	
Ethiopia	RCT	MEB	NA	NA	NA	NA	NA	NA	NA	89.8	99.1	NA	Legesse et al., 2004
		ALB	NA	NA	NA	NA	NA	NA	NA	17.1	69.8	NA	
South Africa	CI	ALB	3.1/0.0	100	NA	29.5/4.7	84.1	NA	51.9/38.0	26.8	NA	16 weeks	Jinabhai et al., 2001
South Africa	CI	ALB	59.4/0.0	100	NA	58.9/17.4	68.9	NA	83.6/61.5	26.4	NA	12 months	Taylor et al., 2001
South Africa	CI	ALB	NA	NA	NA	NA	NA	NA	NA	23.0	96.8	NA	Adams et al., 2004
South Africa	CI	ALB	82.9/17.6	78.8	93.2	22.0/0.8	96.4	97.7	59.8/52.2	12.7	24.8	3 weeks	Saathoff et al.2004
Tanzania	RCT	MEB	NA	NA	68.0	NA	>96.0	>95.0	NA	23.3	>80.0	4 weeks	Albonico et al., 2002
		PY-OX	NA	NA	67.0	NA	>96.0	>95.0	NA	35.1	>80.0	4 weeks	
Tanzania	CI	ALB	61.0/11.0	82.0	97.6	NA	NA	NA	NA	NA	NA	6 weeks	Guyatt et al., 2001
Tanzania	CI	ALB	45.6/11.9	73.9	NA	0.9/0.7	22.2	NA	4.8/0.7	85.4	NA	8 months	Massa et al.,2009
Tanzania	RCT	MEB+LEV	94.0/71.8	26.1	88.7	62.0/1.4	98.5	99.1	93.1/74.5	22.9	85.0	3 weeks	Albonico et al., 2003
		LEV	96.2/87.6	11.9	61.3	59.5/5.7	91.2	98.5	93.8/90.0	9.6	41.5	3 weeks	
		MEB	94.9/91.5	7.6	52.1	59.7/3.0	96.5	99.0	90.7/75.0	22.9	81.0	3 weeks	
Uganda	CI	ALB	50.9/10.7	79.0	92.9	2.8/0.6	78.6	NA	2.2/1.6	27.3	NA	2 years	Kabateriene et al,2007
Kenya	CI	MEB	NA	50.0	66.3	NA	79.6	NA	60.6	NA	NA	6 months	Muchiri et al., 2001
		ALB	NA	92.4	96.7	NA	83.5	NA	67.8	NA	NA	6months	
Kenya	CI	ALB	16.7/ 0.2	98.8	NA	1.6/0.0	100	NA	0.8/0.6	25.0	NA	8 weeks	Kihara et al., 2007

CI=Chemotherapeutic intervention; RCT=Randomized controlled trial; MEB=Mebendazole; ALB=Albendazole; LEV=Levamisole; PY-OX=Pyrantel oxantel; P/P= Pre/post treatment prevalence; CR= Cure rate; ERR= Egg reduction rate; NA= not accessible/not determined

exceptions.[18-27] The potency of the doctrine of informed consent or informed refusal was succinctly captured in the words of Lord Justice Cardozo in 1914 in the case Schoendorff v Society of New York Hospital when he said "Every human being of adult years and sound mind has a right to determine what shall be done with his own body; and a surgeon who performs an operation without his patient's consent commits an assault...."[22] The doctrine of informed consent/refusal was similarly strengthened by the United States Supreme Court in Cruzan decision and recently by the Nigerian Supreme Court in the case of Nigeria medical and dental practitioners' disciplinary tribunal v Okonkwo.[26,27] This principle of informed consent/refusal derives its breath of life from the principle of patient's autonomy. [22]

Discharge against medical advice: a process and not a mere signature

The physician ought to know that discharge against medical advice is a process and not a mere signature. The literature is replete with cases where caregivers were found liable because the process of discharge against medical advice was not properly handled.[28-35] As with informed consent, informed refusal of care is a process, not merely a signature on a "DAMA" form but a process[28,29] Consequently, for it to be a proper withdrawal of consent, the following conditions should be satisfied: (1) the patient's withdrawal of consent is fully informed with respect to risks and alternatives; (2) the patient possesses the mental competency to make a reasoned decision on the basis of adequate information; and (3) the patient does not meet the state standard for involuntary psychiatric hospitalization or any other form of involuntary admission. The medical doctors should recognize that forms signed by a patient who is leaving against medical advice that purports to exonerate the hospital and its staff in the event of an untoward consequence are meaningless, worthless and against public policy and have no legal protective value neither can it be a royal road to legal immunity once the due process of discharge against medical advice has been jettisoned.[28-30] In Battenfeld v. Gregory, the jury returned a verdict for the plaintiff and found that the failure to explain the risks of leaving against medical advice was not excused by the patient's execution of an AMA form.[30] In Canterbury v. Spence, the court held "ideally, a healthcare provider should disclose the benefits, risks and side effects of the treatment in addition to the alternatives to the treatment and the consequences of no treatment".[33,36]

While the documentation may be done in the body of the case file, Henson et al found that when healthcare providers used detailed against medical advice forms, physician documentation improved.[31] The documentation should include the following:

Ascertain decision making capacity: The physician must be certain that the patient seeking discharge against medical advice has appropriate decisional capacity. Who is the competent adult? The answer is not clear cut but demands a lot of reasonableness on the part of the physician. The services of a mental physician maybe required when there is doubt about decisional capacity of patients. In emergency situations, physicians must promptly assess whether a patient is capable of making a decision.[21,28,29,38,39]

Assess patient's values/applications for the situation at hand: The physician should assess and document the patient's values/applications for the situation at hand.

Address patient's concerns: Reasonable attempt must be made to address patient's concern and reasons for wanting to leave. Studies have shown that if there is a deep concern to determine why the patient plans to leave against medical advice, most patients would open up to verbalize their concerns. With adequate discussion and empathy on the part of the care givers, most patients would reverse their decision to discharge against medical advice.[5,6,12,37-39] This duty on the part of the care givers borders more on ethical considerations and demonstrates conscientious application of the Hippocratic Oath.

Inform patients of risks DAMA: The patient should be properly informed about the risk of discharge against medical advice even the risk of possible death depending on the severity of the ailment.[28,29,32-34,38]

Inform other parties when appropriate: In some cases, it may be pertinent to inform family members or the next of kin, hospital management and the police about the patient's decision to discharge against medical advice but consider the appropriateness of doing so.

Consider alternative treatments and compromises: When a patient has declined a particular form of treatment, the physician should be willing to consider alternatives and compromises.[20] For example, if an orthopaedic surgeon offers open reduction and internal fixation for a tibia fracture and the patient declines this method of treatment, the surgeon may consider use of plaster of paris or any other method of closed reduction and immobilization after explaining the implications to the patient.

Provide appropriate care within the scope of what the patient accepted: This sounds controversial but this should be the practice. A patient that has an open fracture may refuse open reduction and internal fixation. But this patient has not said his wounds should not be dressed. The patient has not declined relief of pain. And the patient has not said he does not want tetanus prophylaxis. The physician should be able to draw that reasonable line no matter how thin it seems, to know exactly what the patient refuses or accepts.

Avoid punitive statements and scare tactics: While it is acceptable to explain consequences of discharge against medical advice to the patient, it is totally unacceptable and in fact reprehensible for a physician or any care giver for that matter to use punitive statements and scare tactics. If this is done, it can grant a ground for litigation.[2,28,29,38]

Inform patient that he can always come back: An erroneous practice in most healthcare facilities is the belief that once a patient has discharged against medical advice then such patient cannot come back to the same health facility. The patient who has so discharged himself against medical advice has the right to come back to the same facility at any time. [28,29,38] And this position is also clearly described in the code of conduct for physicians in Nigeria.[40] Accepting such patient back to continue care should be without prejudice to the initial activities that led to the request by the patient for discharge against medical advice. It should be noted also that informed consent and informed refusal are both

dynamic and ambulatory.

Document informed refusal discussion/outcome: The hallmark of the process of handling cases of discharge against medical advice is to have appropriate and detailed documentations of all the discussions regarding informed refusal of treatment and the outcome of such discussion. The documentation must not be nebulous or ambiguous.[5,28,29,31,38]

Consider telephone follow up: For very critical cases, physicians are enjoined to have a telephone follow up to ascertain the state of health of the patient after he had discharged against medical advice from the facility particularly if that patient had indicated that he was going to another facility to continue care.[41]

Various forms of documentations and forms for discharge against medical advice have been designed.[42]

A typical documentation which summarizes the DAMA process above and which should be signed by the physician should take this format:

I have examined _____ and I judge that he has appropriate decisional capacity. I have informed him of the risks of refusing medical care, including potential risks of _____. He understands these risks and voluntarily chooses to refuse medical care at this time. I have offered alternatives including _____. He chooses to _____. I invited him to return at any time for further treatment.

A form to be signed by the patient, the doctor and a witness may be designed with the following format:

This document is to certify that I am leaving this hospital or health care center upon my own free will. In doing so I hereby release this hospital or health care center and the attending physician from any and all claims that I may hereafter make. I understand that further care has been recommended and that my condition may worsen or lead to other problems, causing me further bodily injury, illness, or even death if care is not rendered. I further certify that the medical staff has fully explained to me the risk that I am taking in leaving against medical advice.

Additional notes:

Risks of refusal of medical care:

We invite you to return for medical care at any time, should you decide to consent to treatment.

Signed:_____

Date_____

Witnessed:_____

In the accident and emergency room, the following format may be used:

I acknowledge that my medical condition has been evaluated and fully explained to me to my satisfaction by the Emergency Department physician or other qualified person and/or my attending physician. The discussion included a full explanation of medical benefits to be anticipated from further examination and/or treatment and the potential risk to my medical condition resulting from refusal of further medical examination and/or treatment, including _____. Nevertheless, I hereby refuse to consent to further examination, or treatment of my medical condition.

I hereby release ___(institution) and my physicians from ALL liability and will protect them from all claims made by anyone that may relate to my refusal of medical examination and/or treatment. I understand that I am

encouraged to return for further treatment if I choose to. _ _____

Signature of patient or legally responsible individual signing on patient's behalf Witness

_____ _____

Relationship to patient Date and time[42]

Cases involving incompetent adults and minors: If the adult is incompetent, then a guardian or next of kin can take decisions that will be in the best interest of the patient. Where such decisions are not in the best interests of the patient, then peculiar challenges will need to be handled. For example, if a patient, who was involved in a road traffic accident, became unconscious and has a fracture that requires open reduction and internal fixation and the next of kin wants to discharge the patient to use traditional bone setters, what should the doctor do? The current practice in Nigeria is that the doctor will oblige the next of kin. But this author submits that this position is wrong and ought to be challenged. The hospital and its agents through the instrumentality of the courts should be able to take decisions that will be in the best interest of the unconscious patient. But in doing this, certain criteria should be satisfied.[43] Firstly, this patient is incapable of consenting. Secondly, the medical practitioner who seeks to give the treatment considers the treatment necessary to meet an imminent risk to life or health of the person and that consideration is supported in writing by another medical practitioner who has personally examined the patient (unless in the circumstances it is not practicable to obtain such an opinion). And thirdly, the adult person, has not, to the medical practitioner's knowledge, previously refused to consent to the treatment. But there is a challenge. Who pays for the blood transfusion and the surgery? This will require a functioning strong health insurance system to be able to tackle the challenges.

Minors present peculiar challenges. For the purposes of informed refusal, minors can be categorized into various groups:

Minors indeed: For minors indeed, the practice in Nigeria today is that the parents take decisions for the minors. It is submitted that this is wrong. Where a decision is adjudged to be harmful to the minor and repugnant to natural justice, a clear cut procedure should be defined where the hospital agents or the courts as the case may be can take decisions that will be in the best interest of the minor. Under the doctrine of *Parens Patriae (*refers to the State's interest in the well being of the child), the physicians can and should treat emergency medical conditions of minors, even if the parents object.[23,24] In effect, on religious grounds, an adult may chose to become a martyr but should not be allowed by law to make his child to become a martyr as well. This doctrine appears to be silent in Nigeria.

Emancipated minors: These are minors who have been married, who live independently of their parents or who are in the military. Emancipated minors may consent to or refuse their own medical care.[25]

Mature minors: Mature minors are those who determined by a court to be intellectually and emotionally mature enough to comprehend risks and benefits of the proposed treatment and to that extent are able to consent to or

refuse their own medical care.

Can DAMA be refused?

DAMA can be refused under certain circumstance e.g. cases of infectious diseases like tuberculosis. In an American case, a successful claim was brought against a hospital by a lady who contracted tuberculosis in a dormitory from a tuberculosis patient who ordinary should be on admission in the hospital but was allowed to exercise her right to seek discharge against medical advice.[18] Also, if a patient is being investigated for a criminal matter or was already serving a jail term before he was brought to the hospital, then that patient may be unable to exercise his right in seeking discharge against medical advice. In addition, psychiatric patients (particularly the violent ones and those that have suicidal tendencies), particularly those that are on involuntary confinement may also not be allowed to obtain discharge against medical advice. Lastly, certain laws may also define categories of patients that should not be allowed to discharge themselves against medical advice.

Common errors that may lead to litigations

Inappropriate management of the process of discharge against medical advice may lead to litigations. One of the ways a physician minimizes the chances of litigation is to be aware of the common errors that could lead to litigation with respect to discharge against medical advice and strive at all times to avoid such errors. Inappropriate documentations and application of vital signs can give a ground for litigation. For example, if a patient's packed cell volume is 10% following a road traffic accident, then it is very unlikely that such a patient will be logical in his decisions. Another error that is very common is failure to involve the responsible doctor. Failure to complete the DAMA form and failure to insist that the patient signs the DAMA form before leaving the healthcare facility are common errors that may also lead to litigations. Another common error is failure to clearly document the DAMA process and the outcome of the interaction with the patient in the case note. It is an error also not to inform patient in very clear terms of the potential risks of the decision to obtain a discharge against medical advice. Failure to ascertain patient's decisional capacity is also a common error that can lead to litigation. Failure to inform the family members of the patient's decision to leave against medical advice is a potential issue for litigation.. Another common error is failure to note when the patient left the facility after taking the decision to obtain discharge against medical advice. It is most critical to note the time the patient left the unit in case such a patient were to be found dead, suffers a major morbidity or was involved in a crime after leaving the hospital. The commonest error perhaps is failure to attend to the patient who has come back to the same facility after a previous discharge against medical advice. This is a great error and must be corrected. If this caveat is not taken seriously, then it is a potential hot spot for litigation. Failure to get a witness during the DAMA process is also a potential focus for possible litigation.

Defences for the doctor

A sound knowledge of the common errors and

concerted efforts to avoid the errors provides the best defense for the medical practitioner.

A patient may refuse to sign the dama form – what next?

There may be occasions where the patient seeking discharge against medical advice refuses to sign the relevant DAMA forms. Under the circumstance, the doctor is not expected to compel the patient to sign. But there are steps the doctor must take in order to have a defense. First get a witness who will observe the interactions between the doctor and the patient. Ensure that there is adequate documentation. Inform the hospital authority and the hospital security outfit. Depending on the nature of the case and the peculiar attributes of the patient, one may need to inform the police.

Conclusion/recommendations

There is no substitute for good clinical care and thorough documentation. Before discharging a patient "against medical advice," a physician should ensure that the patient is mentally competent, fully informed, and does not meet the criteria for involuntary psychiatric hospitalization or any other form of involuntary admission. Once the physician is diligent enough to ensure that all these parameters are in place, then litigations related to discharges against medical advice can be reduced to a minimum.

It is recommended that medical ethics be emphasized in medical school curriculum Nigeria so that right from the medical school days, the medical doctors will be fully aware of the import of discharge against medical advice. Medical doctors should have training in medical ethics from time to time so they are continuously abreast of the entire concept of discharge against medical advice. It is also recommended that doctors must always have adequate documentations with regard to their interactions with patients particularly when it bothers on discharge against medical advice.

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Respiratory Health Effects of Occupational Exposure to Flour Dust among Flour Mill Workers in Edo and Delta States

Ibekwe[1]

Abstract

Introduction: The study was carried out to assess the level of suspended particulate matter (dust) in the work environment of flour mills in Edo and Delta States and to ascertain the respiratory health effect of occupational exposure to flour dust by comparing the prevalence of respiratory symptoms amongst these flour mill workers to that of an unexposed group.

Methods: Comparative cross-sectional study designed was utilized for the study and it was carried out over a period of six months, (Nov 2010 to May 2011) among 200 flour mill workers and 200 hospital workers in Edo and Delta states. A modified Medical Research Council (MRC) questionnaire which was interviewer administered and Haz dust particulate monitor was used to collect data. Data analysis was carried out using SPSS version 17.

Results: The level of (dust) suspended particulate matter in the work environment of the flour mills was 1.08mg/m3, whereas in the control site it was 0.03mg/m3,this was statistically significant ($p < 0.015$). Also the prevalence of all the symptoms was higher among the flour mill workers compared with that of an unexposed group, and this was statistically significant for most of the symptoms ($p < 0.001$).

Conclusion: The level of suspended particulate matter in the work environment of the flour mills exceeded the set limits by the regulatory body in the country, hence the need for the management of the flour mills to put in place better dust control measures as well as carry out regular medical checks to assess the health of the workers.

Key words: *Respiratory Symptoms; Flour Mill Workers; Edo and Delta States*

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Introduction

Flour dust is hazardous to health; it is an asthmagen, known to cause sensitization, allergic rhinitis and occupational asthma among bakers and millers.[1,2]When inhaled grain dust can affect the respiratory tract in a variety of ways, it can cause a wide range of acute and chronic respiratory illnesses including allergic rhinitis, bronchial asthma, bronchitis, bronchiolitis, emphysema etc. It can also affect other systems and organs in the body resulting in skin rashes, eye irritations, etc.[3,4] In the United Kingdom, flour and grain

dust are the second most commonly cited agent associated with occupational airway disease[5,6]

In the year 2000, Health safety and Executives (HSE) estimated that between 1,500 and 3,000 persons developed occupational respiratory disorders from grain/flour dust annually, rising to 7,000 cases per year if respiratory disorders made worse by work is included.[5,7] The cost of occupational airway disease resulting from grain/flour dust is estimated to be £ 1.1 billion over ten years, i.e N27.5 billion in a year. The cost can be significant for the sufferer; there is ill health, as well as change or loss of employment. Employers loose valued workers and face the prospects of litigation, while the society bears the cost of social security benefits and loss revenue from income tax.[8,9] With increasing industrialization and urbanization in developing countries, there has been an attendant proliferation of fast food and bakery industries nationwide. Meanwhile very few studies have been carried out to investigate the respiratory health of workers in grain/flour producing and flour using sectors in Nigeria. The study was therefore carried out to determine the level of suspended particulate matter (dust) in the work environment of flour mills in Edo and Delta States and to ascertain the respiratory health effects of occupational exposure by comparing the prevalence of respiratory symptoms amongst these flour mill workers to that of an unexposed group.

Materials & Methods

The study was carried out in two agro-industrial complexes located in Edo and Delta states. Both are located in the tropical rain forest belt. A comparative cross-sectional study design was utilized for the study which was conducted over a period of six months (Nov 2010 to May 2011). A sample size of 125 was estimated using formular for comparative study,[11] however there were a total of 200 flour dust exposed workers in both flour mill and all were selected for the study. Simple random sampling technique was used to select 200 junior staff of the University of Benin teaching hospital. The exposed were flour dust exposed workers who had been in continuous employment in both flour mills for at least one year preceding the study. The controls were the unexposed hospital workers who are of the same socio-economic class as the flour dust exposed workers. The exposed and the controls were matched for age (within a 10-year range), sex and height (within 10cm range) on a group frequency-matching techniques to ensure that they were comparable and thus to avoid the confounding effects of age, sex and height in lung function measurements.[12] All flourmill workers in both companies who had been in continuous employment in the grain/flour industry for at least one year preceding the study were included for the study as well as all junior staff of UBTH who had been in continuous employment for at least one year preceding the study. The participants in the unexposed group were selected using simple random sampling technique from a list of junior staff in the technical department of UBTH. Data was collected using Modified Medical Research Council questionnaire and hand held spirometer.[13] The questionnaire was pre-tested at Juno foods a cereal manufacturing company. Data was also collected using Haz dust particulate monitor, model number HD-

1000. Sampling was carried out in 5 selected locations in each of the industries and these were areas of high level of dust concentration in the industries. Data analysis was carried out with SPSS version 17.0, and the data was presented in percentages, proportion and tables. Where it was applicable analysis was carried out with chi-square test, t-test, z-test and anova. The level of significance was set at $p < 0.05$. Ethical clearance was obtained from the ethics and research Committee of University of Benin Teaching Hospital, Benin before the commencement of the study. Permission to conduct the study was obtained from the management of the various flour mills. Written informed consent was also obtained from the participants after full explanation that their confidentiality was assured.

Results

Flour dust exposed workers in both flour mills were 200 and all were selected for the study. A control group made up of 200 junior staff of the University of Benin Teaching Hospital, matched for age, sex and height with the flour mill workers also participated in the study. All the flour mill respondents were males; as a result only male controls were recruited for the survey. The mean age ± SD of flour mill respondents was 39.8 ±10.05 years, while that of the unexposed group was 39.9 ±9.94 years.

Table 1: Respondent's demographic characteristics

Socio-demographic Variable	Flour mill workers N = 200 n (%)	Unexposed group N = 200 n(%)	Total N N = 400		P value
Age (year)					
15 – 24	14 (7.0)	11 (5.5)	25 (6.2)		
25 – 34	46 (23.0)	49 (24.5)	95 (23.8)		
35 – 44	70 (35.0)	69 (34.5)	39 (34.8)	$\beta^3 = 0.502$	0.973
45 – 54	58 (29.0)	58 (29.0)	116 (29.0)		
55 – 64	12 (6.0)	13 (6.5)	25 (6.2)		
Mean age ±S.D	39.8 ±10.05	39.9 ± 9.94	39.9 ± 9.99	**t-test** = - 0.140	0.889
Height (cm)					
Mean ±S.D	172 .79 ±7.54	172.90 ±7.24	172.84 ±7.38	**t- test** = -0.142	0.887
Education					
None	3 (1.5)	0 (0.0)	3 (0.8)		
Primary	58 (29.0)	57 (28.5)	115 (28.7)	$x^2 = 28.001$**	<0.001*
Secondary	121 (60.5)	137 (68.5)	258 (64.5)		
Tertiary	18 (9.0)	6 (3.0)	24 (6.0)		
Marital Status					
Single	44 (22.0)	37 (18.5)	81 (20.2)	$\beta^3 = 0.706$**	0.684
Married	155 (77.5)	162 (81.0)	317 (79.3)		
Divorced	1 (0.5)	1 (0.5)	2 (0.5)		
Duration of employment (year)					
< 5	57 (28.5)	74 (37.0)	131 (32.8)		
≥ 5-10	54 (27.0)	52 (26.0)	106 (26.5)	β^3 **test** = 3.624	0.163
> 10	89 (44.5)	74 (37.0)	163 (40.8)		
Mean ± S.D	10.00±2.0	10.00 ±3.0	10.00 ±2.0	**t-test** = 0.794	0.427

❖ * *Significant at p < 0.05* ** *fisher's exact*

Table 2: Assessment of Particulate Concentrations in air at flour mill and control site

Parameter	Flour mill Site	Control Site	t-test	P value	National ambient air quality std.
Total suspended particulate (mg/m^3)					
Mean ± SEM	1.08±0.9	0.03±0.007	1.852	0.015*	0.250
Range	0.23-3.05	0.00-0.05			

**Significant at $p < 0.05$*

Table 3: Prevalence of Respiratory Symptoms among exposed and unexposed respondents

Respiratory Symptoms	Flour mill workers (n = 200) n (%)	Unexposed group (n = 200) n (%)	Total N (N = 400) n (%)	β^3 test	P value	Prevalence rates (PR)	95% C.I.
Cough	100 (50.0)	23 (11.5)	123 (30.8)	69.608	<0.001*	7.696	4.597 – 12.884
Sputum production	56 (28.0)	10 (5.0)	66 (16.5)	38.396	<0.001*	7.389	3.644 – 14.982
Wheeze	25 (12.5)	17 (8.5)	42 (10.5)	1.703	0.192	1.538	0.803 – 2.946
Breathlessness	33 (16.5)	5 (2.5)	38 (9.5)	22.797	<0.001*	7.707	2.942 – 20.188
Nasal discharge	35 (17.5)	26 (13.0)	61 (15.2)	1.567	0.211	1.420	0.819 – 2.461

** Significant at $P < 0.05$* *Multiple responses*

Seventy (35.0%) of the flour mill respondents and 69 (34.5%) of the Unexposed respondents were in the 35 – 44 year age group respectively. There were more single respondents among the flour mill workers 44 (22.0%) than in the unexposed group 37 (18.5%), but in the two groups majority of the respondents were married. This difference was not statistically significant. One hundred and twenty one (60.5%) of the flour mill workers and 137 (68.5%) of the unexposed respondents have completed their secondary education, but

Table 4: Prevalence of Respiratory symptoms among Non-smoking respondents

	Non Smokers				
Respiratory Symptoms	Flour mill workers (n = 155)	Unexposed group (n= 130)	Total (n=285)	Test statistics (β^{3l}test)	P value
Cough	80(51.6)	17 (17.3)	97(34.0)	46.765	<0.001*
Sputum production	43(27.7)	8 (6.2)	51(17.1)	22.427	<0.001*
Wheeze	19 (12.3)	12(9.2)	31(10.9)	0.668	0.450
Breathlessness	23 (14.8)	3(2.3)	26(9.1)	13.391**	<0.001*
Nasal discharge	28(18.1)	17(13.1)	45(15.8)	1.323	0.260

*significant at p < 0.05 ** Fisher's exact

with respect to tertiary education a greater proportion 18(9.0%) of the flour mill respondents have completed theirs' compared with 6(3.0) %) from the unexposed group. This difference was significant across the groups. With respect to duration of employment, 89 (44.5%) of the flour mill workers had spent greater than 10 years in employment compared to 77 (37.0%) among the unexposed group. This difference was not significant across the groups. (Table 1)

Table 2 shows the particulate concentration in air at the flour mills and control site. The mean total suspended particulate concentration in the flour mill site is 1.08mg/m^3, this concentration is significantly (p < 0.015) higher in the flour mills than in the control site.

The prevalence of all the respiratory symptoms was higher among the flour mill workers compared to the unexposed group, and this was statistically significant (p < 0.001) for most of the symptoms. The most prevalent symptom among the flour mill group was cough (50.0%), and the odds of flour mill workers experiencing most of the symptoms were at least 7 times higher compared to the unexposed group. (Table 3)

Among the non-smoking respondents the prevalence of all the respiratory symptoms was also higher among the flour mill workers compared to the unexposed population. This was statistically significant (p < 0.001) for most of the symptoms. (Table 4)

Most of the respondents 196 (98.0%) were aware of the kind of PPE's used in their workplace, and these PPE's includes, industrial nose mask, paper nose mask, respirator, safety boots, cover all, eye goggles, e. t. c . (Figure 1)

Figure 2 describes the pattern of use of PPE by the respondents. A greater proportion of the respondents 123(61.5%) claimed they always put on their personal protective equipment while working, whereas 33(16.5%) claimed

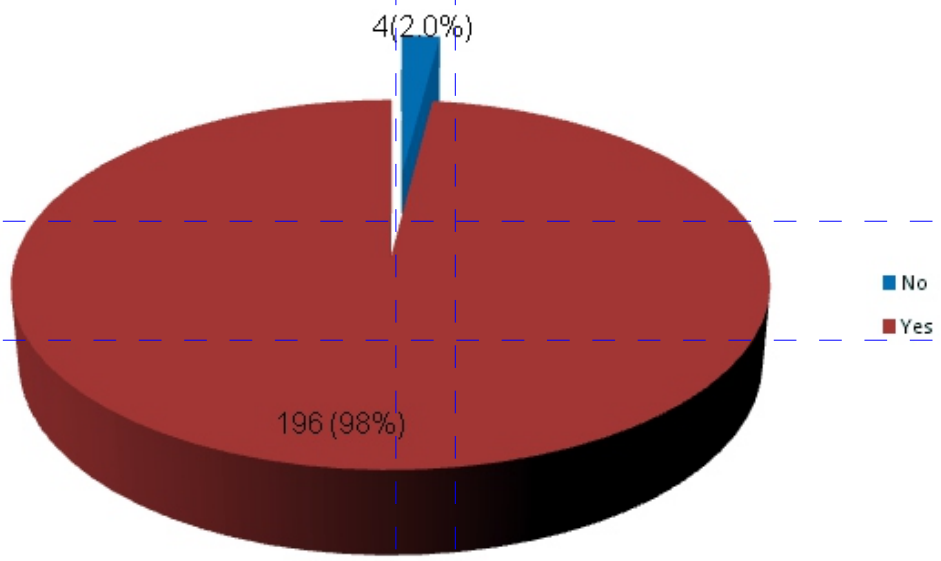

Figure 1: *Awareness of Personal Protective Equipment*

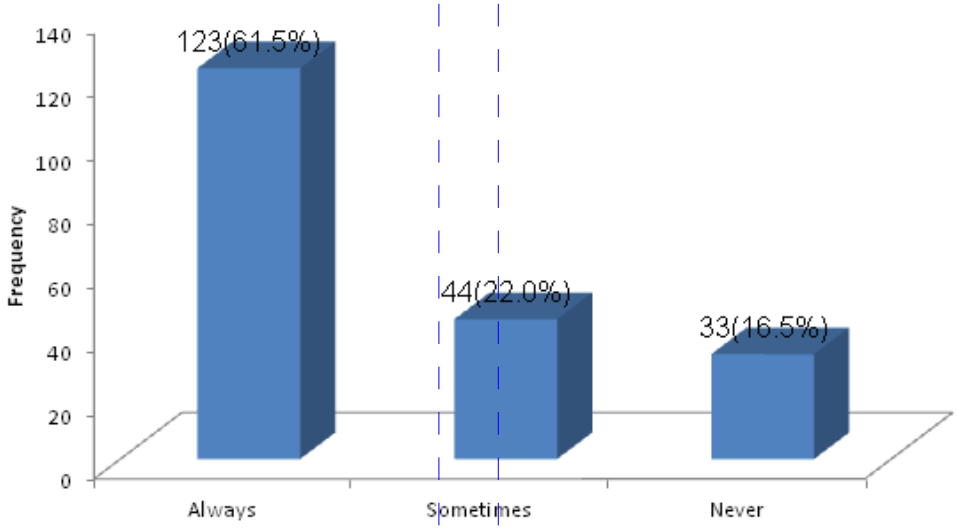

Figure 2: *Pattern of Use of PPE by the Respondents*

they never used it even when it was available, others 44 (22.0%) claimed they used their PPE's sometimes especially when the supervisor was present.

Discussion

As wheat grain is processed into flour, fine particles of dust become airborne, and as the worker breaths in air, these fine dust particles

are trapped in the airways and cause various health hazards for the worker. Various measures should be put in place by the management of these flour mills in order to limit the adverse health effect of flour dust on the workers. In this study the level or suspended particles (dust) in the environment of the flour mills was measured using Haz dust particulate monitor. The mean total suspended particulates (dust) in the work environment of the flour mills was 1.08mg/ m^3 and this was higher than the limit set by the regulatory body in Nigeria, i.e the Federal Ministry of Environment (FMENV). This body has set the limit of 0.25 mg/ m^3 for TSP. This findings is similar to that found in other parts of the world [13,16,17,18], as well as that seen in an earlier study in Ibadan, South Western Nigeria among wheat flour mill workers where the mean TSP in air at their production sites was 3.6 mg/ [(3)11]far above the limit in the country. It is surprising that an earlier study in Ibadan South Western Nigeria, had limits of TSP higher than the level permitted in the country, as well as this present study yet the regulatory body has not brought any of the offending industries to face the law and get punished for not complying to set rules. It is therefore pertinent that the Federal Government of Nigeria should empower these agencies of the government adequately to persecute offenders. It is quite commendable that the level of awareness on personal protective equipment was high (98.0 %) which means that most of the flour mill respondents were aware of the devices that can be worn at work to prevent the adverse effect of dust at work place. The pattern of use of these PPE's shows that a little more than half of the respondents use these PPE's despite the high level of awareness. There is therefore need to adopt other behavior change communication strategies to translate this high level of awareness to utilization. The prevalence of respiratory symptoms was higher among the flour mill workers (exposed group) compared to the unexposed group. This finding however is not surprising as the difference in the prevalence of respiratory symptoms relates to the degree of dust pollution of the various work environments and the dust control mechanism/ measures available and utilized at the different work places. It is also important to note that increased respiratory symptoms among these workers connote signs of increased respiratory disorders, which implies that the job was already having a negative toll on their health. There is urgent need for the management of these flour mills to ensure that other first line measures such as engineering measures designed to control dust are present and functional while also applying other measures such as environment monitoring as this is a useful strategy for the control of the effects of dust on the health of the workers if it is adequately done at recommended intervals. It is also important that other adjunct measures such as wetting of floors are put in place especially at the elevator area where finished products (flour) are loaded into vehicles as well as at the storage area (silo) where raw grains are off loaded and stored. The need for continuous health education cannot be over emphasized as Sir Thomas Legge in his notable aphorism of occupational health says that “All workers should be told something of the danger of the material with which they come in contact, and not be left to find out for themselves – sometimes at the cost

of their lives."[19]Hence health education by way of seminars, workshops, health talks e.t.c. will go a long way in improving the attitude and behaviour of the workers towards health and safety measures in their workplace, which will ultimately reduce the amount of dust inhaled with its attendant respiratory symptoms and respiratory disorders. Smoking is one of the confounders of this study and stratification was carried out at the stage of analysis in order to control for this confounder. The result of the analysis has shown that among the non-smokers (having removed the effect of smoking), the respiratory symptoms were still higher among the flour mill workers compared to the non exposed respondents, hence grain/flour dust affect the respiratory health of the worker irrespective of the effect of cigarette smoke.

Conclusion/Recommendation

The level of suspended particulate matter in the flour mills was higher than the limit set by the regulatory body (FMENV) in the country. The prevalence of respiratory symptoms among the flour mill workers was also higher compared to that of an unexposed population. There is therefore need for the management of the flour mills to put in place better dust control measures, ensure that the exposure limit to grain/flour dust is not exceeded as well as carry out regular and periodic medical checks for the workers in order to detect on time those whose health are already being affected by the job.

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Laryngeal Trauma in Port Harcourt: A Review of 68 Cases

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Abstract

Background: Head and neck injuries with associated laryngeal trauma appear to be on the increase nowadays with most patients presenting with features of acute upper airway obstruction. This study determined the sources of laryngeal trauma, clinical profile, complications and management outcome.

Patients and methods: This was a retrospective study carried out in the University of Port Harcourt Teaching Hospital (UPTH). Case notes of patients that presented through the accident and emergency department with neck trauma involving the larynx and surrounding tissues between September 2004 and August 2009 were retrieved and used for this study. Out of 200 patients only 68 had neck trauma with laryngeal involvement. Patients who had laryngeal trauma from corrosives were excluded from this study. Demographic data, cause of injury, clinical features, complications and outcome of treatment were recorded and analyzed.

Results: Out of 200 patients with various neck traumas, 68 (34%) were noted to have laryngeal involvement. The age range of the patients was 15-65years. The younger age groups were mostly affected, especially males. Gunshot wounds and Road Traffic Accident (RTA) dominated (n=58, 85.30%) the picture and presenting with upper airway obstruction. Majority (n=60, 88.24%) of patients were successfully managed without complication. No mortality was recorded in our series but a few (n=8, 11.76%) had chronic laryngotracheal stenosis.

Conclusion: Trauma to the larynx arising from gunshot wounds to the neck due to violence was found to be a major problem among the youth in Port Harcourt. Government intervention with gainful employment and provision of infrastructure are strongly advised to reduce the incidence of laryngeal trauma.

Key words: *Laryngeal trauma, Head and neck injuries, Upper airway obstruction, Port Harcourt*

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Introduction

The larynx functions as an airway to the lungs, voice production, and fixation of the chest when lifting heavy objects and injuries to the larynx are rare but when it does occur it poses serious danger to the patient [1, 2]. When there is severe injury to the larynx, airway is usually compromised and the patient most times presents with features of acute upper

airway obstruction [1,3]. Speech even though it is affected does not present as an emergency and could be handled after settling the life threatening conditions. Acute Laryngeal trauma with its associated airway obstruction is an otolaryngological emergency requiring immediate intervention to prevent morbidity and mortality [4].

Laryngeal trauma has several classifications; it can either arise from penetrating or blunt injuries which can be further categorized as either high or low velocity [3]. Besides, it could be closed or open. Most commonly, trauma to the larynx occur as a result of road traffic accident (RTA) [5]. In open injuries the laryngeal cartilage can be visualized at close examination of the neck. Sharp objects like table knives, broken bottles and gun shots are notable causes of open laryngeal injuries [3]. Sometimes there are no obvious external injuries to the anterior neck. However, laryngeal edema and possible laryngeal cartilage fracture may become obvious with time [6,7]. This type of closed laryngeal injuries may arise from contact sports and blows.

Since there are different mechanisms of injuries, the clinical presentation may become unpredictable. Patients could present with any of the following: hoarseness, pain around the neck, dysphonia, dysphagia, aphonia and odynophagia [8]. Common signs include stridor, subcutaneous emphysema, hematoma, laryngeal tenderness and sometimes vocal cord immobility [8].

Some authors have suggested routine use of computed tomography (CT) scans for all laryngeal trauma [9, 10] because it gives better anatomical information and assists in preoperative planning. However, there are a number of authors who suggest selective use of CT scans because they believe that CT scans are irrelevant in cases where surgical intervention is clearly necessary, e.g. massive edema, exposed cartilage and displaced fracture [10].

There has been an alarming increase of violence in the Port Harcourt with reported cases of laryngeal trauma. Meanwhile, literature search revealed paucity of information in our environment; hence this study was carried out to determine the sources of laryngeal trauma, clinical profile, complications and management outcome. Besides, it will serve as a baseline for researchers to carry out further studies to improve on the already existing knowledge.

Patients and methods

This is a 5 year retrospective study carried out in the University of Port Harcourt Teaching Hospital, Rivers State which serves as a referral center for the neighboring states of the Niger Delta Region. The study period was from September 2004 to September 2009. Patients used in the study were those involved in neck trauma associated with laryngeal injury. Those without laryngeal involvement were excluded, as well as those who had trauma from corrosives. All the patients first presented to the Accident and Emergency (A/E) department before referral to the Ear, Nose and Throat (ENT) surgery department. Records from the ENT surgery department and theatre records were retrieved to augment the data.

Out of 200 neck trauma cases that presented to A/E. Sixty eight patients had laryngeal injuries. The case notes of these patients were retrieved. The age, sex, source of injury, nature

of injury, clinical presentation, treatment modalities and complications as well as radiological investigation were properly recorded. Simple statistical tables were used to illustrate the data. Categorical data were expressed as mean, mode and standard deviation. Data analysis was done using SPSS for windows 15.

Results

Out of 200 patients with various neck traumas, 68 (34%) had laryngeal involvement including soft tissue around the larynx. The age range of the patients was 11-65 years with a mean of 31.59 ± 10.71 years. There were 45 males and 23 females with a male: female ratio of 1.9:1. The younger age groups were mostly affected. The age range 21-30years has the highest (n=30, 44.12%) incident (Table 1). Gunshot injuries accounted for the highest (n=42, 61.76%) incidence. Out of 42 patients with gunshot injuries, 35 of them sustained laryngeal trauma as a result of youth restiveness while the remaining 7 were victims of armed robbery attack.

Suicidal attempt recorded the least (n=1, 1.47%) number of patients (Table 2). Most (n=40, 58.82%) of the patients presented with upper airway obstruction and exposed laryngeal cartilage (Table 3). Open neck injury

Table 1: Age distribution of patients

Age range	Number of patients	Percentage (%)
11-20	5	7.35
21-30	30	44.12
31-40	20	29.41
41-50	8	11.77
51-60	4	5.88
61-70	1	1.47

n=68

Table 2: Patients source of injury

Source of injury	Number of patients	Percentage (%)
Knife cut	8	11.76
Gun shot	42	61.77
RTA	17	25.00
Suicidal attempt	1	1.47

n=68

Table 3: *Clinical presentation of patients*

Clinical presentation	Number of patients	Percentage (%)
Open neck injury with exposure of the laryngeal skeleton, stridor	40	58.82
Neck swelling with stridor	12	17.65
Open neck injury no stridor	10	14.71
Open neck injury, neck swelling with stridor	6	8.82

n=68

Table 4: Modalities of patient's treatment

Treatment	Number of patients	Percentage (%)
Tracheostomy, neck exploration and wound closure	25	36.76
Neck exploration and wound closure	15	22.06
Tracheostomy alone	18	26.47
Wound closure alone	10	14.71

n=68

with exposure of laryngeal cartilage and airway obstruction accounted for 58.82% patients. Most (n=40, 63.24%) patients had tracheostomy (Table 4). The commonest (n=25, 36.76%) mode of treatment was tracheostomy, neck wound exploration and wound closure (Table 4). All the patients had plain radiographs of the neck and chest but only a few (n=12, 17.65%) had remarkable findings in plain Radiograph of the anterior and lateral aspect of the neck. The findings were suggestive of subcutaneous emphysema and soft tissue swelling. Most (n=60, 88.24%) patients were discharged home without sequelae while a few (n= 8, 11.76%) developed laryngotracheal stenosis.

Discussion

Young individuals especially males were found in our study to be mostly involved in laryngeal trauma. Gunshot injuries were found to be the commonest cause of laryngeal trauma. This could be ascribed to their greater participation in youth restiveness as they demand for better infrastructures and means of livelihood. On the other hand, Shabbir and Sohail [11] in their study revealed that young individuals especially males with laryngeal injuries were mainly associated with road traffic accidents. Another study in Singapore also identified RTA as a major source of laryngeal trauma [12].

Furthermore, our study revealed a male predominance which agrees with several studies done in the past [2, 3]. The commonest clinical presentation in our study was open neck injury with exposure of laryngeal cartilage and stridor. This has also been documented by other researchers [13-15]. These patients had tracheostomy, wound exploration, repair of tissues and wound closure.

There has been controversy over the use of tracheostomy prior to surgical treatment. Some researchers prefer endotracheal intubation while others will insist on tracheostomy before neck exploration and wound closure [8, 15-17]. In airway management usually endotracheal intubation is used as a first line of action before considering tracheostomy [1, 18-19]. If it fails then one can carry out an emergency tracheostomy [20]. Conversely, some researchers have argued that endotracheal intubation in patients with laryngeal trauma could be hazardous [3, 16, 18]. In this study an initial tracheostomy was very safe especially in the cases where the larynx were exposed. We are aware of other methods of initial airway management such as laryngeal mask and cricothyroidotomy [1] however; we did not make use of them. None of our patients did CT scan of the neck because of lack of funds. However; a few did radiographs of the neck anterior and lateral views which showed evidence of emphysema and soft tissue shadow that obscured the laryngeal inlet. There was no need to do initial radiographs for the patients that presented with open wounds exposing the laryngeal frame work.

The majority (n=60, 88.24%) of our patients recovered without complications however, a few (n=8, 11.76%) had chronic laryngotracheal stenosis. Two of them had it while on admission and the other 6 had it four weeks after discharge. Unfortunately, they could not be weaned off the tracheostomy tubes. It is common knowledge that chronic laryngotracheal stenosis more often than not complicates laryngeal injuries and most of the patients end up carrying the tracheostomy tubes for life except when they undergo further surgeries to manage the stenosis [1, 4]. Our patients that have complications were referred to other centers for further expert management due to lack of appropriate facilities.

Conclusion

Trauma to the larynx arising from gunshot wounds to the neck due to violence was found to be a major problem among the youth in Port Harcourt with majority of them presenting with life threatening complications. Furthermore, unsuccessfully managed cases may lead to laryngotracheal stenosis with its associated challenges in management. Therefore, early presentation to the hospital and prompt intervention by the otolaryngologist will certainly help to reduce the complications associated with laryngeal trauma. Besides, government intervention with gainful employment and provision of infrastructure are strongly advised to curb the incidence of laryngeal trauma in our environment.

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Case Reports

Familial Tuberous Sclerosis Complex: Tuberous Sclerosis Complex an a Patient Presenting in Status Epilepticus

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Abstract

Tuberous sclerosis complex is a rare multi-systemic disorder that could be complicated by disabling neurological manifestations including intractable epilepsy. It is an autosomal dominant disorder with variable penetrance. Familial tuberous sclerosis probably occurs more often than is reported in the literature. This article reports on a Nigerian man with tuberous sclerosis complex who presented in status epilepticus with documentation of tuberous sclerosis in his family and discussed the manifestations, diagnostic criteria, clinical evaluation, investigation and management of patients with tuberous sclerosis complex.

Keywords: *tuberous sclerosis complex, status epilepticus, epilepsy*

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Introduction

Tuberous sclerosis also called tuberous sclerosis complex (TSC) is a rare, multi-system autosomal dominant disorder of cellular differentiation and proliferation characterized by hamartomas in most organ systems including the brain and other vital organs such as the kidneys, heart, eyes, lungs, and skin[1,2]. It usually affects the central nervous system and results in a combination of symptoms including seizures, developmental delay, behavioral problems, skin abnormalities, and renal disease. Patients with TSC are frequently diagnosed with co-morbid neurological disorders including epilepsy, intellectual disability, behavioral abnormalities, sleep disorders, and autism spectrum disorders (ASD)[2,3]. The name tuberous sclerosis comes from the characteristic tuber or nodules in the brain, which calcify with age and become hard or sclerotic. The disorder, once known as epiloia or Bourneville's disease was first identified by Désiré-Magloire Bourneville, a French neurologist over 100 years ago[1,3].

The disorder affects as many as 25,000 to 40,000 individuals in the United States and about 1 to 2 million individuals worldwide, with an estimated prevalence of one in 6,000 to 9,000[1,2,3]. TSC occurs in all ages, races and ethnic groups, and in both genders.

TSC is caused by defects or mutations, on two genes-TSC1 and TSC2. The transmission of

TSC is by autosomal dominant trait with variable penetrance. Although some individuals inherit the disorder from a parent with TSC, most cases occur sporadically. Many TSC patients show evidence of the disorder in the first year of life. However, clinical features can be subtle initially and many signs and symptoms take years to develop. As a result, TSC may be unrecognized or misdiagnosed for years.

Case Presentation

An eighteen year old Urhobo man from Oghara was rushed into our emergency department by the father with complaints of repeated seizures and loss of consciousness. He had a fever three days prior to presentation. No history of use of any medication or trauma to the head. He has been having recurrent seizures since the age of eight. Review of systems was negative except for poor educational performance and occasional aggressive behavior. He was in primary six at the time of presentation. No history of birth asphyxia, neonatal or childhood major illness. He was fully immunized for age. He is the third child among five in a monogamous home. Three of his siblings have epilepsy. At the emergency room he was found to be having repeated generalized tonic-clonic seizures with Glasgow Coma Score (GCS) of 10 in between attacks, warm to touch with temperature of 37.5°C. He had facial angiofibroma – adenoma sebaceum on the face (figure 1) {this lesion appeared first on his face at age of 5 and has remained till date} and shagreen patches on the lumbar region (figure 2). Fundoscopic examination was normal. No signs of meningeal irritation or focal neurological deficit. He had intravenous diazepam 10mg and 5mg at five minutes apart and phenytoin infusions to abort the seizures. The motor seizures were aborted within two hours; however, his GCS remained 13 for twenty-four hours before full recovery. His working diagnosis was then status epilepticus precipitated by malaria in a patient with tuberous sclerosis. Malaria parasite test was positive (1+) for Plasmodium falciparum and he was treated with arthemeter-lumefantrine combination. The electrolytes,

Figure 1. *Facial angiofibroma (Adenoma sebaceum) in the patient, with lacerations on the lip and tongue following a seizure*

Figure 2. *Shagreen patches on the lumbar region of the patient*

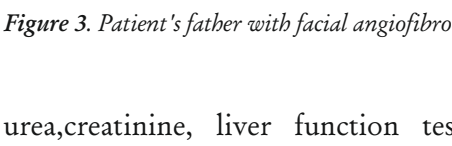

***Figure 3**. Patient's father with facial angiofibroma*

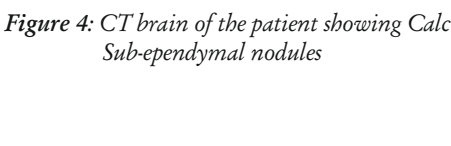

***Figure 4**: CT brain of the patient showing Calcified Sub-ependymal nodules*

urea,creatinine, liver function tests and complete blood count results were normal.

On the third day of admission he had another seizure which started with an abnormal behavioral changes characterized by a strange expression of aggression on his face followed by slapping of a nearby patient and a nurse , screaming and generalized tonic-clonic seizures lasting for four minutes associated with foaming saliva, upward rolling of the eyes, urinary incontinence and post-ictal sleep. The patient had positive history of occasional aggressive behavior without accompanying motor seizures.

His brain computerized tomographic scan revealed calcified subependymal nodules (figure 4) and calcified occipital cortical tuber (figure 5).Renal ultrasound scan revealed no abnormality.

His father (figure 3) and one of his siblings have facial angiofibroma. His late paternal grandfather was said to also have facial angiofibroma. His father and siblings were examined and had no retina lesion or any other skin lesions. He was discharged after five days on admission on phenytoin and seen in the out-patient clinic a week after discharge. Further imaging evaluation planned for the family members could not be carried out as we lost the patient and his relatives to follow up.

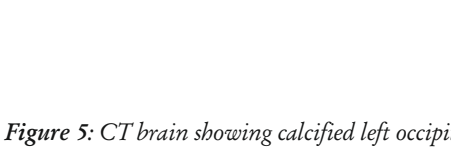

***Figure 5**: CT brain showing calcified left occipital Cortical Tuber*

Discussion

The case presented is that of a familial tuberous sclerosis complex. In familial cases, TSC is an autosomal dominant disorder, and can be transmitted directly from one parent with the

faulty gene to a child. An offspring of a patient with TSC has a 50 percent chance of developing the disorder. The offspring of a TSC patient has variable clinical expression and severity ranging from not manifesting the same symptoms to having milder or more severe form of the disorder. The patient reported in this article presented with a severe form of the disorder among the family members with a combination of epilepsy, mental retardation, abnormal behaviors, facial angiofibroma (adenoma sebaceum), shagreen patches, ash leaf and calcified subependymal nodules and occipital cortical tuber. The father of the index patient has an apparent mild disease. At the age of 56 years he has never experience any other manifestation except the skin lesion (facial angiofibroma).One of his siblings was reported to have the facial angiofibroma and epilepsy, while two other siblings have epilepsy with good educational records without skin manifestations. The presentation of the disorder in this family support the clinical variability in manifestations of the TSC as reported in literatures[1,2,3].

The transmission of the disorder is by an autosomal dominant trait with variable penetrance. Two genes are responsible for TSC, TSC1 and TSC2. The TSC1 gene, discovered in 1997, is on chromosome 9 and produces a protein called *hamartin*. The TSC2 gene, discovered in 1993, is on chromosome 16 and produces the protein *tuberin*[4]. These proteins regulate the enzyme complex, a kinase, mTORC1, which constitute a key cellular pathway important for protein synthesis and cell size regulation. Hamartin and tuberin act in a complex mechanism as growth suppressors by inhibiting the activation of the kinase, mTORC1. Loss of regulation of mTOR occurs in cells lacking either hamartin or tuberin, and this leads to the activation of the kinase, mTORC , abnormal differentiation and development, and the generation of enlarged cells as seen in TSC lesions.[4,5]

Most cases occur sporadically due to new, spontaneous mutations in TSC1 or TSC2. The frequency of mutations reported in *TSC2* is consistently higher than in *TSC1* in familial tuberous sclerosis complex as *TSC1* mutations account for only 10 to 30% of the families identified with TSC[6]. In sporadic cases of TSC, there is an even greater excess of mutations in *TSC2*. However, identification of *TSC1* mutations appears to be twice as likely in familial cases as in sporadic cases.

Three types of brain lesions are seen in TSC: cortical tubers, subependymal nodules (SEN) and subependymal giant-call astrocytomas (SEGA). The cortical tubers, for which the disease is named, generally form on the surface of the brain, but may appear deep in the brain parenchyma. The neurologic manifestations of TSC include epilepsy[7,8] cognitive disability, and neurobehavioral abnormalities, such as autism.[9,10] Seizures occur in about 90% of the patients[1,2]. Seizures of all types may occur, including infantile spasms; tonic-clonic seizures; or tonic, akinetic, atypical absence, myoclonic, complex partial or generalized seizures. The manifestations are closely related to the number of cerebral cortical tubers that are present in over 80% of patients[11,12]. Patients with numerous lesions on neuroimaging tend to have difficult seizure control[13]. Brain magnetic resonance imaging (MRI) or computerized tomographic (CT) scan usually

demonstrates the cortical tubers, subependymal nodules and subependymal gaint cell astrocytomas[14]. The CT best demonstrates the calcified subependymal nodules that characterize TSC[2,14] as shown in the case presented. Subependymal giant cell astrocytoma occur in 10% of the patients. About 50% to 60% of individuals with TSC have developmental delays ranging from mild learning disabilities to severe mental retardation. Behavioral problems, such as aggression, sudden rage, attention deficit hyperactivity disorder and obsessive-compulsive disorder occur in children with TSC and can be difficult to manage. About one-third of children with TSC meet criteria for autism spectrum disorder[1,10].

A wide variety of cutaneous lesions may be seen in patients with TSC. The most common skin lesions include: hypomelanotic macules (ash leaf spots), found in about 80% to 90% of the patients, may be seen anywhere on the body at birth; facial angiofibromas (adenoma sebaceum), which are reddish spots or acneiform eruptions[15] on the malar region of the face that become apparent around the age of five years are made up of vascular and connective tissue elements; shagreen patch; ungual and subungual fibromas and other pigmentary lesions such as confetti lesions, poliosis and café au lait spots. Shagreen patches, usually found on the lower back or nape of the neck are irregularly shaped, slightly raised, leathery textured skin lesions and appear after the age of five. The patient, his father and one of his siblings have facial angiofibromas, but he alone has shagreen patches. His facial angiofibroma and shagreen patches were noticed as from age 5.

Renal angiomyolipomas, which are seen in about 55 to 80% of the patients are benign tumors composed of abnormal vessels, immature smooth-muscle cells, and fat cells, with multiple tumors in each kidney[16,17]. They are the most common kidney lesions in TSC. These growths are also found in about one of every 300 people without TSC[1]. Angiomyolipomas caused by TSC are usually found in both kidneys and in most cases they produce no symptoms. However, they can sometimes grow so large that they cause pain or kidney failure. In addition to angiomyolipomas, epithelial renal lesions that include epithelial cysts, polycystic kidney disease, and renal-cell carcinomas may develop in patients with TSC. Epithelial cysts are generally asymptomatic and are more often associated with hypertension and renal failure than are angiomyolipomas.[18,19] Other rare kidney problems include renal cell carcinoma, developing from an angiomyolipoma, and oncocytomas, benign tumors unique to individuals with TSC.

Lung lesions are present in about one-third of adult women with TSC and are much less commonly seen in men. Lymphangiomyomatosis, also called lymphangioleiomyomatosis, affects women almost exclusively and is characterized by widespread pulmonary proliferation of abnormal smooth-muscle cells and cystic changes within the lung parenchyma[20]. Lymphangiomyomatosis is usually diagnosed during early adulthood and is initially manifested by dyspnea or pneumothorax. Multinodular, multifocal pneumocyte hyperplasia (MPH) is another lung lesion with a more benign tumor that occurs in men and women equally.

Tumors called cardiac rhabdomyomas are

found in 50% to 70% of hearts of infants and young children with TSC, and they are often seen on prenatal fetal ultrasonography. Rhabdomyoma may be associated with cardiac failure, dysrhythmias, including atrial tachycardia, ventricular tachycardia, complete heart block, and the Wolff–Parkinson–White syndrome[21]. Unlike other lesions seen in TSC, cardiac rhabdomyomas if they do not cause problems at birth-when in most cases they are at their largest size, they often regress spontaneously in later life[22].

Benign tumors called phakomas are sometimes found in the eyes of individuals with TSC, appearing as white patches on the retina. Pancreatic cysts, bone cysts, rectal polyps, gum fibromas, and dental pits may also be seen in individuals with TSC.

The diagnosis of TSC is based upon clinical criteria. The diagnostic criteria for TSC consist of a set of major and minor diagnostic features[23]. Currently the results of molecular genetic testing of the *TSC1* or *TSC2* loci are viewed as corroborative. No single feature is diagnostic thus, a detailed evaluation of all the clinical features is necessary to make the diagnosis. The clinical manifestations of TSC appear at distinct developmental points[23]. For initial diagnostic evaluation, careful dermatologic examination of the skin, funduscopic examination to identify retinal hamartomas, MRI or CT of the brain to identify tubers and subependymal giant-cell tumors and ultrasonography with or without CT, or MRI of the kidneys to identify angiomyolipomas are necessary. In women with TSC, CT of the lungs is indicated to look for subclinical lymphangiomyomatosis. In infants, echocardiography may reveal rhabdomyomas.

Based on the diagnostic criteria the clinical diagnosis could be classified as definite, probable or possible. Two major features or one major feature plus two minor features are required for a definite clinical diagnosis of TSC; one major and one minor feature are required for a probable diagnosis of TSC; one major or two or more minor features are needed for a possible diagnosis of TSC[23]. The major features are facial angiofibroma, ungual fibroma, shagreen patch, hypomelanotic macule, cortical tuber, subependymal nodule, subependymal giant-cell tumor, retinal harmatoma, cardiac rhabdomyoma, renal angiomyolipoma and lymphagiomyomatosis. The minor features are multiple pits in dental enamel, hamartomatous rectal polyps, bone cysts, cerebral white-matter radial migration lines, gingival fibromas, retinal achromic patch, multiple renal cysts and 'confetti' skin lesions[23].

The patient reported in this article has definite tuberous sclerosis complex with three major features namely facial angiofibroma (figure 1), shagreen patches (figure 2), subependymal calcified nodules (figure 4) and a calcified cortical tuber (figure 5). The presence of possible TSC in the father (figure 3), one of his siblings and in his grandfather (with the history of facial angiofibroma) strongly support the diagnosis of the rare presentation of familial tuberous sclerosis complex in this three generations.

There is no cure for TSC, although treatment is available for a number of the symptoms. Antiepileptic drugs may be used to control seizures. Vigabatrin, an inhibitor of Γ-aminobutyric

acid transaminase, is particularly useful for treatment of infantile spasms in TSC. Specific medications may be prescribed for behavioral problems. Interventional programs including special schooling and occupational therapy may benefit individuals with special needs and developmental issues. Surgery may be needed in case of complications connected to cortical tubers, SEN or SEGA, as well as in risk of hemorrhage from kidney tumors. Respiratory insufficiency due to LAM can be treated with supplemental oxygen therapy or lung transplantation if severe.

Everolimus, an mTOR inhibitor, was approved by the United States food and drug administration agency in 2010 to treat sub-ependymal giant cell astrocytomas in individuals with TSC who require treatment but are not candidates for surgery[1]. Rapamycin has been shown to be effective in treating SEGA, and it is still undergoing clinical trials.[24]

Another important issue in the management of TSC is long-term follow-up, including the monitoring of lesion growth. No conclusive guidelines for surveillance have been established for this disease, but most centers periodically image the brain and abdomen to monitor the growth of lesions in the brain and kidney.[25] It is a standard practice to perform brain and abdominal imaging at least every 3 years, and more often in patients with brain or renal lesions that have progressive growth. Annual MRI of the brain is suggested in patients until they are at least 21 years of age, and then MRI should be done every 2 to 3 years both to diagnose and to monitor subependymal giant-cell tumors. In patients with multiple angiomyolipomas or a single lesion that is progressive, yearly ultrasonography, MRI, or CT is indicated. In patients with lymphangiomyomatosis, annual pulmonary-function testing may be useful to monitor lung function, and some patients may require more frequent assessments. Although electroencephalography is not part of the diagnostic workup for TSC, it remains an important tool in patients with TSC and epilepsy to define background cerebral activity, characterize patterns such as hypsarrhythmia in infantile spasms, and identify seizure foci. Periodic dermatologic evaluation is useful, since facial angiofibromas can cause cosmetic challenges that may require laser therapy or surgical removal. In general, lifetime surveillance for lesion growth in patients with TSC permits early recognition of potentially life threatening complications.

Genetic counseling should be offered to patients to aid with family planning bearing in mind that as an autosomal dominant disorder, affected persons carries approximately 50% risk of having an affected child.

Conclusion

TSC is a rare multisytemic disorder that occurs worldwide. This report has documented the occurrence of this rare disorder among Nigerians. There is need for physicians to carefully evaluate patients with suspected TSC including screening of the family members for the occurrence of familial TSC.

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Genital and Chest Enteroccocal Infections Complicating Induced Abortion: A Case Report

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Abstract

Several complications of induced abortion have been reported in the literature. We report a rare case of simultaneous genital and chest enterococcal infections following induced abortion, in a teenager, at 14 weeks gestation.

Keywords: *Septic induced abortion, genital and chest enterococcal infection, University of Benin Teaching Hospital*

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Introduction

Abortion complications contribute significantly to maternal mortality and morbidity figures in developing countries for several reasons. Whereas abortion services are restricted by law to situations where they are required to save the mother's life or the developing fetus is malformed beyond remedy by any form of intervention, women and young girls continue to procure abortion to solve the problem of unplanned or unwanted pregnancies.[1] The legal stance on abortion in these countries including Nigeria with restrictive abortion laws has driven the practice underground and made the provision of the service an all comers affair.[2,3] Hence a significant proportion of induced abortions in developing countries are unsafe[4] with attendant complications.[5] Haemorrhage, injury to abdominal or pelvic organs and infection are well documented complications of induced abortion.[6,7]

The infective agents in septic abortion vary according to environment, immune status of the individual as well as access to and proper utilization of antibiotics. Polymicrobial cultures, derived from the normal flora of the vagina and endo-cervix and sexually transmitted pathogens have commonly been reported,[5] though a few cases of single cultures of rare organisms continue to grace the literature.[8-10] In the USA, infection with Clostridium perfringens is largely associated with unsafe abortion,[8] while tetanus infection has been reported as a cause of death from

septic abortion in some third world countries.[9] Recently, Momoh et al[11] reported a positive culture of Treponema pallidum (TP) after a miscarriage at 8 weeks gestation but concluded that TP was a cause rather than a consequence of the abortion.

The rare nature of the index case, enterococcal endometritis and pneumonia complicating induced abortion, informed the report.

Case Presentation

An 18-year-old single nulliparous hairdressing apprentice who had junior secondary education was referred to our hospital two weeks after an induced termination of pregnancy at 14 weeks gestation. The procedure was carried out by a patent medicine store attendant in a village. The termination was achieved by intermittent intramuscular injections and intravenous infusions over 3 days. Following the expulsion of the fetus, she had profuse bleeding per vaginam 5 days later which necessitated an evacuation of retained products and plan to transfuse blood in a private hospital in Benin City; she was admitted for one week but declined to blood transfusion. Two days after the evacuation she developed cough with chest pain and fever which had continued for a week before presentation.

On examination, she was febrile (temperature: 38°C), markedly pale, tachycardic with gallop rhythm and tachypnoeic. She also had a haemic murmur and crepitations on the right lung. The liver was tender and enlarged to 6cm below the costal margin. Ultrasound examination revealed an empty uterus and no fluid collection in the pouch of Douglas. Her chest X-ray examination revealed homogenous opacities on the right hemithorax. The initial endocervical swab (ECS) culture yielded no growth.

The results of her investigations were as follows – packed cell volume :18%, white blood cells count : 10,700 cells/mm^3(neutrophilia), platelet count 195,000 cells/mm^3(normal), retroviral test : negative, blood group : O positive, genotype : AA, electrolyte, urea & creatinine : normal, sputum culture : no growth and sputum Gram stain : Gram-positive cocci.

Post-abortal septicemia with right lobar pneumonia and anaemic heart failure was diagnosed and the patient was admitted. Treatment initially consisted of oxygen therapy by nasal prongs, intravenous ceftriaxone, metronidazole and gentamicin, tablet artemeter-lumefantrine for malaria, blood transfusion and frequent monitoring of vital signs. She was initially co-managed with the hematologists and respiratory physicians.

On 3rd day of admission, cough, chest pain and fever persisted. A repeat full blood count showed PCV of 32%, thrombocytosis and neutropenia. Antibiotics were continued. On 7th day of admission, she still had fever and cough, and had developed bleeding per vaginam. Repeat malaria parasite test was negative, 24-hour urine hCG was 650iu/ml (not significant). She had uterine evacuation and minimal products of conception was retrieved and sent for histology. The histology report excluded gestational trophoblastic disease.

On 11th day of admission, a diagnosis of pyrexia of unknown origin was considered. The medical microbiologists were invited to review and co-manage the patient. They

requested blood film for malaria parasite and endocervical swab, sputum specimen, midstream urine and blood specimen for culture. All the tests were negative except the endocervical swab and sputum cultures which yielded Enterococcus faecalis. She was then placed on parenteral amoxicillin/clavulanate and continued on gentamicin, a combination to which E. faecalis had documented sensitivity. Fever and cough improved within 3 days of commencing these antibiotics and she was discharged home on 20th day of admission with normal vital signs and PCV of 30%.

She was seen in the gynaecological clinic 4 weeks later and she was stable. She had menstruated 12 days earlier and it was normal. She was then referred to the teenage counseling unit of the family planning clinic for contraception and was given a 12-week appointment to the gynaecological clinic. She subsequently was lost to follow-up.

Discussion

Enterococci are Gram-positive cocci that can survive harsh conditions in nature. They are known to colonize the gastrointestinal tract of humans. Enterococci have proven to present a therapeutic challenge because of their resistance to many antimicrobial drugs, including vancomycin.[12] It is likely that the patient we reported acquired the infection during or following the unsafe abortion.

In the antibiotic treatment of septic abortion, several drugs are utilized because of the variety of organisms that can be associated with the condition. Commonly reported groups of bacteria include Gram-positive aerobes, Gram-negative aerobes, facultative or obligate anaerobes, Neisseria gonorrheae and Chlamydia trachomatis.[4,5] The initial choice of antibiotics for this patient which included ceftriaxone, gentamicin and metronidazole was appropriate to cover for Gram-positives, Gram-negatives and anaerobes. The deterioration in clinical state and the emergence of new symptoms while receiving these antibiotics presented a management dilemma. It was expected that evacuation of the uterus would have provided a platform for progressive recovery. However, fever and cough persisted, and these were the first suggestion that a resistant organism might be responsible for the poor clinical state.

The resumption of bleeding per vaginam was quite alarming and necessitated a quantitative beta-hCG screen for gestational trophoblastic disease (GTD), but the value of 650 iu/ml was reassuring. The need to carry out repeat infection screening with sputum, urine, endocervical swab and blood thus became apparent. This sepsis screening was directly supervised by the consultant microbiologist, who ensured that results were ready in good time. From the record of the laboratory, this culture report of E. faecalis in two different specimens from the same patient was the first ever documented by them. Furthermore, E. faecalis was not a common culture from endocervical swabs in this facility. The multidrug resistance known to be associated with E. faecalis is another strong reason to support the role this organism might have played in the clinical course observed in this patient.

In the past, most cases of septic abortion and shock in the USA were mainly as a result of Gram-negative organisms, Clostridium welchii and Clostridium perfringens as well as

non-clostridial anaerobes such as Bacteriodes and Streptococci.[13-15] Similarly, Rotimi and Abudu[16] in Nigeria reported that the predominant flora in septic abortion were anaerobes such as Bacteriodes and facultative bacteria such as Escherichia coli, Klebsiella aerogenes and Streptococcus faecalis.

Hospitalization and exposure to antibiotics have been identified as factors promoting the emergence of multidrug resistant *E. faecalis* infection.[17,18] In the case we presented, the initial cultures did not yield this organism, and this might suggest that the infection was acquired after the use of the multiple antibiotics. It is also possible that the initial culture was not thorough enough to identify the organism. The source of infection could have been the gastrointestinal tract or the genital tract. However, the explanation for the chest infection is not immediately apparent, but this might have resulted from a blood-borne infection. Even so, the blood culture taken at the same time as the sputum and ECS cultures did not yield any growth.

Enterococci have been known to demonstrate both intrinsic and acquired resistance to antibiotics. Unlike streptococcal species, enterococci are relatively resistant to penicillin, with minimum inhibitory concentrations (MICs) that generally range from 1-8 mcg/mL for E faecalis and 16-64 mcg/mL for E faecium.[12] Therefore, exposure to these antibiotic agents inhibits but does not kill these species. Combining a cell wall–active agent such as ampicillin or vancomycin with an aminoglycoside may result in synergistic bactericidal activity against enterococci.[12,18] The afore-mentioned informed the choice of Coamoxiclav, combined with the earlier prescribed gentamicin, given to this patient following the culture of E faecalis. There was an observed clinical response within 72 hours and clinical improvement was steady leading to her discharge home with full recovery.

The role of E faecalis in human infections has long been recognized. The dreaded multidrug resistance associated with enterococcal infections has been highlighted in this case presentation. It will appear clinically acceptable that empirical treatment with high doses of a combination of penicillinase-susceptible penicillin and aminoglycoside can be instituted in the face of a multidrug resistant infection, while waiting for reports of specific cultures. The suspicion for E. faecalis infection might be stronger when Gram-positive cocci growing in chains are demonstrated in the Gram stain. The diagnosis will depend, however, on the isolation of esculin positive, lactose, sucrose, mannitol and sorbitol fermenting organisms which are starch-degrading and grow on 6.5% NaCl.[19]

In conclusion, postabortal infection due to Enterococcus faecalis presents a management dilemma, and so early diagnosis will require a high index of suspicion. Furthermore, access to safe abortion helps to minimize the severe morbidity and mortality associated with unsafe abortion.

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Acute Lymphoblastic Leukemia Complicated by Acute Severe Asthma - A Rare Finding: A Case Report

Abstract

Introduction : The leukaemias are a group of disorders characterized by the accumulation of malignant white cells in the bone marrow and blood. These abnormal cells cause symptoms because of bone marrow failure and infiltration of organs; but acute severe asthma has not been reported as one of the manifestations/complications of acute lymphoblastic leukemia.

Objective: The aim of this paper is to briefly review the literature on acute lymphoblastic leukemia and its clinicopathologic relationship with asthma. A case of Acute Lymphoid leukemia being complicated by acute severe asthma is also reported.

Method/Result: I present a 36-year old male welder who came to the hospital with anaemic heart failure, leucocytosis and thrombocytopenia. Final diagnosis of acute lymphoblastic leukemia was made following bone marrow aspiration cytology and was subsequently commenced on chemotherapy. After successful Induction and Consolidation therapy, the patient had Acute Severe Asthmatic attack during the maintenance therapy and subsequently died in the hospital.

Conclusion: Acute Lymphoblastic Leukemia can be complicated by acute severe asthma. Early diagnosis and use of genuine cytotoxic drugs will go a long way to ameliorate the complications of Acute leukemia.gs gave variable results. Local injections with lidocaine were also successful. Refractory cases had surgical decompression.

Conclusion: Entrapment neuropathies were common conditions prevented by early identification and treatment.

Keywords: *Acute Lymphoblastic Leukemia Acute Severe Asthma*

Correspondence:

Introduction

Acute Lymphoblastic Leukemia (ALL) is a neoplastic disease that results from multistep somatic mutation in a single lymphoid progenitor cell at one of several stages of development[1]. Leukemic cells accumulate relentlessly because of their altered response to growth and death signals[2]. They compete with normal haematopoietic cells, resulting in anaemia, thrombocytopenia and neutropenia. At diagnosis, leukemic cells not only have replaced normal marrow cells but also have disseminated to various extramedullary sites such as the liver, spleen, lymph nodes, meninges, gonads and thymus[3].

The presenting features reflect the degree of marrow failure and the extent of marrow spread[4-6]. About 50% of patients present with fever which is often induced by pyrogenic cytokines (such as IL-1, IL-6 and TNF) released from leukemic cells[7,8]. Clinicopathological relationship between asthma and ALL is not extensively documented in literature. The two major components of asthma are chronic airway inflammation and bronchial hyper-responsiveness where inflammatory cytokines play major roles[9]. Many mediator cytokines have been implicated in the asthmatic response. The cytokines (released by lymphoblasts in ALL) provoke acute bronchoconstriction through central and local reflexes together with increased vascular permeability, oedema and mucus secretion. The cytokines are also known to cause influx of eosinophils whose major basic protein cause epithelial damage[10] and airway constriction[11]. This results in coughing, wheezing, chest tightness and shortness of breath. In some patients, the bronchial wall may lead to irresversible obstruction of airflow.

Case Report:

EE is a 36year old welder who presented to the Haematology clinic of Delta State University Teaching Hospital (DELSUTH) on 10/12/2010 with complaints of recurrent fever, cough, abdominal and leg swellings for one month duration. The cough was productive of frothy/whitish sputum, worse at night, distressing and not associated with chest pains. There was high grade intermittent fever associated with throbbing headache and blurring of vision. The abdominal swelling was associated with easy satiety. There was no vomiting and no change in bowel movements. The leg swelling were progressive, associated with orthopnea but no leg pains. There was no bleeding diathesis. He was not a known asthmatic. The essential findings on physical examination were that of a young man in respiratory distress, febrile and severely pale. There was axillary lymphadenopathy and bilateral pitting pedal oedema. The respiratory rate was 48 cycles per minute and there was bilateral coarse crepitations affecting the lower lung zones. The pulse rate was 116 beats per minute and there was hepatosplenomegaly.

Laboratory investigations revealed a packed cell volume (PCV) of 16%, white cell count (WBC) of 95, 100 per mm^3 with lymphoblastosis of 69.5%. The platelet count was 100,000 per mm^3. Malaria parasite was positive (+ + +). Leishman stained Peripheral blood film showed normochromic normocytic red blood cells with increased number of lymphocytes most of them were immature. Bone Marrow Aspiration Cytology showed a hypercellular spiculate marrow with lymphoblasts making 90% of marrow cells. Morphologically, the lymphoblasts were homogenous and having thin rim of basophilic agranular cytoplasm and also increased nucleo-cytoplasmic ratio.

Diagnosis: Acute Lymphoblastic Leukemia (ALL) of FAB subtype L_1 and Anaemic heart failure. The patient was transfused with three units of red blood cells (as packed red cells) and one unit of fresh whole blood. The patient was placed on Induction chemotherapy on 29/12/2010 using the COAP-regimen (Cyclophosphamide, Oncovin, Arabinocide

Cytosine and Prednisolone). He was also treated for malaria using Artemisinin-combined therapy (ACT). The patient achieved remission, and consolidation therapy was given using same regimen. He was doing very well and stable clinically, with his blood counts within normal ranges. He commenced maintenance therapy on 16/2/2011 using methotrexate, vincristine and dexamethasone. On 6/10/2011 while still on maintenance therapy, he was rushed to the Accident and Emergency Unit of DELSUTH with clinical features of Acute severe asthma. He was immediately placed on IV aminophylline, IV hydrocortisone, nebulized salbutamol with oxygen and prednisolone. Repeat of WBC was 156,000 per mm^3. Significant finding on Chest radiograph was hyperinflation of the lungs and air trapping extending to the neck. He died on 21/10/11 while still on admission.

Discussion

There is a great variation in the clinical presentation of patients with leukemia depending on the extent of bone marrow involvement and dissemination to other extramedullary sites [4-6]. The initial complaints of productive cough in this patient which was worse at night was not directly due to the effect of leukemic cells, rather, it was due to congestive cardiac failure secondary to anaemia. Prompt and early management of the anaemia with red blood cell transfusion would have prevented degeneration to heart failure. In addition, early diagnosis of leukemia and commencement of chemotherapy would have also significantly reduced the sequelae of anaemia. The anaemia and mild thrombocytopenia were due to the bone marrow suppressive action of malignant lymphoblasts on erythropoeisis and megakaryopoeisis, respectively. The patient benefited from red blood cell transfusion (as packed red cells) and fresh whole blood (within six hours of donation) to correct the anaemia and thrombocytopenia, respectively. Thrombocytopenia is best treated with platelet concentrate. This patient was given fresh whole blood as an alternative because at the time of presentation, the hospital did not have the facility to make blood products. The patient was responding very well to the chemotherapeutic agents. He was on maintenance chemotherapy when he had acute severe asthma, which has not been reported to be a complication of acute lymphoblastic leukemia. Firstly, there is a possibility of development of resistance to the cytotoxic drugs by the malignant cells leading to their increased proliferation and ultimate extramedullary spread/ dissemination to the lungs. Secondly, one would have expected the intake of steroids to ''prophylactically'' protect this patient from asthma, again the genuineness of the medications may be in doubt because the patient procured some of his drugs outside the hospital. Again, various cytokines and proteins released by clones of lymphoblasts such as IL-1, IL-6 and TNF have been shown to play a major role in the pathogenesis of acute severe asthma[10-11]. This calls for research and possible production of medications against these cytokines as a novel approach in management of asthma arising as a sequelae of acute lymphoblastic leukemia.

Conclusion and Recommendation

Acute severe asthmatic attack is a complication of acute leukemia- a call for

vigilance. It is recommended that our hospitals especially the tertiary healthcare centres should keep in stock and make available chemotherapeutic agents to prevent the use of substandard drugs which can lead to development of resistance by malignant cells. There is need for pharmaceutical research into the area of anti-cytokines medications for asthma treatment.

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Extramedullary Plasmacytoma of the Right Maxillary Sinus- A Case Report

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Introduction

Plasmacytoma's are localized neoplastic proliferations of monoclonal plasma cells. The disease is divided into primary plasmacytoma of the bone and extramedullary plasmacytomas. These are rare, soft tissue tumors arising from malignant proliferations of plasma cells[1]

They primarily occur in the head and neck region usually presenting as soft tissue masses in the nasopharynx and paranasal sinuses[2]

In view of the rarity of the tumor, a case of extramedullary plasmacytoma of the right maxillary sinus is presented, clinical features described and therapeutic options discussed.

Case Report

The patient was a 37 year old Nigerian female who presented with a two year history of persistent nasal obstruction, headache and nasal discharge from the right nasal cavity.

A diagnosis of chronic sinusitis had been made which was suggested by radiographic examination of the paranasal sinuses (figure1) and she was being managed with antibiotics and had 2 episodes of antral washout done. She later presented with a two week history of an ulcerated mass around the nasal region which was associated with a foul smelling discharge three months later.

On examination, minimal patency was found in both nasal cavities worse on right with foul smelling necrotic tissue in the right nasal cavity. There was a dark colored moderate swelling over the right alar region (figure 2) and on probing a defect was found communicating with the right nasal fossa. A nasal clearance biopsy was done and while awaiting histological diagnosis for definitive management, fifth day post operative period patient developed symptoms of peritonitis and aspiration pneumonitis and succumbed to illness while undergoing treatment

Histological examination of the biopsies subsequently confirmed an extramedullary plasmacytoma [EMP].(figure 3)

Discussion

Extramedullary plasmacytoma is an uncommon malignant neoplasm arising outside the bone marrow in patients without clinical evidence of multiple myeloma, with a predilection for the head and neck region[3]. Nearly 80% can be found in the upper respiratory tract or oral cavity[4]. Representing up to 4% of non-epithelial lesions of this region.[5]

Diagnosis from a clinical point of view can

only be suspected and is ultimately made by histological examination.

The tumor arises in the submucosa of the upper respiratory tract or oral cavity. It grows at a variable rate as a polypoid mass or an invasive tumor expanding and destroying any structures in its path, and eventually appearing as a grayish, pink or dark red to purple lobulated mass, varying in consistency in different parts of the tumor from firm to soft and friable. The surface which is lined by intact epithelium or may occasionally be ulcerated, bleeds easily and sometimes profusely on palpation or taking a biopsy.

Small localized lesions may be sessile or pedunculated so as to suggest easy operability. Long standing ones are large and may produce hideous distortions of the features and vast destruction of bony structures.[6]

The symptoms depend on the stage at which the patient presents for treatment, but a common feature is epistaxis[6]. There may be obstruction of the nasal, pharyngeal or laryngeal passages. Pain is usually absent unless there are complications due to infection or pressure on nerves. Other symptoms will depend on the direction of spread into the ethmoids, orbit or cranial cavity[7]

In cases where there is no previous history of plasma cell malignancy, it is important to exclude disseminated disease in the form of multiple myeloma; this should include a radiographic survey of the skeleton and bone marrow biopsy.

As earlier mentioned, diagnosis is made on examination of pathological specimens with immunohistochemical staining techniques. The histological appearance of EMP consists of a monoclonal proliferation of plasma cells set in a very sparse matrix. Cellular and nuclear atypia may be minimal or prominent[8].

Plasmacytomas are very radiosensitive and radiotherapy is the main treatment modality. Surgery can be used effectively for small lesions, or as a salvage procedure. Chemotherapy is reserved for locally advanced recurrent or dissemination disease. Matinson and Pulveitaff noted in their work done on clinical and live cell study of EMP of the upper respiratory tract that in countries like Nigeria where Radiotherapy is not readily available, chemotherapy is of particular interest especially as most cases present for treatment when the lesions is beyond surgical intervention alone. As the progress of the disease is unpredictable, it would be rash to claim full success for any form of treatment, especially in advanced stages of the disease, but the response to chemotherapy in a small group seen by them was encouraging enough to suggest that this form of treatment may be if developed satisfactorily, a useful adjunct to radiotherapy. It is hoped also that multiple lesions will respond to it where total body irradiation may be considered dangerous, even if it were available[9].

Prognosis is fair, as it is a low grade tumour, 5 year survival is usually most favourable amongst the younger age group(less than 60 years) and poorest amongst the older age group(60+ years) decreasing from 76.6% to 53.3% [10]

Conclusion

A rare tumour of the head and neck region, extramedullary plasmacytoma has been presented occurring in the right maxillary antrum with symptoms suggestive of maxillary sinusitis, in view of the urgent need to make a correct diagnosis at the earliest possible time and institute proper management in these patients its clinical features have been highlighted and treatment

modalities discussed.

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