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EDITORIAL

BREAST CANCER IS CURABLE

World Cancer Day is marked on February 4 each year to raise awareness of all cancers and to encourage prevention, detection, and treatment. However, the cancer that receives most attention every year (and perhaps rightly so) is Breast Cancer, observed throughout October as Breast Cancer awareness month. Every year, there are a lot of activities to create awareness and educate the public about the disease. After all, it is the leading cancer in the country and the leading cause of all cancer deaths in Ghana. Moreover, Breast Cancer evokes a lot of emotion for men and women alike since it is often associated with loss of the breast, a symbol of femininity, beauty and womanhood.

Late presentation of breast and other cancers remains one of the biggest problems with cancer management in Ghana and other lower and middle income countries (LMICs). It is associated with more advanced stage disease, more expensive treatment, more extensive treatment (e.g. mastectomy rather than breast conservation) and poorer prognosis. Late stage disease patients also often suffer from advanced local disease that is difficult to treat and is associated with misery from offensive discharge, ulceration, bleeding and pain. They may need other interventions to deal with complications and metastatic disease. With breast cancer, patients might need draining of pleural effusions and prolonged chemotherapy with its associated side effects.

Results from a recent study from the Radiotherapy Department in the Korle Bu Teaching Hospital, however, show that 5-year survival from Stage 0 and 1 Breast Cancers was as high as 92%, while Stage 4 cancers were as low as 15%. The 5-year survival also decreased with increasing tumour size and increasing number of axillary lymph nodal involvement, both related to late presentation.

The high 5-year survival rate in patients with early stage breast cancer shows that we have the ability to 'cure' most of the patients with breast cancer provided they report early to hospital. This is a message that needs to be emphasized – that early presentation will save lives, that breast cancer can be cured. The improvements that have occurred globally in cancer survival have basically been as a result of early detection (especially through screening) and advances in treatment options and capabilities (e.g. targeted treatment). Effective treatment of cancer also involves multidisciplinary teams working synergistically to offer comprehensive treatment.

Ghana is making slow but significant strides in the fight against cancer. Subspecialty development and multidisciplinary team management of cancer needs to be continued and intensified. Policy makers also need to pay greater attention to non-communicable diseases and to cancer in particular. This is important since the WHO predicts an increase in breast cancer incidence in LMICs.

Treatment of cancer is not at all cheap. Even breast and cervical cancer patients, whose treatment is supposed to be covered by the National Health Insurance Scheme (NHIS), often have to pay a lot out of pocket. Indeed, finance has been cited by many authors as one of the reasons for patients' failure to undergo treatment. Innovative ways of healthcare financing therefore need to be adopted, even by NHIS.

With intensive and effective education, screening, multidisciplinary team work and effective treatment, the fight against cancer can be won in developing countries like Ghana. Cancer is no longer a death sentence; it is curable.

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ORIGINAL ARTICLES

A PROSPECTIVE COHORT STUDY OF CLOSED FOOT INJURIES IN A TERTIARY HOSPITAL IN GHANA

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Abstract

Objective: Our objectives were to determine the proportion of closed foot injuries and their treatment outcomes at a large trauma hospital in Accra, Ghana.
Methods: A structured questionnaire was used to record, for each patient, the type of closed foot injury, the mechanism of injury, any concomitant injuries, the time interval between injury and arrival at the KBTH for treatment as well as the type of treatment instituted.
Enrolled patients were followed up for six months, complications resulting from the foot injury or its treatment were recorded for each patient. The function of the foot after healing of the injury was measured using the American Foot and Ankle Society Score.
Results: A total of 46 patients presented with closed foot injuries, males accounted for 58.7% and females 41.3%. Road traffic trauma was by far the most predominant cause of injury accounting for 63% of cases. Soft tissue contusions involving the foot had excellent outcomes after treatment; displaced metatarsal shaft fractures treated with open reduction and internal fixation with K-wires had a good outcome; displaced metatarsal shaft fractures treated with cast immobilization had unfavorable outcomes. Non-operative treatment of Lanfranc fracture-dislocation with cast immobilization resulted in severe limitation of climbing stairs, shoe wear, walking on uneven surfaces and inability to return to previous occupation.
Conclusions: Displaced intra-articular calcaneal fractures cause significant persistent foot pain after treatment and Lisfranc fracture-dislocations have unfavorable outcomes if treated conservatively with cast immobilization alone. Fractures of the foot cause a long-term morbidity with residual foot pain, limitation of foot wear, climbing stairs, walking on uneven surfaces and difficulty integrating into previous occupation. The resulting foot dysfunction is worse if the fracture is not appropriately stabilized.

Key Words: Close Foot, Injuries, Management

Introduction

Injuries constitute a significant cause of morbidity and mortality globally accounting for about 10% percent of the 2013 global burden of disease [1]. In fact, an estimated number of 973 million people were reported to have sustained injuries that required some form of healthcare with 4.8 million mortalities being attributed to it in 2013[1]. Published literature on the burden of injuries to the foot seems limited, particularly in low and middle income countries, however, a number of studies have documented the dramatic impact of foot injuries on the overall health, activity, and emotional status of patients [2,3,4]. Moreover, multiply injured patients who have an associated foot injury tend to have a poorer long term outcome[5]. Furthermore, in spite of appropriate treatment of foot injuries, long term ambulatory dysfunction and neurogenic foot pain may occur[6]. Additionally, foot injuries may be complicated by malunion, bony impingement, joint stiffness, osteonecrosis and post-traumatic osteoarthritis which may be disabling[6].
Motor cycle crashes have been implicated in most injuries [1] with foot injuries being reported as one of the most common consequences of motor cycles accidents[2]. The ultimate goal of treating foot injuries is the restoration of a painless, stable and plantigrade foot[6].

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Conflict of Interest: None Declared

Methods

Setting

The study was conducted at the Accident Centre of the Korle-Bu Teaching Hospital. The Korle- Bu Teaching Hospital provides diagnostic, therapeutic, rehabilitative and preventive services to people from all over Ghana as well as people from neighboring countries. It provides Trauma and Orthopaedic services for patients 24 hours a day.

It is currently the third largest hospital in Africa and the leading national referral center in Ghana.

The hospital has 2,000 beds and 17 clinical and diagnostic Departments/Units. It has an average daily attendance of 1,500 patients and about 250 patient admissions.

Data gathering

All patients with a closed foot injury who presented to the Accident Centre of the KBTH over a four-month period, from 1st July 2012 to 31st October 2012 and were recruited and followed-up until 30th April, 2013.

A structured questionnaire was used to record the type of closed foot injury, the mechanism of injury, any concomitant injuries, the time interval between injury and arrival at the KBTH for treatment as well as the type of treatment instituted either non-operative or operative. For patients who underwent operative treatment, the type of surgery was recorded. Patients with foot injury in which there was a break in the skin of the foot were excluded.

During the follow-up period, complications resulting from the injury or its management were recorded for each patient. The function of the foot after healing of the injury was measured using the American Foot and Ankle Society Score (Appendix 2).

Clinical examination and radiographs were used as tools.

All necessary radiographic investigations were done accordingly and findings recorded. Information was collected on demographic characteristics, the place, mechanism and duration of injury. A clinical examination was done to assess the general condition of the patient, osseous and soft tissue injuries. X-rays of the foot were taken to confirm the presumptive diagnosis, special views were taken as required. Computerized tomography scan and magnetic resonance imaging were requested as indicated. The imaging results were interpreted with the help of a radiologist where necessary. The type of closed foot injury and the treatment modality were recorded for each patient. Complications of injury and complications of treatment that arose during the follow-up period were recorded as well.

Only patients with injuries to the foot in which there was no break in the skin of the foot, as determined during the treatment of the injuries, were considered for this study.

At six months, the function of the foot was measured using the American Foot and Ankle Society Score and documented.

Patients who refused to take part in the study, patients with non-mechanical trauma to the foot such as burns were excluded from this study, as well as patients who had underlying bone pathology.

Patients with traumatic foot injuries with lack of clear identification, missing or lack of complete history on mechanism of injury and absence of relevant imaging were excluded from the study. Patients with open foot injuries were not considered for inclusion.

Results

Over the 4-month inclusion period, 46 patients presented with closed foot injuries at the KBTH and their characteristics are summarized in Table 1. Most individuals were young adult males who sustained injuries from motor vehicular crashes. There were significant delays from the time of injury to KBTH arrival.

The fracture of the calcaneus and the lisfranc fracture-dislocation involved male patients.

Most of the injuries happened on the road. In addition, motor vehicular accidents (MVA) involving pedestrians, motor cycle riders, pillions and car passengers represented 63% of all causal mechanisms put together.

Substance Use

This study sought to establish whether the patients who sustained closed foot injuries were under the influence of alcohol or not. Out of the 46 patients, three of them representing 6.5% of the patients and presenting within 24 hours after injury had alcoholic foetor on their breath.

The proportion of non-MVA mechanisms of injury represented 37% of cases. Among them, falls had the highest percentage (26.1%). The falls involved: a fall from a height, falls from stair cases, falls following tripping over wet surfaces, falls into gutters and blunt objects falling on the foot.

Pedestrians happened to be most of the victims, following a strike by car or motor bike.

Injuries sustained

The types of closed foot injuries sustained by the patients who were studied were categorized into: painful swollen foot as a result of soft tissue contusion, with no radiographic evidence of a fracture. This category registered the highest number of patients. There were two cases of calcaneal fractures, 4 cases of displaced metatarsal shaft fractures and 1 case of lisfranc fracture-dislocation.

There was no case of bilateral closed foot injury recorded during the study period.

Table 1 Distribution of 46 closed foot injuries by age, gender, site of injury, mechanism of injury and time lapse from injury to hospital arrival

Characteristic	Number	Percentage
Age		
0-5	4	8.7
6-18	5	10.9
19-49	26	56.5
>50	11	23.9
Gender		
Male	27	58.7
Female	19	41.3
Site of injury		
Workplace	5	11
Home	6	13
Sports	3	6
Road	32	70
Mechanism of injury	3	6.5
Motorbike rider	2	4.3
Motorbike pillion	9	19.6
Motorbike pedestrian	12	26.1
Car pedestrian	3	6.5
Car passenger	12	26.1
Fall	4	8.7
Footballer	1	2.2
Workplace trauma		
Foot injury type		
Soft tissue contusion	39	84.8
Metatarsal fracture	4	8.7
Calcaneal fracture	2	4.3
Lisfranc-fracture dislocation	1 **(1 case is not enough)**	2.2
Time lapse from injury to hospital arrival	**16**	35
< 6hours	**13**	28
6-24hours	**17**	37
>24hours		

Out of the 23 males who had painful swollen foot, 14 (60.9) sustained the injury to the right foot and in the remaining 9 males (30.1) the injury involved the left foot.

Seven of the female patients representing 43.9% sustained the injury to the right foot whilst the injury involved the left foot in the remaining 9 (56.1%). Thus, female patients dominated in left foot injuries whilst males dominated in their right foot injuries.

Associated Injuries

Of the patients studied, 3 accounting for 6.5% of the patients had other injuries in addition to the foot injury.

Fall of an object on the left foot

Fig 1: Lisfranc fracture-dislocation of the left foot, showing flattening of the mid-foot.

The associated injuries were distal radial fracture in association with a lisfranc fracture-dislocation, humeral shaft fracture and a patella fracture. All 3 patients who had associated injuries were pedestrians. Two were knocked down by a car and the other by a motor cycle.

Treatment Methods

The foot injuries in this study, were treated in one of several ways depending on the type of closed foot injury.

One of the two calcaneal fractures was intra-articular and displaced.

It was fixed with two 6.5mm lag screws after open reduction and the other one which was extra-articular with minimal displacement was treated with cast immobilization.

Reduction and fixation were verified with the aid of fluoroscopy. The Lisfranc fracture-dislocation was treated with manipulation and casting. One of the 4 metatarsal shaft fractures was treated with open reduction and K-wire fixation and the other 3 patients underwent cast stabilization.

Fig. 2: Check x-ray of open reduction and Kirchner wire fixation of fracture of the shafts of the left 2nd, 3rd, 4th and 5th metatarsals.

Treatment Outcomes

The functional outcomes of the patients enrolled into this study depended on the type of closed foot injury that was sustained and the treatment method administered. The patients who had soft tissue contusions had excellent outcomes at six months. Patients who had closed metatarsal shaft fractures which were treated with open reduction and internal fixation with K-wires had a favorable outcome at six months.

The extra-articular calcanael fracture treated with cast immobilization had a good functional result. The displaced intra-articular calcaneal fracture treated with open reduction and screw fixation had significant heel pain at six months.

The Lisfranc fracture-dislocation which was treated non-operatively had significant pain with severe limitation of climbing stairs, shoe wear, walking on uneven surfaces and had been unable to return to previous occupation at the time of follow-up

Table 2 Distribution of 46 closed foot injuries by injury type, treatment method and functional outcome at 6-months

Injury type	Treatment method	Outcome
Soft tissue contusion	P.O.P cast	All patients in this category had normal gait, foot pain during physical activity ranged from no pain in some subjects to mild pain in others; all subjects could stand on the affected foot, were able to walk on uneven ground and had returned to their previous occupation.
Metatarsal shaft fracture	Closed Reduction + k-wire fixation and P.O.P. cast	All subjects had normal gait; foot pain during physical activity spanned from mild pain in some subjects to moderate pain in others. Those with moderate pain were those who had multiple metatarsal shaft fractures. All patients in this group could stand on the affected foot, two had returned to their previous occupation and two had not on account of foot pain (had multiple metatarsal fractures), walking on uneven ground was painless in three subjects. One subject had mild pain on performing this activity.
	Manipulation + P.O.P casting	Gait was normal for all subjects, foot pain during physical activity was a compliant of all of them, all could stand on the affected foot and had returned to previous occupation; there was pain when walking on uneven ground.

Table 2 Continuation: Distribution of 46 closed foot injuries by injury type, treatment method and functional outcome at 6-months

Injury type	Treatment method	Outcome
Calcaneal fracture	Displaced intra-articular fracture: open reduction + internal fixation with 6.5mm lag screws + Plaster slab	This subject could stand on the affected foot but had a limp, foot pain during physical activity, pain walking on uneven ground, heel pain on wearing normal shoes and failure to resume previous occupation.
	Extra-articular fracture: manipulation + P.O.P. casting	There was no pain standing on the affected foot and the gait was normal. The subject had mild to moderate foot pain during physical activity and when walking on uneven ground, mild heel pain on wearing normal shoes and had returned to previous occupation.
Lisfranc fracture-dislocation	P.O.P. Cast	There was a limp, foot pain during physical activity, had significant pain walking on uneven ground, difficulty wearing normal shoes, Pain on standing on the affected foot longer than 10 minutes and had been unable to resume previous occupation.

Discussion

It was found in this study that the highest rate of closed foot injuries involved people aged between 19 and 49 years. Similarly, a study by Afukaar and colleagues to assess the impact of road traffic trauma in Ghana found that road traffic trauma in Ghana often involved people in their productive age [7]. Although this study looked at only closed foot injuries, it portrayed a similar trend of youth preponderance of foot injuries following road traffic trauma.

In addition, it was identified that more males than females sustained closed foot injuries i.e. 58.7% males as against 41.3% females. This is comparable to findings from Jeffers[3], Boon Tan, Nicolopoulos, Kamath, & Giannoudis, (2004) in their study on the prevalence and patterns of foot injuries following motorcycle trauma in the United Kingdom where 49 males (92.5%) out of 53 patients suffered foot injuries. Also, a study on citywide trauma experience in Kampala, Uganda, found that 73% of 4359 injury patients were males and concluded that injuries in Kampala involved predominantly young adult males [8].

In this study road traffic trauma accounted for 63% of all cases of closed foot injuries and pedestrians predominated, both by car and by motor cycles constituting 45.7% of cases.

There was a statistically significant difference between closed foot injury and the site where it was sustained with injuries occurring on the road accounting for 63% of all sites of occurrence put together (p-value < 0.05).

In a similar vein, Kobusingye et al., (2002)[8] in their study of injuries in Uganda, found that 58% of injuries occurred on the road, 29% at home and 4% in a public building. They, therefore, concluded that injuries in Kampala were mostly due to road traffic accidents.

Motor cycle injuries accounted for 30.4% of cases of closed foot injuries in this study. Naddumba (2001) reported similar findings in Uganda where motorcycle injuries accounted for 25% of all injuries in Mulago Hospital[9]. The high incidence of foot injuries suffered through motor cycle accidents in this study could be due to the increasing number of commercial motor cycle services on the streets of Ghana, most of whom violate the road safety measures in the country.

The influence of alcohol has been associated with a higher than normal risk of injury in a number of studies [10]. It is therefore not surprising that 6.5% of the patients in this study were found to have been under the influence of alcohol. This was established by the patients admitting to the ingestion of alcohol or the detection of alcoholic foeter on their breath, this notwithstanding, a more scientific means of measuring serum alcohol levels or a larger sample size might have detected more patients to have been under the influence of alcohol.

Most (84%,) of the injuries in this study, were minor foot injuries, however only closed injuries to the foot were considered. The right foot (45.7%) more than the left (39%) suffered most of the closed foot injuries, however the reason for the right foot predominance could not be established by the study.

Patient who presented within 6 hours after the injury represented 34.8% of all cases and those who presented between 6-24 hours were represented 28.2%%, and 37% reported after 24 hours. Also, 65.2% of patients presented to hospital after 6 hours following

the injury. This late presentation was probably due to the absence of visible bleeding or trivialization of the foot injury by the patients involved or their guardians.

Most (65.2%) of the patients in this study reported to the health facility after 6 hours following the injury with 34.8% presenting within 6 hours after the injury. Contrary to our findings, Kobusingye and colleagues[8] reported in their study that two thirds of the injured patients arrived in hospital within 30 minutes of injury. Trivialization of foot injuries could account for the late presentation of injuries to the health facility in this study as compared to Kobusingye and colleagues' study in which all injuries were studied.

Three (6.5%) of the patients in this study had other injuries in association with a foot injury. The patients who had associated injuries, in this study, were all victims of road traffic accidents as pedestrians. The presence of associated injuries is likely due to the higher energy transfer involved in road traffic crushes

Functional Outcomes

Treatment outcomes of closed foot injuries in this study depended on the type of closed foot injury. The patients who had soft tissue contusion without a fracture of a bone of the foot, had a good to excellent outcome at six months. The favorable outcome of these injuries was probably due to their minor nature.

Patients who had closed metatarsal fractures which were treated surgically by open reduction and internal fixation with K-wires had a good functional outcome at six months. The group of patients whose displaced metatarsal shaft fractures were treated with cast immobilization had persistent pain and limitation of walking on uneven surfaces at six months.

Open reduction and internal fixation of metatarsal fractures has been shown to have a superior outcome to non-operative treatment such as cast stabilization alone[11]. Arntz, Veith, & Hansen, (1988) also concluded in their study that failure to achieve an anatomic reduction of metatarsal fractures were the most important determinants in the development of posttraumatic arthritis of tarsometatarsal joints.

The poor outcome of displaced intra-articular calcaneal fractures, as found in this study, can be attributed to articular cartilage damage that often accompanies these injuries. It has been shown in other studies, that injuries below the knee are tied to higher rates of unemployment, longer sick leave time, more pain, more follow-up surgeries and decreased overall outcome[12,13,14].

Similarly, at four months follow-up, patients who sustained fractures involving the foot making up 15.2% of all patients studied were unable to wear normal shoes and had significant limitation in terms of performing previous jobs.

The TMC injury that was recorded in this study was treated non-operatively by cast stabilization alone. At six months of follow-up this patient had persistent foot pain that limited ability to climb a staircase, wear normal shoes and to tip toe on the affected foot. Although, our sample size was small, the unsatisfactory outcome of non-operative treatment of TMC injuries has been shown by many other studies[14].

Cassebaum, (1963) explains that nonsurgical management of TMC injuries should be limited to those that were without fracture, nondisplaced, and stable under radiographic stress examination. As little as 2mm of displacement or the presence of a fracture within the TMC warrants fixation[15].

Regardless of the technique used, the goal in the treatment of TMC injuries should be anatomic reduction of the affected joints, as numerous studies have documented that clinical outcome correlates with accuracy of reduction[15].

Conclusions

Road traffic trauma is by far the most predominant cause of closed foot injuries, accounting for 63% of cases in this study.

A limitation of this study was the small number of foot fractures involved **(Admittance of the small sample size).** A larger number of calcaneal fractures and lisfranc fracture-dislocations would have provided a stronger basis to draw conclusions.

Persistent foot pain and limitation of foot function is likely in patients with displaced intra-articular calcaneal fractures treatment.

Additionally, a Lisfranc fracture- dislocation has poor outcomes when treated non-operatively with cast immobilization.

Thus, injuries to the foot cause long-term morbidity and has the potential to confer residual foot pain, limitation of foot wear, climbing stairs, walking on uneven surfaces and difficulty integrating into previous occupation.

Appendix 1

QUESTIONNAIRE

1. Date and time of injury: ……..
2. Demography
(i). Name: ……
(ii). Age: …….

(iii). Sex: ……
(iv). OPD No: …….
(v). Occupation: ……
(vi). Region: ……
(vii). Locality: ……
(viii). Telephone No: ……..

3. Mechanism of Injury
(i). MVA: Car ☐ Motorbike ☐ Bicycle ☐
Rider ☐ Passenger ☐ Pedestrian ☐
(ii). Fall from a height ☐
(iii). Assault ☐
(iv). Gunshot ☐
(v). Others ☐

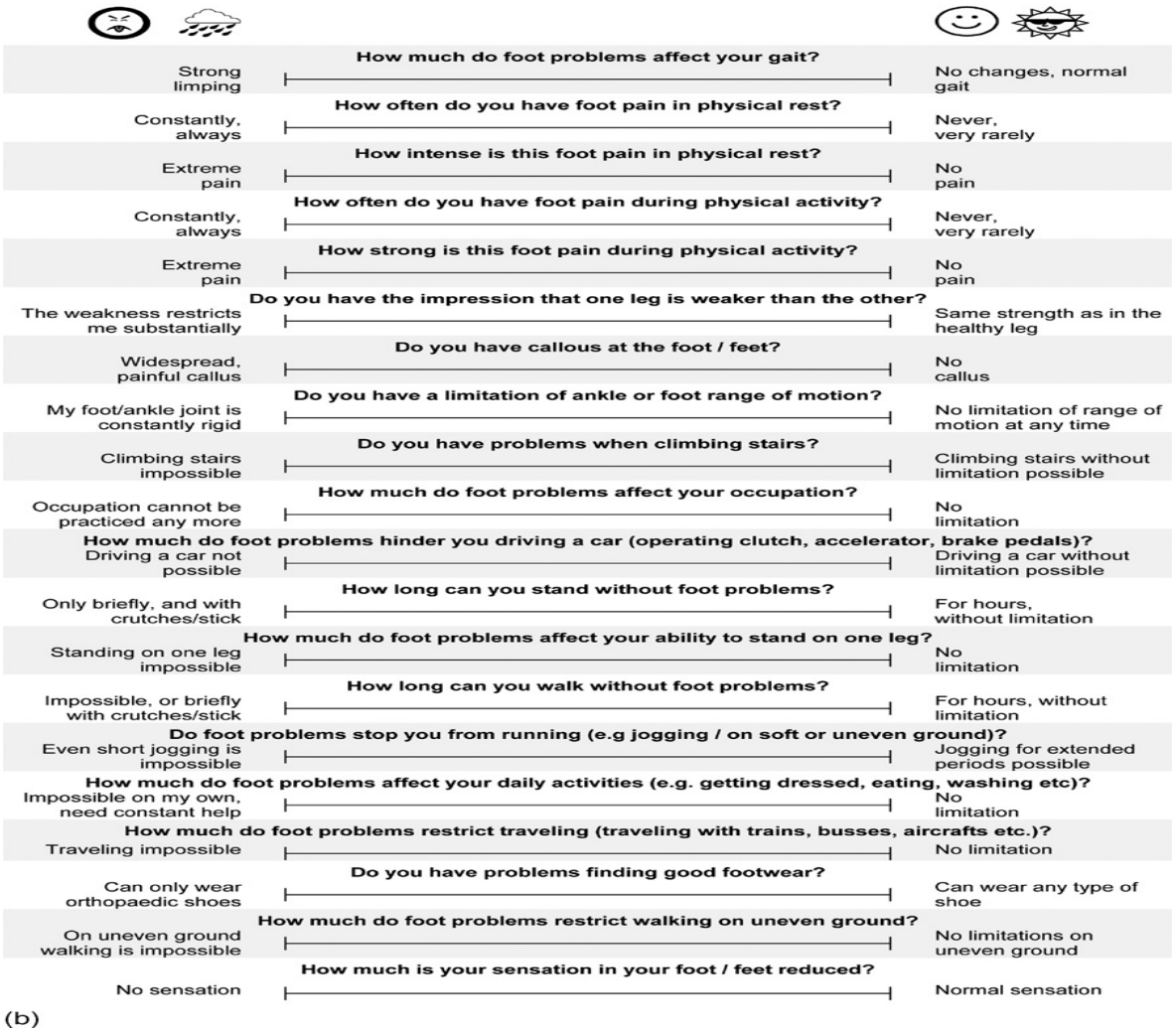
4. Formal Education Level:
a) None ☐ b) Primary ☐ c) Secondary ☐ d) Post-Secondary ☐
e) University ☐
5. Substance use:
a) Alcohol ☐
b) Tobacco ☐
c) Other ☐
6. Radiological Findings and Diagnoses: Open ☐ Closed ☐
7. Site of injury:
(a) Road ☐ (b) Workplace ☐ (c) Home ☐
(d) Others……
8. Associated Injuries
(i). Head ☐
(ii). Chest ☐
(iii). Abdomen ☐
(iv). Pelvis ☐
(v). Other Fractures ☐

9. Time of Presentation after the Injury
(i). Less than 6 hours ☐
(ii). 6-24 hours ☐
(iii). More than 24 hours ☐

10. Treatment: Stabilization
(i). P.O.P cast ☐
(ii) External fixation ☐
(iii). K-Wire Fixation ☐
(iv). Screws ☐
(v). Others ☐

Appendix 2

New Foot and Ankle Outcome Score: Questionnaire Based, Subjective, Visual-Analogue-Scale



(b)

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RESPIRATORY VIRAL INFECTIONS IN PEDIATRIC ACUTE LEUKEMIA PATIENTS PRESENTING WITH FEBRILE NEUTROPENIA IN A TERTIARY HOSPITAL IN ANKARA, TURKEY

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Abstract

Background: The prevalence and roles of respiratory viral pathogens in pediatric acute leukemia patients with febrile neutropenia is not well understood and laboratory tests to detect viral agents are not a routine practice in the investigation of these patients.

***Patients and methods*:** The medical records of 50 neutropenic episodes in pediatric acute leukemia patients in the Hacettepe University Children's hospital, Ankara-Turkey, were reviewed. Blood samples were obtained for blood culture, aspergillus antigen and other routine tests. Nasopharyngeal aspirate samples were collected and transferred to the laboratory in a viral transport medium. Therapy for febrile neutropenia was initiated according to our institution's protocols.

Results: Fifty (50) consecutive febrile neutropenic episodes in 44 pediatric ALL and AML patients were included in the study between 1st October 2009 and 31st August 2010.

Microbiologically documented infections were found in 36% of the episodes, clinically documented infections in 16% of the episodes and 48% of the episodes were accepted as Fever of Unknown Origin. Twenty-two percent (22%) of the microbiologically documented infections were due to viral agents, 56 % were due to Gram positive bacteria, 21% were due to Gram negative bacteria (*E. coli)* and only one episode of fungemia was documented.

***Conclusions*:** Fever of Unknown Origin constituted nearly 50% of the febrile neutropenic episodes in this study despite the availability of advanced laboratory diagnostic methods. Among the episodes with microbiologically documented infections, bacterial pathogens were especially common. Presenting complaints like cough and rhinorrhea are not specific to a viral etiology and care should be taken not to miss potentially threatening bacterial pathogens in such episodes.

Key Words: Acute leukemia, febrile neutropenia, children, nasopharyngeal aspirate, Polymerase Chain Reaction

Introduction

Acute leukemia is the most common cancer encountered in children and is a leading cause of death in this population [1,2]. One of the severe complications encountered during the management of acute leukemia in children is febrile neutropenia (FN) which often leads to delay and or suspension of much needed chemotherapy protocols [3]. This is due in part to the ever-emerging new and potent chemotherapeutic agents, which, while bringing the primary disease under control, also lead to severe and prolonged suppression of the bone marrow. Patients with hematological malignancies frequently develop fever associated with neutropenia, which is a leading cause of morbidity and mortality in these groups of patients [4]. Previous reports on this topic show that about 30 – 60% of febrile neutropenic episodes have an infectious etiology, with the focus mostly on bacterial and fungal pathogens and very little on viral pathogens [5-7].

Respiratory viruses are a common cause of morbidity in children[8] and thus may be significantly involved in the pathogenesis of FN among this group. Previous studies using real time Polymerase Chain Reaction (PCR) analyses have reported the detection of respiratory viruses in the nasopharynx in 44 – 57% of childhood febrile neutropenia cases [9,10].

Although respiratory viruses are a common cause of self-limiting febrile infections in healthy children, their frequency and significance in the neutropenic child with fever is not well appreciated [11]. Very few studies have explored the viral etiologies of FN [11,12] while much more research studies rather focused on the bacterial etiologies within this setting [13].

This prospective study was conducted to evaluate the frequency of respiratory viral pathogens and their roles in FN encountered in pediatric acute leukemia patients managed in a tertiary institution.

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Patients and Methodology

Study Group

Children 18 years old or younger who were diagnosed of Acute Lymphocytic Leukemia (ALL) or

Acute Myeloid Leukemia (AML) and routinely received chemotherapy and other immunosuppressive agents at the Pediatric Hematology Division of the Children's Hospital, Hacettepe University Faculty of Medicine, were evaluated for inclusion into the study when they developed FN. Patients who developed FN while on admission in the hospital were excluded from the study because of the risk of pathogen exposure and change in flora. The study was conducted between 1st October 2009 and 31st August 2010 and it was approved (approval number: 09/123-22) by the Internal Reviews Board of Hacettepe University Faculty of Medicine, Ankara, Turkey. Consent to participate was obtained from parents and/patients.

The hospital records of all patients were reviewed for demographic information, underlying malignancy, duration of follow-up, stage of chemotherapy protocol, relapse of disease, duration of neutropenia, interval since the last chemotherapy, number of previous neutropenic episodes and Granulocyte- Colony Stimulating Factor (G-CSF) use. Detailed history of the current febrile neutropenic episode including duration of fever before presentation to hospital, maximum temperature, associated respiratory symptoms like cough, runny nose, eye discharge and rashes and a family member with symptoms of upper respiratory tract infection in the last week was documented. All FN episodes were managed as inpatients according to standard guidelines and the study institution's protocols.

Data Collection techniques

Peripheral and central line blood cultures were collected into BACTEC PED. Plus^{R} bottles following standard sterilization precautions and incubated in BACTEC^{R} automatic reading machines in the central microbiology laboratory of the study institution. Samples that did not produce a positive signal at the end of the tenth day of incubation were considered negative for microbial agents. Nasopharyngeal aspirates were obtained by placing a thin nasogastric tube into the patient's nostril and irrigating with normal saline. Samples were transferred to the laboratory in a viral transport medium within 48 hours according to manufacturer's guidelines, where the Seeplex^{R} Respiratory Pathogen 18-plex kit was used for detection of viral pathogens by the multiplex PCR method. Aspergillus galactomannan antigen was detected using the Platelia^{R} Enzyme Immunoassay. The Cut-off value was 0.5 ng/ml.

The vital signs of the patients and complications due to infection or antibiotic therapy were monitored after admission, per inpatient management guidelines of the study institution, and further laboratory analysis such as repeat blood cultures were performed based on clinical course of individual patients.

Definitions

For this study, **neutropenia** was defined as Absolute Neutrophil Count (ANC) of < 1000/mm^3 or between 1000-1500/mm^3 but expected to fall below 1000/mm^3 within 48 hours [14]; and **fever** was defined as a single axillar measurement of 38.5^{o}C or 2 or more measurements within 4 hours of body temperature > 38^{o}C[15,16].

Statistical analysis

The data obtained from this study was evaluated using the SPSS 15.0 for Windows (SPSS Inc, Atlanta, USA) packet program. The results were analyzed and presented in tables as counts, frequencies, means and percentages. Initially univariate analysis was used to test for significance. Non parametric variables were also evaluated with the Mann-Whitney U test. P values less than 0.05 was considered statistically significant for each of the variables analyzed.

Results

*Distribution of the study group***:**

One hundred and three (103) children with acute leukemia were managed at the Division of Pediatric Hematology of the institution during the study period. Out of these, 44 patients and 50 consecutive FN episodes were included in the study. Table 1 shows the demographic and baseline characteristics of all the episodes. The age and sex distribution of the FN episodes were similar to the general patient population managed in the division of Pediatric Hematology. 88 % of the acute leukemia patients in the division had ALL, while 68 % of the FN episodes were also ALL patients. There was an indwelling central venous line in 98 % of the episodes. Four (4) patients had 2 FN episodes and one had 3 episodes during the study period. About 90 % of the episodes developed FN within 15 days of the last chemotherapy.

Thirty-six percent (36%) of the FN episodes in this study was classified as microbiologically documented infections. Bacteremia was the cause of all the microbiologically documented infections and Gram positive bacterial pathogens constituted about 60% of the isolated pathogens. Coagulase negative *Staphylococcus spp.* were the most commonly isolated Gram positive bacteria and *E. coli* was the most common Gram negative bacteria isolated in culture-positive episodes (Table 2). Seventy-five percent (75%) of the respiratory viral agents detected by the multiplex PCR method were due to Influenza A. Twenty-six percent (26 %) of the cases were classified as clinically documented infections while 48 % were classified as fever of unknown origin (FUO). Out of the 11 FN episodes with mucositis at presentation, *E. coli* was isolated in the blood cultures of 2, *Methicillin Resistant Staphylococcus Epidermidis(MRSE)* in 1 and *Streptococcus spp.* in 1 episode.

Table 1: Demographic and baseline characteristics of patients with FN

Characteristics	Patients managed in the hematology division; n (%)	Patients with FN; n (%)
Sex Female Male	 38(37) 65(63)	 14(32) 30(68)
Mean age(years)	9,5	8,9
Underlying malignancy ALL AML	 91(88) 12(12)	 34(68) 16(32)
Central venous catheter Present Absent	 - -	 49(98) 1(2)
Relapse patients		13 (26)
Recurrent episodes of FN		5 (10)
Mean interval since last chemotherapy (days)		8,5

Table 2: Etiological classification of FN episodes.

Classification	n (%)
Microbiologically documented infection	18 (36.0)
Bacteremia	
- *MRSE*	6 (28.0)
- *MSSE*	2 (11.0)
- *Streptococcus spp.*	1 (6.0)
- *E. coli*	3 (15.0)
- *Acinetobacter spp.*	1 (6.0)
- *Salmonella spp.*	1 (6.0)
- *Candida* spp.	1 (6.0)
Viral PCR (nasopharyngeal aspirate)	
- Influenza A	3 (16.0)
- Human Rhinovirus	1 (6.0)
Clinically documented infections	13 (26.0)
FUO	24 (48.0)

Twenty-six percent (26%) of the FN episodes had runny nose and 38% had cough as an associated symptom at presentation. Mucositis was detected in 22% and respiratory distress in 4% of the episodes at initial evaluation. All the episodes for which a viral agent was detected by the multiplex PCR had at least a cough or runny nose, which are frequent in viral respiratory infections, at presentation. Among the culture-positive episodes, 8 (47 %) had at least one of these symptoms at presentation as shown in Table 3.

Table 3: Frequency of cough and rhinorrhea in viral PCR and blood culture-positive and negative episodes of FN.

	Viral PCR		Blood culture	
	(+)	(-)	(+)	(-)
Rhinorrhea (n)	2	5	6	5
Cough (n)	3	9	5	11

Statistically, there was no difference in the duration of fever (mean 12.7 versus 4.2 days, p=0.085) and the duration of antibiotic therapy (mean 22 versus 13.7 days, p=0.075) between the viral PCR positive episodes and the culture-positive episodes. However, as shown in Table 4, there was clearly a numerical difference between the 2 groups with the duration of fever and of antibiotic therapy, tending to be shorter in the culture-positive FN episodes. There were also no significant differences in mean previous neutropenic episodes (p=0.600), ANC at presentation (p=0.650), mean age (p=0.150), duration of neutropenia (p=0.100) and the frequency of antibiotic modification (p=0.240) among the group with microbiologically documented infections in a univariate analysis (Table 4).

Table 4: Comparison of FN episodes according to the microorganisms isolated

	Viral PCR positive (n=4)	Culture-positive (bacterial pathogens) (n=14)	Other (n=1)	P value
Mean neutropenic episodes (days)	4.5	2.6	2.0	0.600
Mean age (years)	10.0	7.6	7.0	0.150
Underlying malignancy				
ALL	1	10	1	NA
AML	3	4	0	NA
Central line (%)	50	100	100	NA
Symptoms at presentation(n)	2.0	4.0	1,0	0.580
ANC (/mm^3) at presentation	250	250	600	0.650
Mean CRP level (mg/L)	10.1	14.0	-	0.125
Mean duration of neutropenia (days)	3.6	6.6	5.0	0.100
Mean fever duration (days)	12.7	4.2	1.0	0.085
Antibiotic modification (n)	6.0	17.0	1.0	0.240
Mean length of stay and duration of treatment	14.5	11.8	-	0.814

Discussion

Infectious complications are an important cause of morbidity and mortality in pediatric cancer patients. It often leads to delays and/or suspension of chemotherapy protocols [3]. Despite the advancements in medicine, inpatient management is still the mainstay for acute leukemia patients with FN.

Bacteria are the most common microbial agents isolated in FN patients but with prolonged fever, the risk of fungal infections increase [17]. However, despite the advanced microbiological culture techniques available, bacterial pathogens are only isolated from 1/3 of all FN episodes and in 1/5 of episodes infections can only be documented clinically [18].

Most previous studies conducted on the etiology of FN have focused more on bacterial pathogens [19,20]. There are however, few studies in the literature investigating viral agents as an etiologic cause in FN and in most centers laboratory investigations for viral agents is not a routine practice [12,21,22].

In this study viral agents were isolated in 8% of all FN episodes and in 22% of all microbiologically documented infections. This incidence is similar to other studies in the literature [23,24]. In the study carried out by Hakim et al [24] viral agents were isolated in 33% of episodes and it was 14% in the study by Castagnola et al [23]. Differences between studies could be due to the patient population included in the study and also the methods used to detect the viral agents. Some studies, like the present one, use only the viral PCR while others use antigen detection techniques, viral culture or more than one method on different body fluids [11,24]. Beside, this study only investigated respiratory viral pathogens.

In previous studies, Respiratory Syncytial Virus (RSV) and human rhinovirus were the most common viruses that were isolated [25,26] but in this study Influenza A was the most common (2 pandemic H1N1, 1 seasonal influenza A). This result could be due to the H1N1 pandemic that was encountered in the winter of 2009 when this study was conducted. Another probable explanation may be that our patients were older (mean age 9.5 years) and the incidence of RSV infections decreases with increasing age [16]. The 2 patients with H1N1 pandemic influenza A were both treated with oseltamivir. The first patient became afebrile after the second day of treatment and was discharged on the 5th day of admission. The second patient had respiratory failure, was intubated and managed with ventilator support but he died on the 19th day of admission. Oseltamivir is a neuroaminidase inhibitor used for influenza A chemoprophylaxis and the treatment of uncomplicated infections but there are very limited second line medications for patients whose respiratory symptoms worsen [27]. There are a couple of uncontrolled studies and case reports that show that Ribavrin could be effective as a second line medication but treatment should be started early in the course of the infection to be effective [28].

Generally viral infections are considered first, as a possible diagnosis, in patients presenting with fever, cough, runny nose and rashes [16,25,26]. However, we have demonstrated in this study that these signs and symptoms may be encountered in both viral and bacterial infections or even in patients with FUO. Hence, the sensitivity of these findings is high but specificity is low and clinicians must be cautious not to miss potentially threatening bacterial infections in this setting.

Bacteremia was the single most common cause of infection in the microbiologically documented infection episodes and Gram positive bacteria were the most commonly isolated organisms from blood cultures. The pathogen shift from Gram negative to Gram positive bacteria has been demonstrated in many studies carried out in recent years [29,30]. Possible reasons cited for this shift include increased use of indwelling central venous

lines, high dose cytarabine chemotherapy protocols, use of proton pump inhibitors and wide spread use of quinolone prophylaxis [29,31]. 98% of the patients in the present study had indwelling central venous lines. The most common Gram positive and Gram negative bacteria isolated from blood cultures in this study were coagulase negative staphylococcus *and E. coli* respectively which is consistent with previous studies [32]. Blood cultures of patients with oral mucositis are more likely to yield Gram positive bacterial pathogens but in this study both pathogens were equally represented [6].

Although not pathognomonic, it is known that fever lasts longer and the C-reactive Protein (CRP) levels in viral infections are lower when compared to bacterial infections [33] but there was no significant difference between the viral PCR positive and the culture-positive bacterial infections in this study, when these two parameters were considered (mean 10.1/14.0 mg/L, p=0.125, table 4). However, it is noteworthy that CRP level was numerically higher in the bacterial episodes (14.0 mg/L as against 10.1 mg/L) and probably did not reach significance levels because of the small sample size. In our center and in many other centers, even in cases where no bacterial etiology is demonstrated, one of the most important factors determining the duration of antibiotic treatment is the duration of fever as seen clearly in this study.

The rates of FN episodes classified as FUO differ from one study to another [20,34]. In the study by Castagnola et al., 79% of the episodes were classified as FUO while in the study by Arrifin et al., 56% of episodes were classified as FUO [24,35]. In this study 48% of the episodes were classified as FUO.

Differences in given rates are due in part to the time that the diagnosis of FUO is made. Patients often present with fever as the only symptom and if diagnosis is made during the initial presentation, it might lead to increase FUO episodes [36]. Episodes of FN that are classified as FUO may be due to viral or other atypical microorganisms that are not detected with available laboratory techniques.

The duration of antibiotic treatment and hospital stay in this study was approximately 3 days longer in the FUO group (mean 14,5/11,8 days, table 4). This difference was however not statistically significant in a univariate analysis (p=0.814). We attributed this to the limited number of cases in this study but our observation is that clinicians are inclined to treating patients in the hospital until they are afebrile. It could be said that even when no focus of infection is documented, the duration of antibiotic therapy depends on duration of fever.

Conclusions

FUO constituted nearly 50% of the FN episodes in this study despite the availability of advanced laboratory diagnostic methods. Among the episodes with microbiologically documented infections, bacterial pathogens were especially common (77% as against 22% for viral agents). Wide spread use of central venous lines increases the risk of Gram positive bacterial infections. Presenting symptoms like cough, runny nose and rashes are not specific to a viral etiology and clinicians should be careful not to miss potentially threatening bacterial pathogens in this group of patients.

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MENSTRUAL HYGIENE MANAGEMENT AND RESOURCES FOR ADOLESCENT GIRLS IN AN URBAN SETTING IN ACCRA, GHANA

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Abstract

Background: Menstruation is the recurring peeling of the inner part of the uterus or the shedding of the uterine lining on a regular basis in the reproductive-aged females during the monthly menstrual cycles. Menstrual hygiene management (MHM) is an everyday challenge to the adolescent girl child globally, and in developing countries like Ghana. Positive menstrual hygiene management is important because it helps in preventing several health challenges which may be associated with poor menstrual hygiene management. The aim of this study was to determine the state of MHM among adolescent girls in Accra.

Method: Quantitative cross-sectional study was conducted using self-administered questionnaires to collect data which was analysed to evaluate the sanitary provisions in the school. Two Basic Schools in Legon, Accra were identified and random sampling procedure was used to select research participants.

Results: Findings revealed that the mean age at menarche of adolescent girls in Basic Schools in Legon was 11.9 ±1.2 years; and that MHM was promoted at home and in schools. In all, 68% and 21% of the adolescent girls routinely bathed two and three times daily respectively during menstruation; 50% of the respondents changed sanitary products three times daily when menstruating, this was followed by 47% who changed twice daily. More than half of them disposed of their used sanitary products by wrapping and putting in the dustbins. Sanitary facilities were seen to be available and in use during the time of survey.

Conclusion: Menstrual hygiene practices among the Basic School girls were good, with socio-economic factors contributing to the use of good disposable menstrual products during menstruation. Sanitary facilities were seen to be available and in use although resources such as running water, soap for hand washing, and sanitary products in the event of an emergency were unavailable.

Key Words: Menstruation, Menarche, Adolescent girls, Accra, Sanitary products, Resources Basic Schools

Background

According to the World Health Organization (WHO), the adolescent age is between the ages of 10 and 19; and they account for about 20% of the world's population with 85% of them resident in developing countries such as Ghana[1]. The crucial and indeed one of the most challenging period of a girl child is when nature gives rise to varied changes that cause emotional and psychological instability, all occurring at the same time and progressively leading to womanhood[2]. One of such changes is menstruation. Menstruation refers to the recurring peeling of the inner part of the uterus or the shedding of the uterine lining on a regular basis in the reproductive-aged females during the monthly menstrual cycles[3]. Menstruation, which can be experienced about 3000 times in a woman's life time[4], is a physiological condition that is associated with diverse terms.

Worthy of note, is that in defining MHM, due consideration must also be given to the educational and psychological needs of girls undergoing the monthly process of menstruation. MHM includes the use of water and soap to clean the body, and also gaining access to sanitary facilities in order to dispose of used sanitary products[5].

In most traditional settings including African societies the topic of menstruation is largely treated as a taboo, and is rarely discussed publicly[6]. This is because of the prevalent misconceptions; one of which is that menstruation is considered impure in some societies[7]. This often limits the amount of information available to adolescent girls especially teenagers who are going through the process. This often leaves many adolescent girls disillusioned and saddled with a feeling of guilt, shame and 'unworthiness' and many may not know how to maintain optimum hygiene required at such times.

Furthermore, the adolescent girl gets predisposed to health, social and cultural factors including infection as a result of poor hygiene practices during menstruation[8]. These factors may also be as a result of inadequate sanitary use, water source and low income. In resource-poor settings, access to sanitary materials and appropriate sanitary facilities is limited thus posing a huge challenge to the comfort of menstruating girls.

The situation is almost dire in most public schools in that consideration is often not given to the hygienic needs of menstruating girls with regards to adequate health education and type of sanitary facilities available for use. Girls need to have access to adequate water

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supply, soap and sanitary towels/pads and proper disposal facility to maintain optimum hygiene. Absence of an enabling environment can impact on the school attendance of students as some are left with no other alternative but to stay at home for the duration of their menstruation. This brings to the fore the need for a rethink on the approach to health education. The aim of this study therefore, was to assess menstrual hygiene practices and resources among Basic School girls in an urban setting (Legon) in Accra; to create the basis for planning and policy formulation on menstrual education is an essential aspect of school health education programmes.

Methodology

Study population

Participants in this study comprised all adolescent school girls from the University of Ghana Legon Basic School and Legon Staff Village Basic School who had attained menarche. These two schools were purposively selected in line with the study objectives.

Data collection

The tools used for data collection included a checklist, self- administered questionnaire which was completed by all students. It consisted of open-ended and closed ended questions with sections for demographic data of students and questions on menstrual hygiene management practices.

Prior to the data collection period, the Basic Schools were visited to inform them of the selection criteria that participants would have to meet. An empty class room was selected during break session for data collection to prevent participants from staying out of school lessons. Students from class 5 to JHS 3 from the University of Ghana Basic School and Staff village Cluster Basic School who had started menstruating participated in the study. The participants were randomly selected and the process of response to the questionnaire was under strict monitoring to prevent them biasing each other in the course of conversing among themselves. The following procedures were employed to ensure that questionnaires were properly administered.

Step no. 1: A sampling frame was drawn, that is a complete list of all the sampling units of girls who had attained menarche from primary 5 to JHS 3 and the sample size for each school was proportionally allocated to each stratum. Thereafter, sampling size for each stratum was determined.

Step no. 2: Students' register containing their names was collected and checked to ascertain for completeness of participants names.

Step no. 3: Systematic method of sampling was used to determine participating students for the study from the total student numbers of each stratum.

Step 4: The first girl (participant) was a number chosen from 1 to k by simple random sampling (balloting). Afterwards, every Kth girl on the class register was selected and administered questionnaire until the sample size was obtained. When the end of the register was reached, a return to the top of the list was made so as to continue selection of the girls.

Data analysis

Each completed coded questionnaire was checked manually on hard copy to ensure no information was missed. Background features of the survey respondents were obtained and entered into the Excel 2013 version. This was imported into Stata version 13 software package and analysed using descriptive as well as inferential statistics.

Results were expressed as percentages and presented using tables, frequency distributions and graphs. The outcome (dependent) variable was MHM while the independent variables were health/ hygiene knowledge, Behavioural patterns, Culture and societal norms, Hand washing practices and Resource availability.

Ethical issues

The ethical clearance to conduct this research was obtained from the Ghana Health Service Ethical Review Board. In addition, permission and clearance was obtained from the Director, Metro Educations Board and selected Basic School's headmasters/mistresses.

Permission to send written informed consent forms to parents/ guardians of pupils was obtained from authorities of the schools and thereafter issued to the pupils to be signed by their parents/ guardians. Assent forms were signed by the participants before administration of questionnaires.

Results

Socio-demographic characteristics of respondents

Table 1 shows that majority 209 participants, (89.0%) were between the ages 12-15 years, with a mean age of 13.4±1.3 years. The mean age of girls at menarche was 11.9±1.2 years. The predominant ethnic group was Akan, (43.5%). Among the 209 participants, 69.9% were surprised at the onset of their first menses; 12.9% were happy; 10.5% were sad and 6.7% indicated they were prepared.

Menstrual Hygiene Practices

Table 2 demonstrates that a little over half of the participants (51.7%) had a menstrual flow duration of 1-4 days,

Table 1: Socio-demographic Characteristics of the Adolescent Girls in the Basic Schools in Accra

Characteristics	Numbers (N)	%
Age (years) Mean ± SD	13.4 ± 1.3	
Age of first menses (years) Mean ± SD	11.9 ± 1.2	
Grade in school		
Class 5	27	12.9
Class 6	29	13.9
JHS 1	52	24.9
JHS 2	68	32.5
JHS 3	33	15.8
Religion		
Christianity	201	96.2
Islam	8	3.8
Ethnicity		
Akan	91	43.5
Ewe	66	31.6
Northern	18	8.6
Ga	28	13.4
Other	6	2.9
Personal affect at the onset of first period	14	6.7
	27	12.9
Prepared	22	10.5
Happy	146	69.9
Sad		
Surprised		
Total	**209**	**100.0**

39.2% (5-7 days) and 9.1% (more than 7 days). Virtually all participants (99.0%), took their bath regularly when menstruating. In all, 68.0% of participants took their bath twice daily, and 20.6% took it three time or more.

Overall, half of the participants (50.2%) changed their sanitary pads three times or more and another 47.4% changed it twice daily. Close to three quarters of the girls (74.6%) changed their sanitary products while in school, and most of these (76.1%) indicated they found a private place on the school premises to do this. Regarding modes of disposal of the used sanitary pads among the 209 adolescent girls, 60.8% disposed them off in a dustbin, 33.0% burnt them and 17.7% buried them.

In addition, 39.2% of the adolescent girls had a moderately painful menses, 20.6% experienced very painful menses and 12.4% had extremely painful menses.

Interestingly, the painful menses resulted in 13.9% of the participants absenting themselves from school during the menstrual period.

Table 2: Menstrual Hygiene Practices among Adolescent Girls in two basic schools in Accra

Hygiene Practices	N	%
Days bled in a month		
1-4	108	51.7
5-7	82	39.2
Above 7	19	9.1
Take bath when menstruating	207	99.0
Yes	2	1.0.
No		
Number of times bath taken daily	1	0.5
None	21	10.1
Once	142	67.9
Twice	43	20.6
Three times or more	2	1.0
Don't remember		
Number of times sanitary products changed daily	1	0.5
None	4	1.9
Once	99	47.4
Twice	105	50.2
Three times or more		
Methods of disposing used sanitary products	37	17.9
Bury	69	33.3
Burn	4	1.9
Wash	127	61.4
Wrap in a dustbin	4	1.9
Flush		
Sanitary products changed in school	156	74.5
Yes	53	25.4
No		
Private place available to change in school	159	23.9
Yes	50	76.1
No		
Level of pain experienced during menses	35	16.8
	23	11.0
None	82	39.2
Mild	43	20.6
Painful	26	12.4
Very painful		
Extremely painful		
Total	**209**	**100.0**

Availability of Menstrual Resources

In all, as depicted in Table 3, 77.5% of participants indicated they always had water to wash and change during menstruation and 63.6% had access to soap. The assessment showed that 97.6% adolescent girls washed

their genitals when menstruating. Among this cohort, 61.2% used water only, while 38.4% used both soap and water.

The majority (98.1%) of the participants had been taught about hand washing practice and 97.6% washed their hands after change of sanitary materials.

Regarding the most common type of sanitary product used during menses, almost three-quarters of participants (73.2%) indicated they used disposable sanitary pads. However, a few (16.3%) used toilet paper, (6.2%) a piece of cloth, and (2.4%) used tampon.

Table 3: Resources available for the menstruating adolescent girl in two basic schools in Accra

Menstrual Resources	N	%
Have water to wash when menstruating		
Not at all	5	2.4
Few times	13	6.2
Most times	29	13.9
Always	162	77.5
Wash genital when menstruating		
Yes	204	97.6
No	4	1.9
Don't know	1	0.5
How genital hygiene is maintained		
Water only	128	61.2
Soap and water	80	38.3
Nothing	1	0.5
Access to soap at all times		
Not at all	27	12.9
Few times	21	10.1
Most times	28	13.4
Always	133	63.6
Most common type of sanitary material used		
Toilet paper	34	16.3
Cotton wool	2	1.0
Mattress foam	1	0.5
Disposable sanitary pad	153	73.2
Piece of cloth	13	6.2
Tampon	5	2.4
Menstrual cup	1	0.5
Total	**209**	**100.0**

Survey of Sanitary Facilities in Basic Schools

The sanitary survey assessed the provision, availability and functionality of some indicators such as the school's committee and clubs, menstrual hygiene resources, menstrual hygiene practices, disposal of used sanitary products and operational maintenance as well as schools' sanitation system.

In all, menstrual hygiene resources such as running water, soap for hand washing and other sanitary products were not available at the time of the survey in the basic schools. Some health education on menstrual hygiene was provided in both schools

Waste bins were available for the disposal of used sanitary products, and an incinerator was found in one of the schools, while the other school was linked to the University community's waste management system for final waste disposal.

Generally, the toilet facilities in the two schools were not in a hygienic state and did not offer an enabling environment (privacy, availability of water etc) for maintaining appropriate menstrual hygiene among the adolescent girls.

Discussion

Findings from survey demonstrated that all the participants were between the ages of 10-17 years, with a mean of age at menarche of 11.9 ± 1.2 years, which was less than a year (0.6 years) earlier than the mean age at menarche of 12.5 ±1.28 years found in a similar study of Ghanaian school girls[9]. This slight decrease in age at menarche can be attributed to changing environmental conditions such as urbanization, nutrition type as well as general wellbeing of the adolescent girls. The study also revealed that about two thirds of the adolescent girls were surprised at the onset of their first menstrual period.

Improved hygiene practice during menstruation is an important factor that reduces predisposition to urinary tract infections and improve personal hygiene.

To achieve improved menstrual hygiene practice, menstrual resources such as water, soap, sanitary products must be readily available. Our survey found that disposable sanitary pads were most commonly used. This contrasts with findings from studies in Uganda and India where the majority of the respondents used traditional materials like cloth because of the poor socio-economic status of the adolescent girls studied[2, 6, 10].

In the current survey, most of the girls had access to water, and above three quarters had access to soap, which enabled more than half of the girls to wash their genitals frequently when menstruating. This practice may be due to knowledge of menstrual hygiene gained from home or at school since almost all respondents acknowledged having been taught health or hygiene in relation to menstruation at school.

Regular bathing during menstruation was observed among the respondents, an observation similar to that seen in a study conducted in Mali[12]. Facilities for bathing were not available on the school premises, which may be challenging for adolescent girls who may begin menstruation while school is in session.

The most common sanitary material used was disposable sanitary pads. The socioeconomic status of the participants and the location of the schools in a relatively higher socio-economic environment in Accra may account for this. However, this finding is in congruence and compares favourably with those done in rural schools with low socioeconomic status[2,6,13].

Menstruation as a taboo may greatly influence adolescent girls' hygiene practices during menstruation as well as ways and methods in which used sanitary

products are disposed of[2]. One study[14], found a third of adolescent girls disposed of their used sanitary products into pit latrines, reason being that it was the safest for them. This is in contradistinction to our findings, where over two thirds of the school girls disposed of their used sanitary pads by wrapping and throwing them in a dustbin. This was indeed similar to what was observed in Mansoura, Egypt where most of the adolescent girls disposed of their used sanitary products in domestic waste[15].

Adequate sanitary facilities within the school premises when promoted improve menstrual hygiene among adolescent girls especially while in school. This study found that although three quarters of participants changed sanitary products in school, most of them did not have a private place to do this. Thus, adolescent girls may experience challenges when menstruating during school sessions[16].

Water and sanitation at school, in workplaces and at home are ingredients for the maintenance of health and hygiene of the adolescent girl and necessary for the reduction of reproductive tract infections in line with the United Nations Sustainable Development Goals 3 and 6.

Improved hygiene practices, such as the use of clean sanitary products and also adequate washing of the genitalia with soap and water during menstruation cannot be overemphasized. Access to clean and soft absorbent disposable sanitary pads by adolescent girls to enable optimal protection during menstruation is imperative.

Limitation: Study was undertaken in an urban setting with a relatively high socioeconomic levels and findings may not reflect that of the entire Ghanaian population. However, key policy implications are applicable and useful for planning in basic schools of the country

Conclusion

Perceptions and practices of menstrual hygiene management among the two basic schools in Accra was relatively good and most of the adolescent girls used clean disposable sanitary pads during menses. The schools had some sanitary facilities in use and waste disposal systems that promoted the maintenance of hygiene among the adolescent girls. However, lack of privacy and unavailability of resources (running water, and soap for hand washing), were identified.

In as much as the study found that menstruation was not a major influence on school attendance, a few adolescent girls missed school during the period of their menses. In the quest to achieve universal basic education, no girl should miss or be out of school because of menstruation-related issues including hygiene and dysmenorrhea. Teachers at the basic school level need to be provided with the skills to guide and provide accurate information on health and hygiene for the adolescent girls.

Ethics approval and consent to participate

The ethical clearance to conduct this research was obtained from the Ghana Health Service Ethics and Research Committee of the Research and Development Division (RDD), Ghana Health Service, Accra, with approval identification number GHS-ERC 45/12/15. In addition, permission and clearance was obtained from the Director, Accra Metropolitan Educations Board and the headmasters/mistresses of the selected Basic Schools.

Written informed consent was obtained from parents/ guardians of pupils and assent forms were signed by the participants before administration of questionnaires.

Consent for publication

Written informed consent was obtained from parents/ guardians of pupils and assent forms were signed by the participants before administration of questionnaires. Parents/ guardians of pupils were assured of strict confidentiality of data obtained.

Availability of data and material

All data generated or analyzed during this study are included in this published article and its supplementary information files.

Competing interests

The researchers declare no conflict of interest in this research.

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Authors' contributions

BE developed the concept, designed the research and collected data. BE and AE analyzed the data and drafted the manuscript. All the authors reviewed the manuscript before submission.

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OUTCOMES IN ELECTIVE INDUCTION OF LABOUR WITH 50 µG INTRAVAGINAL MISOPROSTOL IN POSTDATE SINGLETON LIVE PREGNANCY AT KORLE-BU TEACHING HOSPITAL

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Abstract

***Background*:** Induction of labour is indicated when the risk associated with expectant management of labour is higher. The most common indication for labour induction is postdate pregnancy and induction for this indication has been shown to reduce perinatal death. Misoprostol is the most commonly used drug for labour induction at the Korle-Bu Teaching, the leading national referral centre in Ghana.

Method: To assess the outcomes in Elective Induction of Labour using 50 µg of intravaginal misoprostol in postdate singleton live pregnancies at Korle-Bu Teaching Hospital. This was a prospective cohort study carried out to measure the rates of vaginal deliveries and factors affecting vaginal deliveries during labour induction. One hundred and sixteen pregnant women of at least 41 weeks gestation.

Women were included and followed up from the first insertion of misoprostol to delivery.

Results: Eighty-six patients (74.1%) had vaginal delivery and 30 (25.9%) were delivered by caesarean section. Among those who delivered vaginally, 77 (89.5%) delivered within 24 hours. There was a significant association between mode of delivery and Bishop Score (P=0.002). The highest Apgar score at the first minute was 7 in 55 babies (47.4%) and the lowest was 3 in 2 babies (1.7%).

Conclusions: The high rate of vaginal delivery and absence of induction related perinatal mortality confirmed the effectiveness and safety of misoprostol in postdate singleton live pregnancy at Korle-Bu Teaching Hospital

Key Words: Misoprostol; Labour induction; Postdate, Intravaginal.

Introduction

Induction of labour (IOL) has become a common practice for the Obstetrician today. Over the past several decades, the incidence of labour induction for shortening the duration of pregnancy has continued to rise. Labour induction is indicated when the risk associated with expectant management of labour is higher. In developed countries, the proportion of infants delivered at term following induction of labour can be as high as one in four deliveries[1]. Rates of labour induction are increasing in developing countries as well. This rate varies from 9.5%-33.7% of all pregnancies annually[2]. In Canada, the rate has increased from 12.9 in 1992 to 21.8% in 2005 and in the USA, it has increased from 9.5 in 1990 to 22.1% in 2005. [3,4]. In African countries, although it is low, it is also on the rise, reaching 11.6% in some regions.

The most common indication for labour induction is postdate pregnancy, defined as a pregnancy lasting more than 294 days, or 42 completed weeks after the first day of the last menstrual period. However, some physicians believe that the term should be used for the more global group of patients for whom reliable dating criteria may not be available[5]. Induction for this indication has been shown to reduce the likelihood of perinatal death because these pregnancies have been shown to have an association with the increase of perinatal mortality, morbidity, and operative delivery[6]. For labour induction, the most commonly used drug is misoprostol. Its high efficacy and reasonable safety profile have been confirmed in several studies[7, 8, 9] and it has remained a common drug used since 2001. This drug is inexpensive, easily stored at room temperature and rapidly absorbed after oral or vaginal administration. Misoprostol is used with many protocols according to hospital policies and the most commonly used is intravaginal misoprostol of 50µg which is seen to be effective.

Induction of labour with misoprostol has successful results in vaginal delivery but sometimes fails with potential risks of increased rate of operative vaginal delivery, caesarean birth, excessive uterine activity, abnormal foetal heart rate patterns, uterine rupture and maternal water intoxication among other complications[7,8]. Therefore, it is important to know maternal and foetal outcomes during induction of labour with misoprostol for postdate pregnancy. The main aim of this study is to assess outcomes of delivery (rate of vaginal delivery, maternal, foetal and neonatal

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complications) after induction in postdate live singleton pregnancy with 50ug intravaginal misoprostol at the Korle-Bu Teaching Hospital (KBTH), the main referral teaching hospital in Ghana.

Subjects and methods

This was a prospective cohort study of 116 postdate pregnancies to measure the rates of vaginal deliveries and factors affecting vaginal deliveries during induction of labour between 1st May and 30th June 2015 at the Department of Obstetrics and Gynaecology KBTH.

Elective induction of labour was decided by the team on duty according to the gestational age by last menstrual period or early ultrasonography. After all examinations to rule out current contraindications, the patient's cervical scoring was done according to the Bishop score which was deemed unfavourable if the score was less than 6. The Patient was then admitted to the ward for labour induction with misoprostol. In the morning of induction of labour (duty day), the patient was counselled about labour induction and reassessed to check for any further cervical changes before starting. Thus, a quarter of 200 µg misoprostol was inserted into the posterior fornix every four hours until the patient went into active labour, which was defined as having three contractions in ten minutes with each lasting longer than thirty seconds or the cervix was four centimetres dilated. The patient was reviewed each time before inserting the next 50 µg if it was necessary until a maximum of 200 µg was inserted. At least 6 hours after the last dose of misoprostol, if the cervix is considered favourable, oxytocin drip was then set up, and patient monitored at the labour ward for uterine contractions (number and duration), foetal heart rate, liquor colour, and cervical dilation and recorded on the partograph. In the advent of abnormal occurrence including vaginal bleeding, foetal distress, uterine hyper-stimulation, patient was sent to theatre for emergency caesarean section.

To recruit participants, the investigators went to the labour ward every morning to check the labour induction list for the following day. Once patients were identified, introduction and invitation for participation in the study were made. Translators were made available to assist those who did not understand English to ensure consistency and therefore validity. Induction was set up on the appointed day of labour induction and the questionnaire was filled up after written informed consent or verbal informed consent. Information which could not be obtained on direct questioning was taken from patient's folder.

The study had three sections. The first section collected demographic information using multiple choice and fill-in-the blank questions. The second section comprised of multiple choice questions regarding participant's pregnancy parameters and section three was about labour and delivery settings, infant parameters and complications.

Comparison of numerical variables was carried out using the Student t-test for independent samples.

For comparison of categorical data, the Chi^2 test and Fisher exact were carried out. All statistical calculations were carried out using Epi Info 7.1.5. P values less than 0.05 was considered statistically significant.

Results

A total of 176 patients had induction of labour during the study period. Out of these, 122 (65.90%) cases were on account of postdate (their estimated or actual gestational age was more than 41 weeks). Six patients were excluded because they had initial Bishop Scores greater than 6. One hundred and sixteen cases were therefore included in the study (Fig. 1).

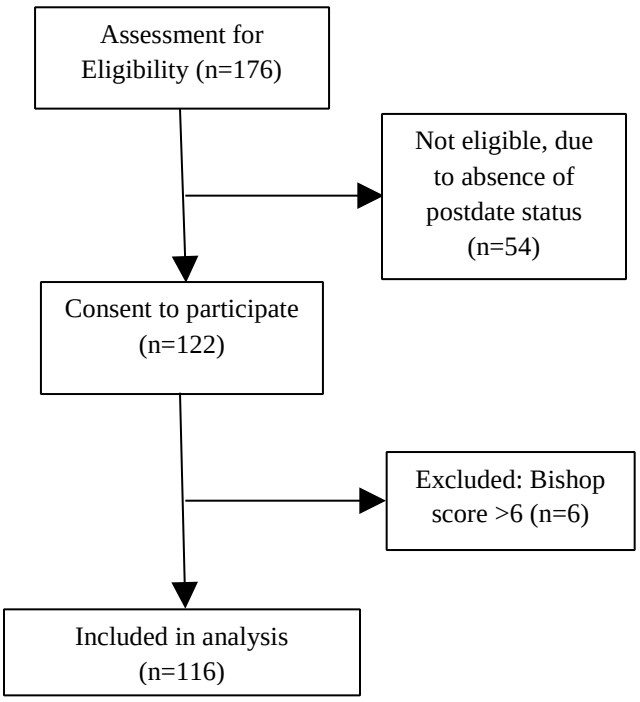

Fig. 1 Flow chart of study participants.

The mean age of the women was 29 years (SD 5.5), most 78 (67.24%) were married, more than half 65 (56.03%) had only primary level of education, 24 (20.69%) had tertiary level education and they were all from varied occupations with traders forming the largest group (43.11%) (Table I).

Of the 116 women, 27 (23.3%) were pregnant for the first time (primigravida) and 89 (76.7%) pregnant before (multigravida). However, 45 (38.8%) were delivering for the first time (nulliparous). The mean gravidity was 3.0 (SD1.8) and parity was 1.8 (SD 1.3). Most of the women, 96 (82.8%), had attended antenatal

Table 1. Social-Demographic Characteristics

Variables	Frequency (N)	Percentage (%)
Age:		
Mean age	29 (SD 5.5)	
<20	5	4.31
20-24	16	13.80
25-29	40	34.50
30-45	38	32.75
35-39	14	12.06
≥40	3	2.58
Total	116	100
Marital status:		
Single	26	22.41
Cohabiting	12	10.35
Married	78	67.24
Total	116	100
Education:		
None	12	10.35
primary	65	56.03
Secondary	15	12.93
Tertiary	24	20.69
Total	116	100
Occupation:		
Traders	50	43.11
Artisans	33	28.46
Service	6	5.17
Finance	5	4.3
Secretaries	5	4.32
Student	4	3.45
Health	3	2.58
Pastor	1	0.86
Others	9	7.75
Total	116	100

N: Number, %: Percentage, ≥: equal to or more than

clinic in other hospitals, and were referred to Korle-Bu Teaching Hospital on account of having gone past estimated 40 weeks or 280 days). The mean gestational age was 41 weeks 1 day with standard deviation of 2.5 days. Fourteen (12.1%) women were induced at 42 weeks gestation or beyond, the greater majority being induced after 41 but before 42 completed weeks of gestation. Although 97 (83.6%) could not remember the date of the last menstrual period, only 67 (57.8%) had an early ultrasound scan done before 14 weeks of gestation (Table 2).

The Bishop score of five was recorded in 51 (44.0%), four in 30 (25.9%), three in 20 (17.2%), two in 7 (0.6%) and one in 2 (1.72%) women. Only one dose of misoprostol (Cytotec) was sufficient to lead to the onset of labour in 67 (57.8%) patients and only 2 onset of labour in 67 (57.8%) patients and only 2 (1.7%) women had up to four doses inserted (Table 3).

Table 2: Pregnancy Parameters

Variables	Frequency (N)	Percentage (%)
Gravidity:		
Primigavida	27	23.27
2-4	65	56.03
≥5	24	20.70
Total	116	100
Parity:		
Nulliparous:	45	38.80
2-4	70	60.34
≥5	1	0.86
Total	116	100
Gestational age:		
41w-41w6d	102	87.93
≥42w	14	12.07
Total	116	100
LMP known:		
Yes	19	16.38
No	97	83.62
Total	116	100
Early Scan (7-14 weeks):		
Yes	67	57.76
No	49	42.24
Total	116	100
Antenatal Clinic Attendance:		
Yes	96	82.76
No	20	17.24
Total	116	100

LMP: Last menstrual period

Table 3: Induction Parameters

Variables	Frequency (n)	Percentage (%)
Number of doses:		
1	67	57.76
2	33	28.45
3	14	12.07
4	2	1.72
Total	116	100
Time between first dose and vaginal delivery:		
Within 12H	51	59.30
12H-24H	26	30.23
24H-48H	7	8.14
≥48H	2	2.33
Total	86	74

H: Hour

The mean interval between the first dose inserted and the second was 6.88 hours in 49 patients, between the second dose and third was 8.09 hours and between third dose and fourth was 8.5 hours (Table 4).

Table 4: Time Characteristic during Induction

Variables	Frequency (N)	Mean (hours)	Standard Deviation (SD)
Mean time(hours) between doses:			
1st -2nd	49	6.88	2.67
2nd -3rd	16	8.09	4.70
3rd -4th	2	8.50	2.12
Time between induction to delivery			
VD	86	12.72	10.63
CS	30	22.49	13.56

VD: Vaginal Delivery, CS: Cesarean section

One hundred and ten patients went into active labour in a mean of 9.82 (SD 12.1) hours after the first dose was inserted. There was no significant association between Bishop score and number of doses of Cytotec used. However, women with lower Bishop scores were more likely to require oxytocin augmentation. This was done in 26 (22.41%) patients. The oxytocin infusion rates in two patients were not recorded. The highest rate of oxytocin infusion was 34.0 (SD 13.8) drop/min (correlation coefficient = -0.12) but not significant (p=0.17).

For obstetric outcomes, 86 (74.13%) patients had vaginal delivery and 30 (25.87%) were delivered by caesarean section (Table 5).

Table 5: Effect of Parity, Gestational Age and Bishop's Score on Mode of Delivery

Variables	Mode of Delivery		P-Value/ Or/Ci
	VD	CS	
Parity:			
nulliparous	30 (66.67)	15 (33.33)	0.19*/0.53/ [0.23 1.24]
Multiparous	56 (78.87)	15 (21.13)	
Gestational Age:			
41W-41W6D	77 (75.49)	25 (25.51)	0.27**/1.71 / [0.52-5.58]
42W and more	9 (64.29)	5 (35.71)	
Bishop Score:			
1-3	15 (51.72)	14 (48.28)	0.002*/0.24 / [0.09-0.59]
4-5	71 (81.61)	16 (18.39)	

Among those who delivered vaginally, 77 (89.53%) delivered within 24 hours. Episiotomy was performed in 20 (23.73%) patients while 29 (33.73%) had first degree perineal tears. Indications for Caesarean Section were Cephalo-pelvic-disproportion in 14 (46.67%), foetal distress in 13 (43.33%) and failed induction (no cervical response to induction) in 3 (10%) cases. There was no statistically significant difference between parity and gestational age and mode of delivery but there was a significant association between mode of delivery and Bishop Score (P=0.002). The higher the Bishop score, the greater the likelihood of the women having vaginal delivery. The mean blood loss was 224.50 (SD 158.0) ml. for those delivered vaginally and 428.00 (SD 160.0) ml. for those delivered by CS. The most common complications were abnormal foetal heart rate and meconium staining of the liquor, 42.86% and 38.10% respectively. One case of PPH was reported, hysterectomy with conservation of both ovaries was done on account of uterine atony.

The highest Apgar score at the first minute was 7 in 55 (47.41%) babies (Table 6). The lowest was 3 in 2 babies. At 5 minutes, 110 (94.82%) babies had Apgar score of 7 or more the mean weight of babies was 3,113.79 g and male babies were 50.86%. Five babies were referred to Neonatal intensive care unit (NICU) on account of severe asphyxia (2 neonates), Meconium stained liquor (2 neonates) and offensive liquor (1 neonate) but all were discharged in satisfactory conditions.

Table 6: Neonatal Outcomes

Parameters	Frequency (N)	Percentage (%)
Apgar score 1 minute:		
≤6	30	25.86
≥7	86	74.14
Apgar score 5 minute:		
≤6	6	5.17
≥7	110	94.82
Infants sex:		
Male	59	50.86
Female	57	49.82
Birth weight (g):		
<2000	1	0.87
2000-2500	8	6.89
2500-3000	44	37.93
3000-3500	48	41.38
≥4000	15	12.93

Discussion

In our study, the proportion of postdate as indication for induction of labour was 65.90% and this result is similar to the study of GIRIJA in India (Manipal) (69.8%)[9] but higher than the results of OUEDRAOGO in Burkina, JESPER FRIIZE in Denmark and FREMY in France (32.4%, 34.6%, 40% respectively)[11,12,13]. On the other hand, it remains lower

than those found in Africa, especially in Nigeria and in Ghana[1, 14, 15]. This may be due to errors in estimation of gestational age, as most women did not remember their last menstrual periods and some did not have first trimester ultrasound scan.

The need to augment labour with oxytocin infusion occurred in 22.41% of subjects. This rate was lower than those found in the Cochrane review (39.07%), as well as in a study in Nigeria (41.86%)[16,17]. However, this result was higher than those reported in Pakistan and in another region in Nigeria, 12% and 16.4% respectively[18,19].

It is generally agreed that the success of induction of labour is vaginal delivery and that caesarean section after induction can be considered a failure of induction. In this study, the success rate of vaginal delivery (74.13%) was independent of parity and gestational age but correlated with the Bishop score. However, induction success rate of 82% was reported in the same Ghanaian hospital in 2002[15], and in another teaching hospital in Nigeria[14]. The difference might be linked to the fact that their study was not selective in terms of gestational age. Our finding is still lower than that found in Pakistan (84%) where a study was done in post-term pregnancy[11]. This difference could be due to the fact that the study participants were fewer (78 patients). Our finding is similar to that described in Burkina (80%), River state in Nigeria, (79.7%), Saudi Arabia (77%), Morroco (76%) and in Moniaya, Nigeria (77.7%)[11,14,20,21,22]. All these studies show that with the same dosage of misoprostol, the success rate may be different. About 90% of vaginal delivery occurred within 24 hours in this study. Similar results were found by other authors in their studies[18,22] confirming the effectiveness of misoprostol in induction of labour.

The caesarean section rate of 25.87% is comparable to that found in Nigeria (22.3%)[22] but is higher than others in literature (13%-15%) and other studies (10.8%, 8.3%,11.1%)[18,19,23]. The commonest indication for caesarean section was cephalo-pelvic disproportion (CPD) followed by feotal distress as reported by other studies[18,23,24]. The mean birth weight was 3113g with extremes of 1900 and 3900; this means that the macrosomia could not be responsible for the CPD.

The overall mean-time from induction to vaginal delivery was 12.72±10.63 hours and was similar to the findings of other studies in Nigeria (12.0±3.6) and Ghana (13.8±7.9),)[22, 25], On the other hand, our findings are slightly higher than the 10.2 hours found in an earlier study in Ghana[15]. This difference might be due to the mean longer intervals between doses in our study. That could affect how quickly contractions were established making labour progress more slowly. The finding in this study is however, lower than what has been reported in other studies[7, 26].

Oxytocin was required for augmentation in 22.41%. This result was lower than what was recorded in Port Harcourt, Nigeria (41.9%) but higher than those recorded in Pakistan (12%) and in Ibadan, Nigeria (15.9%)[, 17,18,19]. This difference might be explained by the variation in protocols. In our study there was a strict observance of at least 6 hour intervals between last dose of misoprostol and start of Oxytocin infusion. The need for augmentation was significantly associated with the Bishop Score. It is not very clear why lower Bishop Scores were not associated with higher number of doses of Cytotec but were associated with an increased likelihood of the need for oxytocin augmentation.

There were three (2.60%) cases of failed induction, no progress in cervical changes and or foetal distress which was similar to the finding in a previous study in Ghana (4%)[15], but lower than in Morocco (13.12%) and in India (20%)[21, 24] and higher than the finding of 0.9% in Pakistan[18]. There was no case of hyper-stimulation recorded in our study. This was similar to that found in Nigeria[19] but different from the findings in Pakistan, in India and in Egypt (Cairo) where they found various proportions of hyper-stimulation (1.81%, 5.8%, and 16% respectively)[18,24,27]. The absence of hyper-stimulation in our study may be due to the fact that the mean interval between the doses of misoprostol was longer than the conventional time between doses, which is 6 hours.

Despite studies linking misoprostol use to the high incidence of uterine rupture, especially the dose of 50µg, there was none observed in this study. This is similar to the findings in India and Germany (Berlin)[24,28]. Others have, however, reported instances of uterine rupture with 50µg of misoprostol, a case each in the Ghana and Gabon studies[15,23.] The absence of uterine rupture (a dreaded complication from misoprostol administration) could be explained by the absence of tachysystole during monitoring with CTG and hyper stimulation, and that women with scarred uterus were excluded from this study.

Twenty per cent of patients had complications in our study, the most common were meconium stained liquor and abnormal foetal heart rate. Such complications are reported in literature and in many studies in Africa than in Asia but with variables rates; in Pakistan (4.01%, 40%) in India (23.64%, 11.82%) and in Egypt (10%, 22%) [18,24,27].

Five babies were admitted to NICU with favourable outcomes. Six babies (5%) had Apgar score of less than 7 at 5 minutes, which is similar to reports in literature compared to placebo and others studies in Africa and Asia. In our study, no case of fresh stillbirth was recorded while in others studies, some cases were recorded [18].

Conclusion

Postdate pregnancy is the commonest indication for induction of labour and intravaginal Misoprostol remains the drug of choice for IOL in our teaching hospital for postdate pregnancy when the cervix is unfavourable. It has an increased rate of vaginal delivery within 24 hours and neither parity nor gestational age is

associated with success of induction. However, Bishop Score is associated with the success of vaginal delivery; the higher the Bishop Score, the more likely is vaginal delivery, as a higher Bishop score signifies readiness of the cervix for labour. Foetal distress and cephalo-pelvic disproportion are the main indications for the caesarean sections. The neonatal outcomes after the IOL were generally acceptable, confirming the effectiveness and the reasonable safety of misoprostol used in induction of labour in postdate singleton live pregnancy at Korle-Bu Teaching Hospital

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TRANSMITTANCE CHARACTERISTICS OF DIMETHACRYLATE RESIN BASED DENTAL COMPOSITES

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Abstract

Background: The transmission of light through dental composites is a major factor responsible for photo activation polymerisation and optical properties of these materials. The extent of the light transmission depends on their formulations.
Objectives: The purpose of this study was to determine the transmittance of dental resin-composites and investigate the effect of material thickness and light wavelength**.**
Methods: Four photo-cured disc samples (Φ20mm) with different material thicknesses (ranging from x=0.11mm to x=1.46mm) of three different nanohybrid dental resin–composites (Regular, Flowable and Sealant) of the same shade, A3 and matrix but different filler loading were prepared. Transmittance measurements (n=3) were made using an Ocean Optics USB 4000 fibre optic Spectrometer operated by a Spectra Suite software. Data were analysed by One-way analysis of variance (ANOVA) combined with Tukey multiple test.
***Results*:** Differences were found in transmittance values as both material thickness and light wavelength increases. Transmittance (T) increase significantly ($P<0.05$) with increasing wavelength and decrease with increasing thickness. Linear regression analysis of In (T) with material thickness for light wavelength, gave R^2 values ranging from 0.81 to 0.99. Correlation of attenuation coefficient with light wavelength for the materials indicated significant correlation ($p<0.05$, $r=0.94$) with Grandio Seal but not with Grandio ($p>0.05$, $r=0.77$) and Grandio Flow ($p>0.05$, $r=0.79$).
***Conclusions*:** The significant differences in the transmittance with increasing light wavelength and material thickness of the materials may affect their clinical appearance.

Key Words: Transmittance, Dental resin-composites, Light wavelength, Dimethacrylate, Attenuation coefficient

Introduction

Visible light cured (VLC) resin-composites have become the principal type of anterior dental restorative materials. The advantages of these materials include ease of handling and aesthetic properties of translucency and colour [1,2].

Translucency is one of the many factors which influence the appearance and colour of teeth and defined as the ability of a material to allow both dispersion and passage of light such that objects cannot be seen through them clearly[3,4]. Hence, it could be described as partial opacity or a state between complete opacity and complete transparency. Translucency Parameter (TP), contrast ratio (CR) and light transmittance has been used to characterise translucency of dental resin composites[5,6].

The translucency parameter (TP) is calculated as the colour difference between a uniform thickness of a material over a black and white background and corresponds directly to common visual assessment of translucency.

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The contrast ratio (CR) is the ratio between the daylight apparent reflectance of the specimen over black and white standard backgrounds and an estimate of the opacity [5, 6].

Light transmittance is defined as the fraction of the intensity of the transmitted light through a material thickness. Its characteristics such as wavelength dependency play an important role for the colour of resin composites [6, 7]. Numerous techniques have been used to measure light transmittance of dental resin composites. They include radiometers combined with filters, a photo-conductive cell combined with an analyzing recorder[1,8,9,10], Uv-Vis Spectrophotometer [11,12], Kubelka and Munk theory[13], Goniophotometer[14], Computer-based diode technique[15].

The purpose of the present study was to determine effect of material thickness and light wavelength on transmittance and of representative dental resin-composites. In addition, investigate transmittance relationship with material thickness and light wavelength.

The research hypothesis tested was how material thickness and light wavelength influenced transmittance.

Materials and Methods

The materials used in this research study were three different nanohybrid dental resin- composites (Regular, Flowable and Sealant) of the same matrix and shade (A3) but different filler loading (Table 1).

Table 1. Materials studied

Material	Matrix Phase	Filler vol (%)	Filler wt (%)
Grandio	Bis-GMA/TEGDMA	71.4	87
Grandio Flow	Bis-GMA/TEGDMA/HEDMA	65.7	80
Grandio Seal	Bis-GMA/TEGDMA	-	70

Sample Preparation

Four photo-cured disc samples (Φ20mm) and different material thicknesses (ranging from x =0.11mm to x =1.46mm) of the dental resin–composites were prepared. The specimens were prepared by packing an uncured composite paste into Teflon moulds of inner circular space of diameter 2cm. The opened ends of the mould were covered with glass plates and the composite pastes were photo cured for 40 s at an initial temperature of 23^{o}C using a curing unit (Optilux 501, Kerr, U.S.A) of calibrated irradiance 500mW/cm^2. The mean specimen thickness was measured with a digital caliper to a precision of 0.01mm (Mitutoyo, Tokyo, Japan).

Measurement of Transmittance

The transmittance measurements (n=3) were made using a standard light source and an USB4000 fibre optic Spectrometer (Ocean Optics, FL-USA) operated by Spectra Suite software (Fig.1).

The spectra suite calculates the transmittance, T using the equation below;

$$\%T_{\lambda} = \frac{S_{\lambda} - D_{\lambda}}{R_{\lambda} - D_{\lambda}} \qquad \text{Eq.1}$$

Statistical analysis

Data were analysed by One-way analysis of variance (Anova) combined with Tukey post-hoc multiple tests at a significance level of p=0.05 and regression analysis

Results

The means and the standard deviations of the transmittance for each light wavelength and material thickness group are summarised in Tables 2-4 and Figures 1-3. In Figures 1-3, the percentage direct transmittance at different material thickness of each material is plotted as a function of light wavelength.

Table 2. Transmittance measurements at different light wavelength and material thickness of Grandio.

Wavelength(nm)	Transmittance D1	Transmittance D2	Transmittance D3	Transmittance D4
500	2.90 (0.23)	1.96(0.18)	1.82(0.39)	1.24(0.48)
600	5.17 (0.17)	3.56(0.30)	3.44(0.39)	2.69(0.45)
700	5.63 (0.34)	2.66(0.16)	2.37(0.31)	1.64(0.12)
800	7.75(0.62)	3.38(0.37)	3.14(0.09)	1.93(0.12)
900	9.82(0.33)	4.57(0.40)	4.22(0.24)	2.66(0.38)

*D1=0.70mm, D2=0.97mm, D3=1.10mm, D4=1.46mm

Table 3. Transmittance measurements at different light wavelength and material thickness of Grandio Flow.

Wavelength(nm)	Transmittance D1	Transmittance D2	Transmittance D3	Transmittance D4
500	4.61(1.15)	1.99(0.32)	1.53(0.53)	0.89(0.47)
600	9.55 (1.86)	4.20(0.14)	3.16(0.14)	2.30(0.04)
700	11.20(0.13)	4.95(0.26)	2.96(0.14)	1.39(0.26)
800	15.87(0.32)	7.74(0.39)	4.65(0.25)	1.91(0.44)
900	20.25(0.25)	10.47(0.55)	6.52(0.32)	2.43(0.33)

*D1=0.63mm, D2=0.85mm, D3=1.10mm, D4=1.41mm

Table 4. Transmittance measurements at different light wavelength and material thickness of Grandio Seal.

Wavelength(nm)	Transmittance D1	Transmittance D2	Transmittance D3	Transmittance D4
500	6.75(0.59)	1.43(0.59)	1.29(0.50)	0.98(0.24)
600	10.22(0.89)	2.51(0.14)	2.00(0.27)	1.57(0.04)
700	13.99(0.16)	1.93(0.11)	1.52(0.07)	0.87(0.09)
800	19.75(0.12)	2.93(0.40)	1.29(0.06)	1.06(0.12)
900	25.26(0.45)	4.58(0.70)	1.76(0.09)	0.94(0.13)

*D1=0.11mm, D2=0.28mm, D3=0.37mm, D4=0.56mm

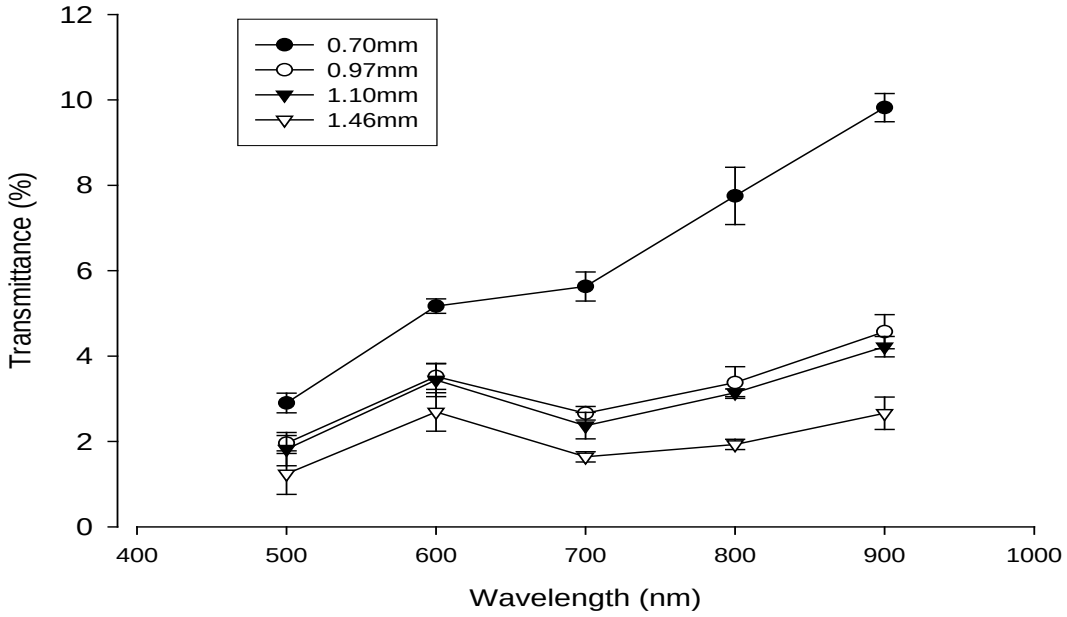

Fig. 1 Direct transmittance with light wavelength at different material thickness of Grandio

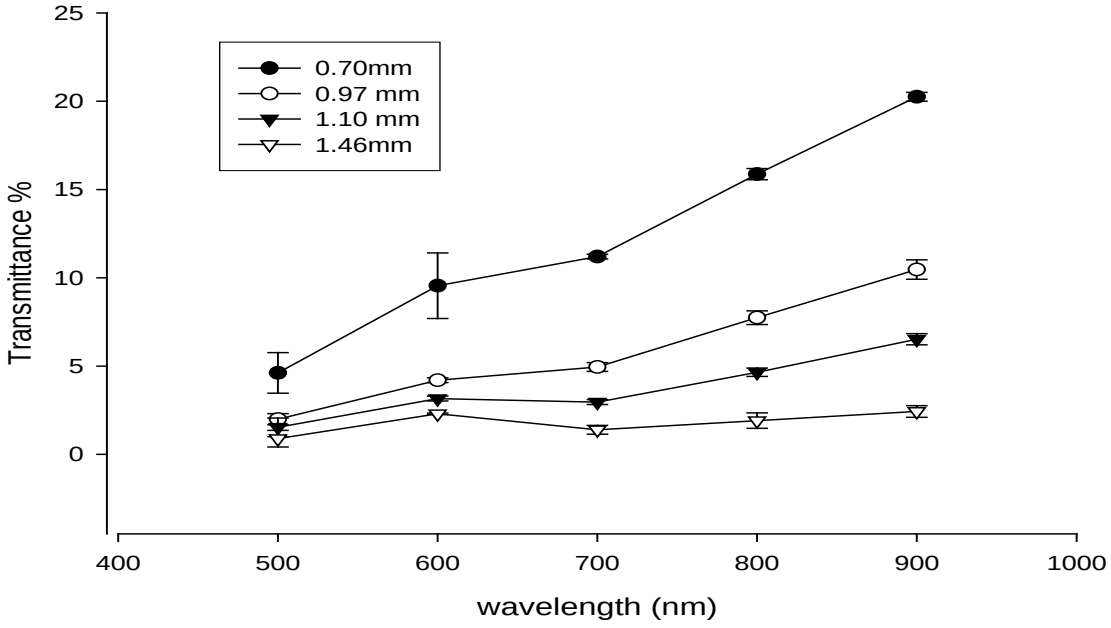

Fig. 2 Direct transmittance with light wavelength at different material thickness Grandio Flow.

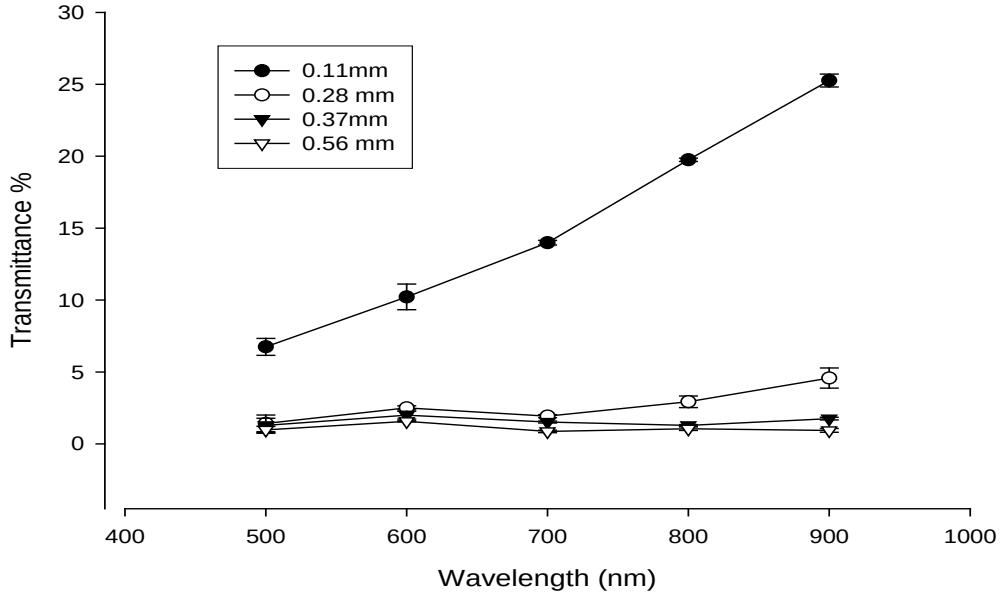

Fig. 3 Direct transmittance with light wavelength at different material thickness of Grandio Seal.

There were significant differences ($p<0.05$) in the direct transmittance variations with light wavelength and material thickness among the materials. Figures 4-6, indicates the natural log of direct transmittance (InT) of each material plotted as a function of material thickness for a range of wavelength from 500-900nm and yielded straight lines with negative slope. The slope is a measure of the attenuation coefficient and values with wavelength for each material are indicated in Table 8. Fig. 7 indicates the variation of the attenuation coefficient with light wavelength. Analysis of linear regression carried out on the In(T) variations with material thickness, gave r^2 values ranging from 0.81 to 0.99. Correlation of attenuation coefficient with light wavelength for the materials indicated significant correlation ($p<0.05$, $r=0.94$) with Grandio Seal but not with Grandio ($p>0.05$, $r=0.77$) and Grandio Flow ($p>0.05$, $r=0.79$).

Table 5. Natural log of direct transmittance measurements at different light wavelength and material thickness of Grandio

Wavelength	ln(T) D1	ln(T) D2	ln(T) D3	ln(T) D4
500	1.06(0.08)	0.67(0.09)	0.56(0.21)	0.16(0.38)
600	1.64(0.03)	1.27(0.08)	1.23(0.09)	0.98(0.16)
700	1.73(0.06)	0.98(0.06)	0.91(0.09)	0.50(0.08)
800	2.05(0.08)	1.21(0.11)	1.14(0.03)	0.66(0.59)
900	2.28(0.03)	1.52(0.09)	1.44(0.56)	0.97(0.15)

*D1=0.70mm, D2=0.97mm, D3=1.10mm, D4=1.46mm

Table 6. Natural log of direct transmittance measurements at different light wavelength and material thickness of Grandio Flow

Wavelength	ln(T) D1	ln(T) D2	ln(T) D3	ln(T) D4
500	1.51(0.24)	0.68(0.17)	0.38(0.34)	0.10(0.28)
600	2.15(0.03)	1.43(0.03)	1.14(0.13)	0.83(0.02)
700	2.53(0.03)	1.60(0.05)	1.09(0.05)	0.32(0.19)
800	2.76(0.02)	2.05(0.05)	1.54(0.05)	0.63(0.24)
900	3.01(0.01)	2.35(0.05)	1.87(0.05)	0.88(0.14)

*D1=0.63mm, D2=0.85mm, D3=1.10mm, D4=1.41mm

Table 7. Natural log of direct transmittance measurements at different light wavelength and material thickness of Grandio Seal.

Wavelength	ln(T) D1	ln(T) D2	ln(T) D3	ln(T) D4
500	1.90(0.08)	0.60(0.04)	0.40(0.23)	-0.01(0.02)
600	2.30(0.04)	0.90(0.06)	0.70(0.14)	0.40(0.04)
700	2.60(0.01)	0.60(0.05)	0.20(0.25)	-0.10(0.11)
800	3.00(0.01)	1.10(0.14)	0.20(0.03)	0.03(0.15)
900	3.20(0.02)	1.50(0.60)	0.60(0.03)	-0.10(0.13)

D1=0.11mm, D2=0.28mm, D3=0.37mm, D4=0.56mm

Table 8. Attenuation coefficient of the dental resin-composites

Wavelength	Attenuation coefficient Grandio	Attenuation coefficient Grandio Flow	Attenuation coefficient Grandio Seal
500	1.17	1.95	4.27
600	0.84	1.61	4.01
700	1.55	2.73	6.08
800	1.75	2.66	6.51
900	1.66	2.66	7.20

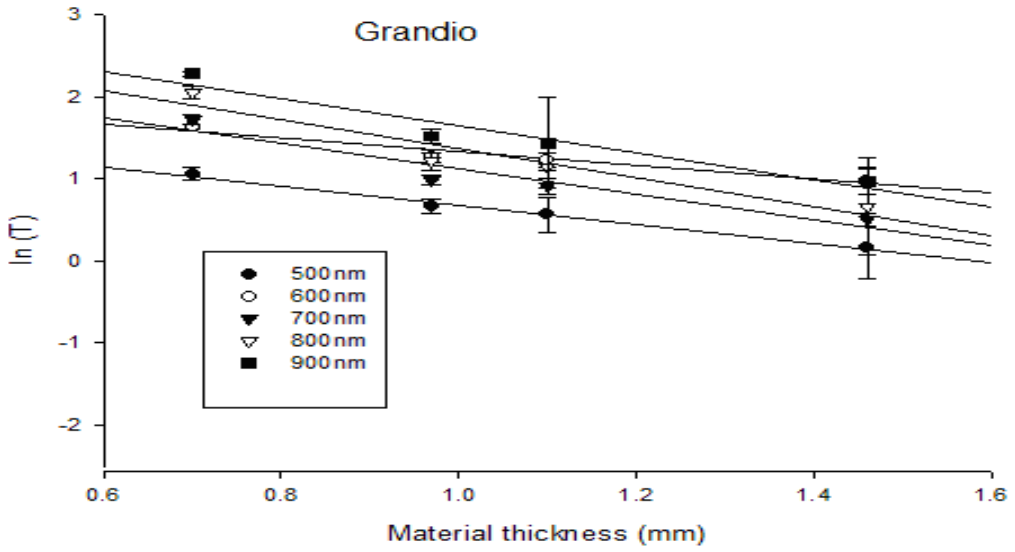

Fig. 4 Natural log of direct transmittance (InT) with material thickness at different light wavelength of Grandio.

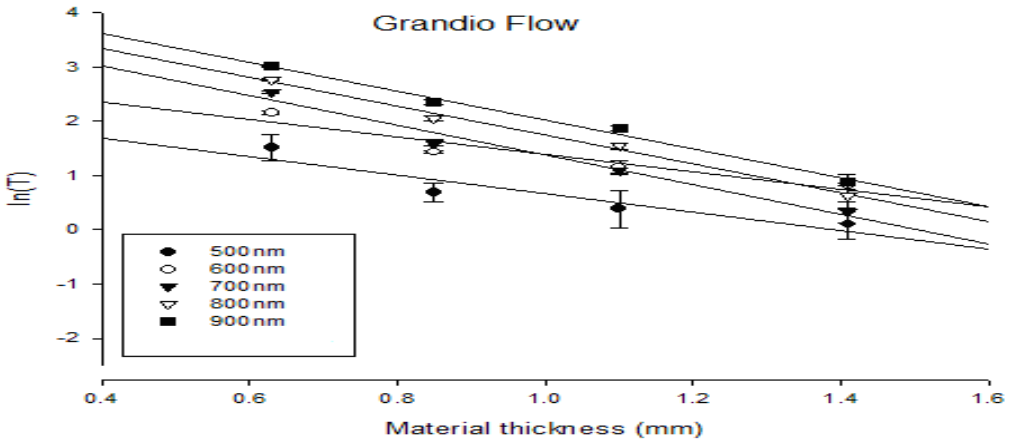

Fig. 5 Natural log of direct transmittance (InT) with material thickness at different light wavelength of Grandio Flow.

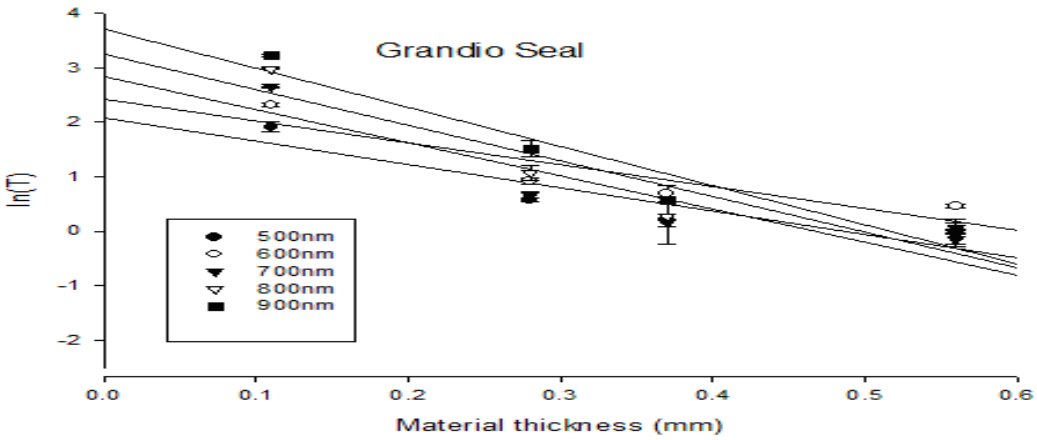

Fig. 6 Natural log of direct transmittance (InT) with material thickness at different light wavelength of Grandio Seal.

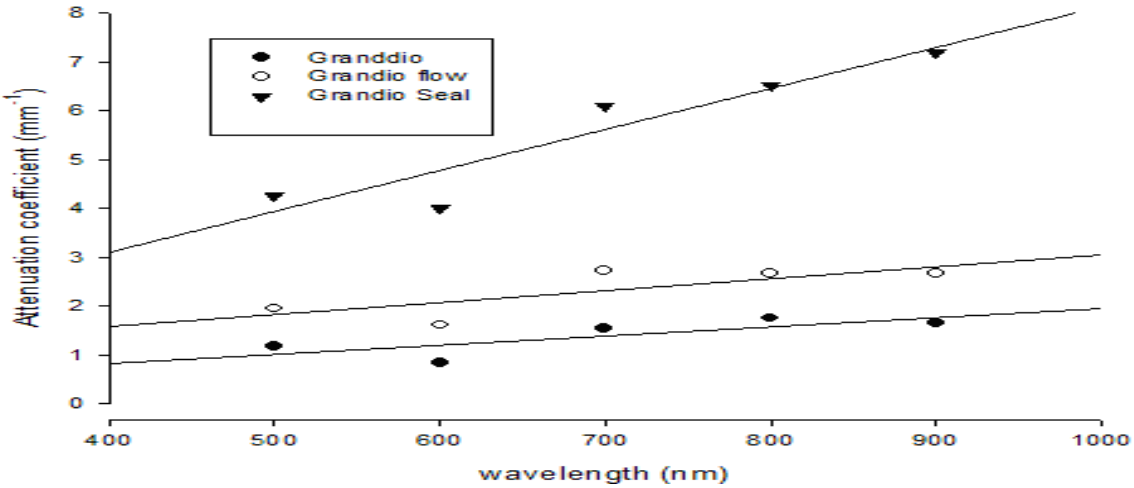

Fig. 7 Attenuation Coefficient with light wavelength of the dental resin composites

Discussion

The success of esthetic dental restorations requires that there should be no visible difference between the restorative material and the natural teeth. This is achieved by matching the optical properties of the restoration and the natural tooth. The matching of the optical properties involves manipulative techniques such as the layering technique [15]. However, the polymerisation of dental resin composites results in significant changes in the optical properties including transmittance between the uncured and cured material[11-13]. The increase in light transmittance in the cured material may be explained as due to two processes namely vitrification and photobleaching [12].

The present research study aims to investigate the influence of material thickness and light wavelength on direct transmittance of different dental resin-composites (regular, flowable and sealant) of the same shade and filler type (Table 1) after polymerisation. The direct transmittance was used to characterize the translucency of the materials and was measured using an USB 4000 fibre optic spectrometer operated by Spectra Suite software and a standard light source.

The results of the transmittance values for all the materials irrespective of the type of material indicated a significant increase with light wavelength from 500nm to 900nm for each material thickness (Figs.1-3). However, the light transmittance values decrease with increasing material thicknesses. Possible explanations to the variation of light transmittance with light wavelength could be due to the changes in the refractive indices of the polymeric matrix as a result of polymerization and scattering of light by the filler particles and other additives in the resin-composites. This scattering of light decreases with increasing light wavelength resulting in a reduction in the transmittance with decreasing wavelength and in accordance to the Rayleigh scattering equation of light (eqn. 2) which effectively analyses the light transmittance for a composite structure such as dental resin-composites[9,11];

$$T = \exp -2.303d\left[3V_p r^3 \frac{\left(n_p/n_m - 1\right)}{4\lambda^4}\right] \quad (2)$$

where d is the material thickness of the sample, Vp is the volume fraction of the particles, r is the particle radius, n_p is the refractive index of the particles, n_m is the refractive indices of the polymeric matrix and λ is the light wavelength.

The results of the transmittance with light wavelength are consistent with those of other researchers [12, 19, 20].

The direct transmittances decrease exponentially with increase in material thickness (Figs. 1-3). This variation in transmittance with thickness could be explained as a result of increases in absorption by the polymeric matrix and other additives and scattering of light by the fillers and appreciable light reflectance at the outer surface of the materials and according to Rayleigh scattering equation [11, 13].
and Lambert's law equation of light[15] (eqn 3);

$$T = I/I_o = \exp(-\mu d) \quad (3)$$

where T is the transmittance, μ is the coefficient of attenuation, d is the material thickness, Io is the incident light intensity, and I is the transmitted light intensity.

On application of the napery an log, eqn (3) becomes [15];

$$\ln(T) = a - \mu d \quad (4)$$

where a accounts for experimental unknowns including the reflectance at the surface of the materials [9]. Equation (4) is confirmed by Figures 4-6.

The results seem to be consistent with other studies which found decreases in light transmittance with sample thickness of materials [14, 19,20].

On application of regression analysis of naperian log of direct transmittance (lnT) versus material thickness, the slopes and intercepts of the graphs (Figs.4-6), are determined (Table 8) .The slopes represents the optical attenuation coefficient of the materials which describes how the intensity of light decreases by a given thickness of a material medium, i.e. characteristic of the material and the light wavelength[17].

There was significant correlation of the attenuation coefficient with light wavelength for the Grandio Seal but not with Grandio and Grandio Flow. The optical attenuation coefficient determination has been suggested as a precise method in the measurement of both low and high radio-opacity than the equivalent aluminium thickness method[18]. The intercept is measure of the reflectance at the surface of the material and an additional factor to be considered responsible for the decrease of light transmission through the materials [9].

The clinical significance of the present study relates to the optical aesthetics of dental resin composites with regards to shade matching and suggests that clinicians must take into consideration the significant changes in the transmittance (translucency) with material thickness and light wavelength as well as the surface reflectance for successful shade selection.

Conclusions

The conclusions of the research study are summarised as follows: The transmittance was significantly influenced by material thickness and by light wavelength. The variation with material thickness and light wavelength was in accordance with the Lambert's law as well the Rayleigh scattering equation. The dependency of direct transmittance of the cured dental resin-composites on material thickness and light wavelength may result in significant changes in colour and clinical appearance of the visible light cured resin-composites.

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PREVALENCE AND FACTORS ASSOCIATED WITH SELF-REPORTED HEARING LOSS AMONG REGISTERED PENSIONERS IN GHANA

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Abstract

Background: Hearing loss affects quality of life. Prevalence of hearing loss varies across various geographical regions. The aim of the study is to determine the prevalence and factors associated with self-reported hearing loss among the registered pensioners in Ghana

Method: the study was a cross-sectional nation-wide study among members of the national pensioners association. It was carried out in thirteen study sites with at least a study site in each region capital of Ghana. Questionnaire administration, physical examination, urine and blood examinations were the method for data collection.

***Results*:** Overall prevalence of self-reported hearing loss among the pensioners was, 4.1%. Pensioners below 65years of age had a prevalence of 3.6% (95% CI, 2.7 – 4.5) whiles those above 80 years of age had an overall prevalence of 5.6% (95% CI, 1.5 – 9.6). Also, 14 pensioners per 10,000 pensioners in Ghana use hearing aids whereas 31 pensioners per 1000 reporting hearing loss, use hearing aid. The following factors were found to be associated with hearing loss; raised urine nitrates (AOR 2.3, 95% CI, 1.1 – 5.0), history of allergies (OR 1.9, 95% CI, 1.2 – 2.8), history of chronic bodily pain (OR 1.7, 95% CI, 1.3 – 2.4), use of eyeglasses (OR 1.8, 95% CI, 1.3 – 2.6) current alcohol intake (OR 1.5, 95% CI, 1.0 – 2.2) underweight (OR 1.7, 95% CI, 1.0 – 2.9)

Conclusion: The prevalence of self-reported hearing loss is low in Ghana compared to its regional and global estimates. The uptake of hearing aid use among pensioners in Ghana is very low.

Key Words: Hearing loss, Self reported hearing loss, Hearing aid, Pensioners

Introduction

Old age is associated with many health problems. Hearing loss (HL) has been described as the most common sensory deficit in the elderly[1]. The underlying problem for the HL in the elderly has mainly been attributed to presbycusis. Presbycusis is defined as a slowly progressive often symmetrical HL, of multifactorial process, associated with the cochlear degenerative process of aging.[2,3,4] Hearing loss affects the quality of life of the older adults.

Impact of HL on elderly quality of life is profound. Some of the effects ranges from difficulty in functioning normally, depression,[5] difficulty with communication,[6,7] decreased mental function,[8,9,10] loneliness, social isolation,[11] dependence, frustration[1], reduced self esteem and reduced social skills. Studies has also demonstrated that among community dwelling older adults, hearing loss poses a significant reduction in life-space mobility which has been interpreted to include the size of the space a person moves through in a daily routine.[12] The reduction in the life-space mobility is linked with the perceived and/or experienced challenges with walking difficulties, postural balance, and risk of falling among older adults with hearing loss[13,14,15]. Also, HL has been linked with increased mortality. HL in older adults have been associated with increased mortality independent of demographic and cardiovascular risk factors.[16] Studies have demonstrated that rehabilitation with hearing aids or cochlear implants in instances where hearing aids fail to improve HL has caused dramatic improvement in the quality of life of elderly with HL[17,18,19,20].

Humans studies over the years grouped these causes of age-related HL in to cochlear aging, environmental exposure to noise, genetic predisposition and co-morbidities including smoking[21]. Factors that have been associated with HL included increasing age, male sex, cardiovascular disease, diabetes, ear infections, socioeconomic status and exposure to loud noise[22,23]. Other factors associated with increased risk of HL included analgesics use particularly Ibuprofen and acetaminophen use,[24] higher body mass index and large waist circumference,[25] racial difference,[26] alcohol use[27] and increased serum cholesterol.[28] The effect of age is remarkably demonstrated by epidemiological studies showing that HL prevalence doubles every decade of life from the second decade to the seventh decade[29].

The gold standard for HL assessment has been the use of audiometry. However self-reported hearing loss (SRHL) was found to be fairly accurate with an acceptable sensitivity for use to identify older adults requiring hearing rehabilitation[30]. However, prevalence

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based on SRHL compared with audiometry has been shown to underestimate prevalence for adults above 70 years and overestimate prevalence for adults below 70 years[31]. Also, the sensitivity of SRHL is comparable to gold standard in moderate to severe hearing loss but low for mild hearing loss[32]. It therefore suggests that, most studies relying on SRHL mainly estimate the prevalence of moderate to severe hearing loss. For resource poor setting, SRHL remain a valuable tool in the assessment of HL.

Prevalence of HL varies across various geographical regions. The world health organization in 2012 estimated that about 5.3% of the world's populations have disabling HL with about one in three adults over 65 years affected by disabling HL[33,34]. The prevalence is estimated to be greatest in sub-Saharan Africa, south Asia and Asia pacific. In Ghana, there is lack of nationwide data on the prevalence of HL among the older adult population. However, some studies carried out in Ghana in 2004 suggested that approximately 8% report hearing problems[35,36]. A study conducted among 140 workers from the stone crushing industry and 150 health workers in 2012 in Ghana found that SRHL occurred in 2.8% of the health workers compared to a prevalence of 21.5% of workers in the stone crushing industry[37]. Hearing aid use is the approach most frequently used to correct age related HL. The prevalence of hearing aid use in Ghana among older adult is significantly lacking in Ghana. The aim of this study was to determine the prevalence of HL among the older adults in Ghana using a SRHL approach in a registered pensioner population. The study also identified factors that were significantly associated with HL among the pensioner population in Ghana.

Method

Study design

This study is a secondary analysis of data from the Pensioners medical Scheme (PMS) survey conducted in Ghana among members of the National Pensioners association. A cross-sectional study was conducted with study participants from all ten regions of Ghana. It involved questionnaire interviews, physical examinations as well as laboratory examinations of urine and blood samples collected from study participants. Physical examination carried out included: general examination (pallor, jaundice, pedal edema), eye exams (visual acuity, funduscopic examination), cardiovascular examination (pulse rate, blood pressure, heart auscultation), respiratory exams (respiratory rate, chest percussion and auscultation), abdominal examination (tenderness, palpation of liver, spleen and both kidneys). It was a nationwide exercise that took place from April to December of 2014. Members of the national pensioners association converged at the centers within the days of the screening.

Study sites

The study took place at thirteen sites of which ten were in the regional capitals of the ten regions of Ghana, West Africa. The study setting was predominantly urban. However participants from peri-urban and some rural areas within close proximity of each of the study sites also took part in the study. The study sites and their respective regions were as follows: Tamale (Northern region), Bolgatanga (Upper East region), Wa (Upper West region), Koforidua (Eastern region) and Cape coast (central Region). The other centers were Accra (greater Accra region), Sunyani (Brong Ahafo region), Kumasi (Ashanti region), Ho (volta region) and Takoradi (Western region). There were three additional study sites, which were not regional capitals. These extra sites were selected because they are major cities in their respective regions with high membership of pensioners yet much further from the regional capital. These extra sites were Tema (Greater Accra region), Tarkwa (Western region) and Hohoe (Volta region).

Study Population and Eligibility criteria

The study subjects were pensioners, majority of the pensioners qualified as elderly as defined by the United Nations classification of 60 years and above. There were some participants below 60 years who had retired before the retirement age of 60 years due to disability and other reasons thereby qualifying as pensioners. All pensioners who were members of the National Pensioners Association were eligible as participants of the study. Within the study period, 4813 members of the national pensioners association presented for the medical screening. Participant were member of the National Pensioners association and must be resident in Ghana.

Sample size and Sampling method

Every member of the National pensioners' association resident in the regional capital of the respective region and their surrounding towns and villages were eligible. It was the hope of the study to recruit as many as were pensioners in the region during the exercise. A census of all pensioners who were members of the national pensioners association within and around the selected study sites was the target. 4813 pensioners took part in the study.

Definitions and examinations

Study participants were asked about any hearing loss. They were then asked to specify the hearing loss. We excluded from the data all forms of hearing problems (tinnitus, ear pain, ear discharge) without hearing loss. Self-reported hearing loss was defined as perceived hearing loss in the elderly reported by the elderly. Medical officers conducted physical examination for all participants.

Study materials and data capture tool

Study questionnaires were used to record socio-demographic data of participants. It had a section on past medical history collecting information on known past medical history. It further collected information on allergies, alcohol, smoking, exercise and diet. There was a physical examination form attached, which was used to capture data of the physical examination conducted by medical officers. Weight was measured with a weighing scale with attached stadiometer for height. The Blood pressure was measured using standardized electronic sphygmomanometer with appropriate cuff sizes. Blood sample was taken and a glucometer was used to measure the random blood sugar. Blood sample was collected into a serum separator bottle and transported to a laboratory for measurement of serum cholesterol using automated and standardized techniques.

Data collection

Trained research assistants filled the questionnaire based on the response of the study participants. The weight was measured with the weighing scale to the nearest one-kilogram while the height to the nearest one millimeter. Random blood sugar was measured using glucometer. Medical officers perform physical examination while the eye team checked the vision and carried out the comprehensive eye examinations. Personalized reports of the medical screening were sent to each participant.

Data processing and Analysis

The data generated in the research were entered into Epidata 3.1 and exported into STATA/MP 11.0 (copyright 2004-2009) for analysis. The primary outcome in the study was self-reported hearing loss. The background characteristics of the respondents were obtained by cross tabulation. Logistic regression was used to analyze the factors association with self-reported hearing loss. First, the association between each of the potential factors and self-reported hearing loss was examined ignoring other variables. This analysis was important because it gave a fair idea as to which of the variables were strong predictors/ related to visual impairment/blindness. Second, to construct a model with factors that were independently associated with self-reported hearing loss, each of the independent variable was a candidate provided that the p-value was 0.05 or less. P-value of 0.05 was considered statistically significant. A choropleth map was constructed manually using CorelDraw and a plain map of Ghana from Google map to display the prevalence of self-reported hearing loss among pensioners in Ghana.

Ethical considerations

Review and approval was obtained from the National Pensioners Association board. The board further monitored each step of the data collection process. Members of the National Pensioners association gave their consent to participate. The content of the medical screening exercise was developed in extensive consultation with the executives of the National Pensioners Association. Consent was voluntary and each study participant had the right to withdraw at any stage of the study process. Uttermost privacy and confidentiality were maintained. No compensation or payments were made to any study participants. The results of the physical examination were carefully explained to all participants and were counseled on healthy lifestyle in old age. Personalized results of the study were sent to each participant in a sealed envelope. Data files were password protected. Hard copy data were stored in locked file cabinets, and access was limited to the Principal investigator.

Results

Table one displays the background characteristics of the study participants. Out of the 4,782 study participants who took part in the study, 69.0% were males. 3.1% of the study participants were above 80 years of age. 37.3% of the study participants were below the age of 65 while 34.0% were between the age of 65 and 69 years.

Prevalence of self-reported Hearing loss among the pensioners in Ghana

Table 2 shows the prevalence of SRHL among the registered pensioners in Ghana. Overall prevalence of SRHL among the pensioners was, 4.1%. The overall prevalence by sex was 4.1% (95% CI, 2.0 – 4.7) for males and 4.1% (95% CI, 3.0 - 5.2) for females respectively. The prevalence of SRHL increases with increasing age of pensioners. The pensioners below 65years of age had a prevalence of 3.6% (95% CI, 2.7 – 4.5) those above 80 years of age had an overall prevalence of 5.6% (95% CI, 1.5 – 9.6). The highest prevalence of SRHL was found among pensioners who were separated by marital status accounting for 5.6% (95% CI, 2.3 – 9.1). The least prevalence by marital status was within the widowed or widower group, 3.1% (95% CI, 1.8 – 4.4). By educational status, pensioners with educational status as vocational/technical had the highest prevalence of 5.6% (95% CI, 2.0 – 9.2) whereas pensioners with educational status as primary education had the lowest prevalence of SRHL.

There was a geographical variation in the distribution of the prevalence of self-reported hearing loss among the pensioners. The highest prevalence of self-reported hearing loss was found in the upper east region of Ghana where the prevalence of SRHL was 10.5% (95% CI, 6.5 – 14.5). Among the pensioners in the upper east region, the prevalence of SRHL among the male pensioners was 10.8% (95% CI, 6.4 – 15.1) whereas the females had a prevalence of 9.1% (95% CI, 1.0 – 19.1). The lowest prevalence was found in the central

Table 1: Characteristics of study participants

	Proportion by Sex		All Participants
Participant characteristics	**Female**	**Male**	**Total**
	n (%)	**n (%)**	**N (column %)**
All participants	1,482 (31.0)	3,300 (69.0)	4,782 (100)
Age in years			
< 65	704 (50.5)	960 (31.4)	1,664 (37.3)
65 - 69	461 (33.1)	1,056 (34.5)	1,517 (34.0)
70 - 74	166 (11.9)	627 (20.5)	793 (17.8)
75 - 79	50 (3.6)	295 (9.7)	345 (7.7)
≥ 80	14 (1.0)	123 (4.0)	137 (3.1)
Current marital status			
Never Married	36 (2.6)	40 (1.3)	76 (1.7)
Married	556 (40.3)	2,679 (88.0)	3,235 (73.1)
Widow/Widower	511 (37.1)	200 (6.6)	711 (16.1)
Divorced	157 (11.4)	63 (2.1)	220 (5.0)
Separated	119 (8.6)	62 (2.0)	181 (4.1)
Body Mass index (by WHO BMI cutoff/ classification)			
Underweight	34 (2.4)	232 (7.6)	266 (6.0)
Normal	393 (28.0)	1,743 (56.8)	2,136 (47.8)
Overweight	492 (35.1)	848 (27.6)	1,340 (30.0)
Obese	483 (34.5)	246 (8.0)	729 (16.3)
Highest formal educational status			
None	70 (5.4)	423 (15.1)	493 (12.0)
Primary	517 (39.7)	1,116 (39.9)	1,633 (39.4)
Secondary	195 (15.0)	434 (15.5)	629 (15.4)
Tertiary	452 (34.7)	724 (25.9)	1,176 (28.7)
Vocational	68 (5.2)	100 (3.6)	168 (4.1)

Table 2: Prevalence of Self-reported Hearing loss among pensioners in Ghana

Prevalence by Characteristics	Female	Male	Overall
	% (95% CI) [a]	% (95% CI) [a]	% (95% CI) [a]
Overall	4.1 (3.0 – 5.2)	4.1 (3.4 – 4.8)	4.1 (3.5 – 4.7)
Age in years			
< 65	3.3 (2.0 – 4.7)	3.8 (2.6 – 5.1)	3.6 (2.7 – 4.5)
65 - 69	5.0 (3.0 – 7.1)	3.7 (2.5 – 4.8)	4.1 (3.0 – 5.1)
70 - 74	3.9 (1.0 – 7.0)	4.7 (3.0 – 6.3)	4.5 (3.0 – 6.0)
75 - 79	8.9 (1.0 – 17.3)	4.7 (2.2 – 7.1)	5.2 (2.8 – 7.6)
≥ 80	-	6.3 (1.8 – 10.8)	5.6 (1.5 – 9.6)
Marital status			
Never Married	6.0 (2.2 – 13.9)	2.6 (2.5 – 7.8)	4.2 (0.5 – 8.8)
Married	4.2 (2.5 – 6.0)	4.2 (3.4 – 5.0)	4.2 (3.5 – 4.9)
Widow/Widower	3.5 (1.9 – 5.1)	2.2 (0.1 – 4.2)	3.1 (1.8 – 4.4)
Divorced	4.0 (1.0 – 7.1)	2.0 (1.6 – 5.0)	3.3 (0.9 – 5.7)
Separated	5.1 (1.1 – 9.2)	7.0 (0.3 – 13.3)	5.7 (2.3 – 9.1)
Highest Educational level			
None	4.4 (0.5 – 9.3)	5.0 (2.8 – 7.0)	4.8 (2.9 – 6.7)
Primary	3.3 (1.7 – 4.9)	3.0 (2.0 – 4.0)	3.1 (2.2 – 4.0)
Secondary	5.0 (1.8 – 8.2)	3.8 (2.0 – 5.6)	4.1 (2.5 – 5.7)
Tertiary	4.1 (2.2 – 6.0)	4.2 (2.7 – 5.7)	4.2 (3.0 – 5.3)
Vocational	6.3 (0.3 – 12.2)	5.1 (0.7 – 9.6)	5.6 (2.0 – 9.2)
Region			
Ashanti	3.1 (1.4 – 4.9)	2.3 (1.2 – 3.4)	2.6 (1.6 – 3.5)
Brong Ahafo	1.3 (1.2 – 3.8)	3.5 (1.0 – 6.1)	2.9 (1.0 – 4.9)

Continuation of table two

Prevalence by Characteristics	Female	Male	Overall
	% (95% CI) [a]	% (95% CI) [a]	% (95% CI) [a]
Central	2.6 (2.5 – 7.8)	0.8 (0.7 – 2.3)	1.2 (0.4 – 2.8)
Eastern	2.3 (0.3 – 5.0)	4.7 (2.2 – 7.2)	3.9 (2.1 – 5.8)
Greater Accra	5.2 (1.1 – 9.2)	5.1 (2.4 – 7.8)	5.0 (2.8 – 7.3)
Northern	-	3.4 (1.3 – 5.5)	3.1 (1.2 – 5.0)
Upper East	9.1 (1.0 – 19.1)	10.8 (6.4 – 15.1)	10.5 (6.5 – 14.5)
Upper West	8.8 (2.5 – 15.0)	7.4 (4.0 – 10.3)	7.5 (4.7 – 10.4)
Volta	6.7 (3.6 – 9.8)	4.6 (2.3 – 6.9)	5.5 (3.7 – 7.3)
Western	2.1 (0.06 – 4.1)	2.4 (0.8 – 4.0)	2.3 (1.0 – 3.5)

(95% CI) [a] - 95% confidence interval

Table 3: Factors associated with self-reported hearing loss among the pensioners in Ghana

Factors	OR [a]	(95% CI) [b#]	P-value
History of Allergies			
Normal	-		
Allergies	1.8	(1.2 – 2.7)	<0.005
Chronic body pains			
No chronic bodily pains	-		
Chronic bodily pains	1.9	(1.3 – 2.7)	<0.0005
Use of eyeglasses			
No eye glasses	-		
Uses eye glasses	1.5	(1.1 – 2.1)	<0.05
Alcohol intake			
No alcohol intake	-		
Takes in Alcohol	1.7	(1.2 – 2.4)	<0.005
Body Mass Index (Kg/M^2)			
Underweight (<18.5)	1.7	(1.0 – 2.8)	<0.005
Normal weight (18.5-24.9)	-		
Overweight (25.0-29.9)	0.7	(0.4 – 0.9)	
Obese (≥30)	0.7	(0.4 – 1.0)	
Urine appearance			
Clear	-		<0.05
Cloudy/ Hazy	2.0	(1.2 – 3.2)	
Urine nitrites			
Normal	-		
Raised	2.4	(1.2 – 5.1)	<0.05
≤ 2.25 (199 mg/dL)	-		<0.05
≥ 2.26 (200 mg/dL)	0.4	(0.2 – 1.0)	
Vegetarianism			
Non vegetarian	-		
Vegetarian	2.1	(1.0 – 4.7)	<0.05
Region of residence			
Ashanti	-		<0.0001
Brong Ahafo	1.1	(0.5 – 2.4)	
Central	0.5	(0.1 – 2.0)	
Eastern	1.6	(0.8 – 2.9)	
Greater Accra	2.0	(1.1 – 3.7)	
Northern	1.2	(0.6 – 2.4)	
Upper East	4.4	(2.5 – 7.8)	
Upper West	3.1	(1.8 – 5.3)	
Volta	2.2	(1.3 – 1.7)	
Western	0.9	(0.4 – 1.7)	

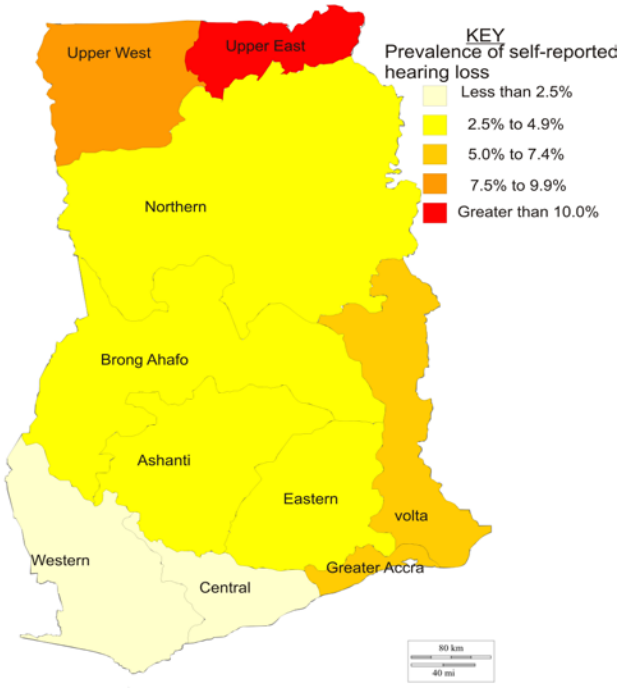
OR [a]; Odds ratio, unadjusted

(95% CI) [b#]; 95% confidence interval, Reporting for only significant findings

Table 4: Multivariate logistic regression analysis of factors associated with self-reported hearing loss among pensioners in Ghana.

Factors	AOR [c]	(95% CI) [b#]	P-value
History of Allergies			
Normal	-		
Allergies	1.9	(1.2 – 2.8)	<0.005
Chronic body pains			
No chronic bodily pains	-		
Chronic bodily pains	1.7	(1.3 – 2.4)	0.001
Use of eyeglasses			
No eye glasses	-		
Uses eye glasses	1.8	(1.3 – 2.6)	0.001
Alcohol intake			
No alcohol intake	-		
Takes in Alcohol	1.5	(1.0 – 2.2)	<0.05
Body Mass Index (Kg/M^2)			
Underweight (<18.5)	1.7	(1.0 – 2.9)	<0.05
Weight ≥ 18.5	-		
Urine appearance			
Clear	-		
Cloudy/ Hazy	1.7	(1.0 – 2.9)	<0.05
Urine nitrites			
Normal	-		
Raised	2.3	(1.1 – 5.0)	<0.05
≤ 2.25 (199 mg/dL)			
≥ 2.26 (200 mg/dL)			

(95% CI) [b]; 95% confidence interval
AOR [c]; Adjusted odds ratio - Adjusting for age, sex, region of residence
[#] Reporting for only significant findings



Source: Data analysis from this study

Figure 1: Choropleth Map showing the prevalence of Self-Reported hearing loss by region of residence in Ghana

region with an overall prevalence of 1.2% (95% CI, 0.4–2.8)

Figure 1 displays a choropleth map of the prevalence of SRHL by region of residence. Generally, the prevalence of SRHL increased form the south to the northernmost part of the country. Another feature was the relative increase in the prevalence of hearing loss from the west to the east of the country.

Prevalence of hearing aid use among pensioners in Ghana

The prevalence of hearing aid use among pensioners with self-reported hearing loss in Ghana was 3.1%. However, among all pensioners including participants with and without SRHL, the prevalence of hearing aid use is 0.14%. Thus overall, 14 per 10,000 pensioners in Ghana use hearing aids whereas 31 pensioners per 1000 with hearing loss use hearing aid.

Factors associated with Self-reported hearing Loss among Pensioners in Ghana

The following factors were associated with increased likelihood of SRHL: history of allergies (OR 1.8, 95% CI, 1.2 – 2.7), history of chronic bodily pain (OR 1.9, 95% CI, 1.3 – 2.7), use of eyeglasses (OR 1.5, 95% CI, 1.1 – 2.1) and current alcohol intake (OR 1.8, 95% CI, 1.2 – 2.7). Others included body mass index in the underweight region (OR 1.7, 95% CI, 1.0 – 2.8), being a vegetarian (OR 2.1, 95% CI, 1.0 – 4.7), raised urine nitrated (OR 2.4, 95% CI, 1.2 – 5.1) and cloudy/Hazy urine appearance (OR 2.0, 95% CI, 1.2 – 3.2).

Factors that were associated with reduce odds of SRHL were raised serum triglyceride above 2.26 mmol/L (200 mg/dL) and BMI weight classification within the WHO classification of overweight and obesity. Table 3 displays the odds ratio of unadjusted analysis of factors associated with SRHL.

In the multivariate analysis adjusting for age, sex and region of residence, it was found out that, raised urine nitrates had the highest odds of being associated with SRHL (AOR 2.3, 95% CI, 1.1 – 5.0). Other factors that were associated with increased odds of reporting with hearing loss were history of allergies (OR 1.9, 95% CI, 1.2 – 2.8), history of chronic bodily pain (OR 1.7, 95% CI, 1.3 – 2.4), use of eyeglasses (OR 1.8, 95% CI, 1.3 – 2.6) and current alcohol intake (OR 1.5, 95% CI, 1.0 – 2.2). Others included body mass index in the underweight region (OR 1.7, 95% CI, 1.0 – 2.9) and cloudy/Hazy urine appearance (OR 1.7, 95% CI, 1.0 – 2.9). Table 4 displays the results of the multivariate analysis.

Discussion

Prevalence of self-reported hearing loss

Overall prevalence of SRHL among the pensioners was lower compared to estimates based on audiometry [33,34, 35,36]. Data from this study reports an overall prevalence of SRHL of 4.1% far lower than the global estimates of over 30% hearing loss in elderly above 60 years[33,34] and the Ghanaian all age group estimate of 8%[35,36]. Audiometry assessment classifies elderly as having impaired hearing loss at frequencies that will appear normal and having little or no impact for the elderly patient. Also, many elderly in Ghana have come to accept hearing loss as a part of the processes of aging and would not consider it a problem worth reporting. This may account for the low prevalence of hearing loss compared to estimates from audiometry and global estimates.

This study did not find any significant difference between the sex prevalence of hearing loss among pensioners in Ghana. The study population for this study was predominantly from a class of the society that were in a formal employment sector unlike many studies that included elderly from the informal/ self-employed sector. Secondly, this study used a self-reported hearing loss as the tool for diagnosis whereas most of the studies that found difference in sex prevalence used audiometry.

By educational status, pensioners with highest educational status as vocational/technical had the highest prevalence compared to other educational status. It is an established fact that occupational exposure to noise increases the risk for hearing loss. Since the pensioners with highest educational status as vocational or technical were more likely to have been working in a vocational or technical settings where noise exposure may be higher compared to other work settings explains the higher prevalence of hearing loss among this category of pensioners.

Factors associated with hearing loss

With regard to factors associated with hearing loss, in a multivariate analysis adjusting for age, sex and region of residence, the following factors were found to be associated with hearing loss; raised urine nitrates, history of allergies, chronic bodily pain, use of eye lenses, current alcohol intake, underweight and urine appearance classified as hazy/cloudy. Contrary to findings suggesting higher body mass index to be associated with hearing loss (25), this study found underweight to be associated with hearing loss and overweight and obesity to be associated with lower risk of hearing loss. This requires further studies to determine what accounted for the observed association. Chronic bodily pain was associated with SRHL. Some studies have found analgesics use particularly Ibuprofen and acetaminophen use to be associated with hearing loss (24). We believe there is a link between these two findings as pensioners with chronic bodily pain were more likely to be using analgesics for the pain.

Conclusion

SRHL is a valuable tool in assessing hearing loss particularly in poor resource settings. The prevalence of self-reported hearing loss in Ghana is low compared to global and African regional estimates. The prevalence of hearing aid use among the older adults in Ghana is very

low. The following factors were identified to be related to self-reported hearing loss; raised urine nitrates, history of allergies, chronic bodily pain, use of eye lenses, current alcohol intake, underweight and urine appearance classified as hazy/cloudy.

Recommendations

We recommend that the Ghanaian ministry of health and the Ghana health service should intensify education on hearing aid options available for improving hearing loss in older adults. Self-reported hearing loss can be used as a fast screening tool by health workers particularly in the community settings. All elderly must be asked of reduced hearing by clinicians and helped appropriately. Also steps must be taken by employers and employees to prevent occupational noise induced hearing loss during active working life.

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A PRELIMINARY STUDY ON LIVING WITH LOW VISION: EMOTIONAL AND PSYCHOSOCIAL EXPERIENCES AND CHALLENGES OF PATIENTS IN A TERTIARY HEALTH FACILITY IN GHANA

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Abstract

Background: Low vision usually results in difficulties in independent mobility with associated emotional and psycho-social challenges and impairment in overall quality of life of sufferers. This study explored the psychosocial experiences and challenges of adult low vision patients at the Korle Bu Teaching Hospital.

***Methodology*:** A qualitative exploratory research was conducted to explore the psychosocial experiences and challenges of patients at the Low Vision Clinic at the Korle Bu Teaching Hospital, Ghana. Adult low vision patients aged ≥18 years were selected for a face-to-face in-depth interview and a focus group discussion. An interpretive content analysis of the data was performed to identify themes and sub-themes from the respondent's narrations.

***Results*:** A total of 15 participants aged between 24 years and 75 years were involved in the study. There were 9 males and 6 females with a mean age of 50.5± 17.9 years. Themes generated from the study include; emotional reactions, loss of hope in life, social support, low vision rehabilitation and coping strategies. Emotional feeling, depression, fear of eventual blindness, dependency on family and society, difficulties in coping with low vision, loss of hope in life, lack of support from family and friends and reduced quality of life were found to be the most challenging psychosocial issues surrounding the low vision patient in their daily living. Burden of care and cost for rehabilitation of persons with low vision is borne by the individual and not covered by the National Health Insurance Scheme.

***Conclusion*:** The NHIS could include basic and less expensive devices for improving the everyday lives of persons with low vision in the benefits package of the scheme. Structured counselling sessions should be included as part of the care package for persons with low vision and role of the clinical psychologist in the care team is essential.

Key Words: Low vision, emotional and psychosocial experiences, depression, coping strategies

Introduction

Low vision is a common instance of chronic condition that affects daily functioning and quality of life with a significant reduction of visual function that cannot be fully corrected by ordinary eyeglasses, contact lenses, medical treatment or surgery[1].

Low vision is still a significant public health concern even though the World Health Organization (WHO) has revealed a reduced global visual impairment[2,3]. Globally, cataract and other age-related diseases have been identified as the leading causes of low vision[3,4]. Some studies in Africa have also revealed cataract and glaucoma as the major causes of blindness and low vision[5,6].

Even though population studies in Ghana have shown high prevalence of low vision[7-9], service facilities for such persons are grossly inadequate as there are only two low vision centers in the country. Persons with low vision are faced with psychosocial, physical and socioeconomic anxieties which eventually impact on their quality of life[1, 10-13].

In Ghana, psychosocial care for sufferers of low vision still remains a problem which has not received the deserving attention. Formal structures for social support structures for people with low vision are almost non–existent. Informal care giving and support is predominantly by families of these people; a phenomenon which often causes such people to resort to begging on the streets.

Similar situations exist in other low-income settings. In Nigeria, the existing blind populations are not given much attention either[14,15]. This usually result in isolations from families and societies in search of a better life which may not even exist for such people[16,17].

Most adults with low vision are chiefly concerned with their daily survival through securing and maintaining their jobs to enable them manage their homes and fulfill their social responsibilities[18,19]. Most of these usually older adults, are faced with various challenges in life at a stage when their health is totally

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reduced due to other age-related co-morbidities with concerns on the ability to live an independent life[19-21].

In Ghana, there is paucity of data on emotional and psychosocial challenges among persons with low vision and limited documentation on the psychological support for this target group upon visits to health facilities. National health and social policy for this population group is non-existent.

This was an exploratory survey on the emotional and psychosocial experiences of adults with low vision attending a large tertiary health care facility in Ghana. It is aimed at providing a guide as to what really affect the daily living of these patients and what they would expect upon their hospital visitation and during rehabilitation.

Methods

Study Site

The Low vision Clinic of the Eye Department at the Korle Bu Teaching Hospital was used as the study site. This facility was established in 2005 to take care of the unmet needs of low vision patients in Accra and other regions in Ghana. Patients are mainly referred from sub clinics of the Eye Department at the Korle Bu Teaching Hospital, private practicing Ophthalmologists/ Optometrist and other health facilities within the country.

Study design

Qualitative exploratory design examined the psychosocial experiences and challenges of low vision patients at the Low Vision Clinic at the Korle Bu Teaching Hospital.

Study population

Adult low vision patients aged 18 years and above presenting at the Low Vision Center at the Korle Bu Teaching Hospital were used as the study population. Adults with low vision (clinically diagnosed) aged ≥18 years presenting at the Low Vision Center at the Korle Bu Teaching Hospital who gave informed consented were selected using a simple random sampling approach.

Instrument and data collection procedure.

The data was collected over an eight-week period in 2017. In all ten out-patients were involved in the in-depth interviews and five out-patients were included in the focus group discussion. A face-to-face interview lasting 20 minutes with each of the 10 patients were conducted. Interview guide with structured questions were used. It solicited information on the patients' experiences, feelings, thoughts and challenges after being diagnosed with low vision. Two trained interviewers, the principal investigator (male) and an ophthalmic nurse (female), both with first degree background, used a series of prompts to encourage the participants to volunteer more information when necessary.

A focus group discussion was conducted for five patients, purposively selected for the face-to-face discussion in one of the consulting rooms of the units. This was to ensure privacy and away from the service providers. All data collection were conducted in the hospital away from interference from other patients and health workers.

The principal investigator was the moderator and was assisted by a recorder. The session lasted close to 50 minutes. Information obtained was audio-taped, after seeking consent from study participants and transcribed verbatim immediately after the sessions. The field notes were completed immediately after the sessions to allow a reflection on context and limit potential bias.

In this study, credibility was established by the audiotapes verified to confirm accurate transcription and field notes made during the interviews and focus groups. In order to be as faithful as possible to the individuals' conceptions of reality, detailed documentation of participants intentional relations to their conceptions and interpretations throughout the whole research process was maintained. Credibility was also promoted using direct quotation from study subjects. A respondent quotation from the face-to-face interviews was identified with alphabets ranging from A to J whiles the focus-group discussions were identified with FG.

Patients agreed to participate voluntarily without any incentives provided. There were, however, no refusal to participate in the study.

Questions, prompts and guides were provided and interview guide was pilot tested among patients of the unit three weeks before the study. No repeat interviews for participants were conducted i.e. these patients were not included in the main study. Transcribed data were returned to participants for comments and feedback.

Themes and sub-themes used for assessment

Themes and sub-themes upon which the assessment was based were, Emotional feelings (sadness, fear of danger, depression and distress); Loss of hope in life (marriage and job); Social support (financial and social support from family, friends and religious groups), Views on effect of rehabilitation (counseling and training with devices) and Coping strategies (daily task, marriage, friends and finance).

Data Handling

Data was recorded, transcribed and cleaned after interview and discussion. Participant's information was treated as confidential. Codes were used to represent names of participants and was done by two of the authors.

Statistical Analysis

Basic demographic and clinical characteristics of patients was manually analyzed. This was presented as frequency tables.

Manual thematic content analysis was used to summarize the qualitative data. The interpretation process consisted of three phases.

1. Each transcript was read a couple of times to get a brief understanding of the meaning of issues described by the participants.

2. Structural analysis was done to permit a detailed analysis of the text, aimed at identifying the parts and patterns of meaningful consistency and seeking explanations of the text. Five themes emerged out of the analysis namely; emotional feelings, seeking support, coping strategies, loss of hope in life and low vision rehabilitation consequences.

Ethical consideration

Ethical approval was obtained from Ethical and Protocol Review Committee, University of Ghana College of Health Sciences. A written informed consent was obtained from each participant. The technical difficulties with the maintenance of confidentiality in focus groups were made clear to participants. Privacy and confidentiality were maintained throughout the conduct of the study.

Results

The baseline characteristics of the 15 participants shown in table 1 indicates, five respondents had attained tertiary and secondary education, four had attained vocational and one respondent primary level of education.

Table 1: Baseline characteristics of the study participants at the Low vision clinic, Korle-Bu Teaching Hospital, Accra, Ghana.

Age group:	Male	Female	Total
18-64years	6	4	10
65+years	3	2	5
Total	9	6	15
Mean age ± SD	51.1± 8.6	49.7± 18.5	50.5 ± 17.9
Age at diagnosis for low vision:			
21-30	2	1	3
31-40	1	1	2
41-50	1	1	2
50+	5	3	8

Eleven of the respondents were Christians and four were Muslims. In all nine were married, five were single and one respondent was divorced. Only four respondents were currently working. More than half of the respondents were diagnosed with low vision at age 50 years and above.

Emotional feelings (*Sadness, fear of danger, depression and distress):*

Most respondents indicated they were troubled with sadness and fear in knowing their state. Depression and distress dominated their daily lives and emotional distress persisted in all their daily life activities resulting in low levels of their quality of life. Some of the vivid expressions of these emotional reactions were:

"I nearly became crazy in hearing the state of my visual impairment. I felt very sad and became distressed suddenly. I sometimes asked myself, how can I go to places without an aid? I always like to be independent in all spheres of life. But thinking about this condition, I sometimes sense danger hmmm" (Respondent D).

"In fact, come to think of my vision state still makes me feel I am not part of society. Initially, I thought of committing suicide since my eye is my light in this world. If such an organ is not functional, then is life worth living? I better die than to live and not see well" (Respondent C).

"I felt depressed when the doctor even told me the National Health Insurance does not cover low vision rehabilitation services provide. I asked myself, where and how can I get funds to assist me in managing this condition. This made me feel depressed and saddened. (Respondent A)".

"The doctor explained my eye condition which rather made me worse psychologically. Ever since my vision began to deteriorate, I always sensed the danger of becoming blind in the very near future. This created a lot of distress, fear and panic in my daily life (Respondent G)".

Loss of hope in life:

Participants indicated low vision had significant and devastating impact on the quality of their lives. Participants who were currently not married had deep feelings of foreboding and felt it would be very difficult for someone to marry them. Three respondents lamented on this:

"How would someone even love me except I have a lot of money? Otherwise, I am not qualified to marry. I know it will not be easy to cope with disabilities in marriage. But in this state how can I even get the few who may be ready to marry me" (Respondent I).

"Hmm, as for marriage, I don't even think of it because I have already ruled myself out. No man would like to marry a dependent and visually impaired person like me. How would I even take good care of my children? As for marriage it is out of my thoughts" (Respondent J).

"I lost my job as a result of this low vision. My employer can no longer engage me in active business. I was forced to resign voluntarily which emotionally affected me and made me bury the hope I had in ever working again. Then I thought of resorting to asking for alms to support myself" (Respondent E).

Social Support:

Support from family, friends, religious bodies, and financial support from society remain a crucial issue in rehabilitating the person with low vision. The analysis demonstrated that, participants received support in

various forms from spouses, families, friends, religious bodies and society in general. Four persons with low vision among study participants did not obtain any support from these groups resulting in extreme difficulties.

Some participants expressed their views on social support as follows:

"As for support, my wife always does almost everything for me. I feel blessed about this. I know it is very difficult to assist physically challenged persons. I am lucky to have such a wonderful woman. The church and friends have also assisted me financially and with prayers which spiritually makes me strong. (Respondent F)"

"I felt dejected by friends and loved ones when my diagnosis was made. I had marital issues when my husband could not cope with the situation and associated cost any longer. I had to resort to my family who initially supported me but now it is becoming increasingly difficult to get help from them. In the house when I send children on errands, their parents forbid them to do so. There are instances where some even see my condition as a curse. Others think I am a witch." (Respondent B).

"Life has not been easy with me, financially, I am down completely. It was the church who initially supported me but this support later stopped. I find it even difficult to purchase the low vision devices. These devices I was told are not covered in the National Health Insurance Scheme. I sometimes consider going to ask for alms on the streets" (Respondents H).

"My husband left me in marriage as a result of this low vision. All my children are with me assisting me with my daily tasks. It would have been difficult without them. Some friends would occasionally come to my aid financially. One of the devices for my rehabilitation was very expensive, and it took the church to intervene in buying this device" (Respondent D).

Views on effect of rehabilitation for Low vision

The analysis showed counseling enabled low vision patients cope with life, performed daily tasks and improved their quality of life. Low vision devices played a key role in enhancing visual adaption and use of residual functional vision among some study participants. In addition, study participants had been trained to use low vision devices for visual rehabilitation. Views on effect of rehabilitation were:

"Hmm. Initially, I came with high hopes that my situation will be improved significantly. However, this hope was lost and I suddenly became disappointed when I was given a telescope and a magnifier to use. But upon much encouragement from the rehabilitation workers, I have adapted to the use of these devices. I can now read some few manuscripts which were previously very difficult to even see. Thanks for the device" (Respondent D).

"I am still not comfortable with my device. It looks very clumsy to use. I am hoping they would one day get some other devices which may be quite comfortable to manage" (Respondent A).

"The devices were quite expensive. This becomes very difficult to purchase as most of us are not working. The government must do something about it" (Respondent H).

"After my rehabilitation, I found myself being able to do a lot of things which I couldn't do earlier on. I think it is worth practicing with these devices but they are quite expensive. I suggest the National Health Insurance Scheme come to our assistance" (Respondent B).

"The counselling I received has actually encouraged me to come back to life. I thought initially that there was no hope for me. But now I can do some few things in life which have improved my daily condition" (Respondent D).

Coping strategies.

Coping was seen to be necessary in making activities of daily living bearable and comfortable for these patients. Participants expressed their views on coping with daily task, employment, marriage, friends and finance through these submissions:

"Coping with this situation was very difficult for me initially. Psychologically, I was distressed asking why me? why me? but with time, I was able to manage the situation" (Respondent C).

"I am sometimes convinced that God will heal me. This faith has kept me moving and happy all the time knowing God can do all things when I believe" (Respondent F).

"I am not moved by this situation any longer. I know God is my helper. I keep on praying to God all the time with high hope that He will touch me with His healing hand" (Respondent G).

"At the initial stage of this condition, I couldn't cope with my daily tasks. But thanks to the rehabilitation exercise; I can now do a lot in life" (Respondent I).

"I am lucky to have a husband who helps me even in this situation. He has been a pillar for me in all these circumstances. I am able to cope with the low vision condition" (Respondent B).

Respondents suggested solutions to mitigate psychosocial challenges of low vision

The following suggestions were derived through the focus group discussions:

"I believe the government social interventional structures exist but they are not functional to the best of my knowledge. Government needs to strengthen these structures to make them visible and be able to solve the problems they were designed to solve" (Respondent FG 1).

"The National Health Insurance needs to be extended to cater for conditions such as low vision. Unfortunately, most of the potent drugs for the treatment of glaucoma are not even covered by the scheme. That is why my condition worsened up to this stage. I had

glaucoma and I also lost my job due to less productivity at the job site. I had to come home depending on relatives and others who will be touched by my situation" (Respondent F G 5).

"It is necessary for spirituality to be emphasized during this stage of visual loss. People should be educated to rely on God in times of difficulties when all hope is lost" (Respondent FG 4).

"The role of family and friends is very significant in such a situation like this. Families and society need to be educated on eye healthcare so that together they can help strengthen the lost hope of persons living with low vision. I believe low vision persons can be assisted in their daily tasks and given the necessary support they require" (Respondent FG 2).

"I think there should be a dedicated person at the Eye Clinic to give counseling to low vision patients who are referred to the facility as part of the rehabilitation support. Often we are down-hearted, troubled emotionally and we think all is lost. I think the ophthalmologist in such a situation cannot solve our emotional and distress problems. It should be the work of the counselor and occupational therapist" (Respondent FG 3).

"Support from relatives, government and the society is very important to us in this condition. As you can see, it is not easy to live with this situation at all. Support could come in the form of finance, care and prayers. These could sustain us significantly and foster good hope for the future" (Respondent FG 1).

Discussion

People living with low vision and even blindness in our societies have found success in almost all spheres of life. Such people are found in the education sector, journalism, legal businesses, political and religious arena as leaders who have excelled in their domain of work. Thus getting persons with low vision to be socially functional is imperative.

The role of the eyes in the optimum functioning of humans cannot be overemphasized[22,23]. This analysis provides a qualitative assessment of the psychosocial challenges encountered by patients with low vision in their daily life. Generally, findings from this study agree with others explored in the literature and indicate that low vision sufferers are often faced with low self-esteem, financial difficulties, and dependency on family and friends[23,24].

Religion plays an important role in the management of patients who have debilitating conditions with significant impact on the quality of life[25]. Religion plays an important role in the way Ghanaian view illness especially chronic conditions and this should be appreciated by health workers in the care of these patients[25,26]. Most participants in this assessment believed in God and totally rely on the supreme healing power of their God. They expressed hope and trust in God as the only one who can solve their problem. Integration of religion into the rehabilitation process could also help the patients in putting their trust in God. Nukunya in assessing coping strategies of Ghanaians during chronic illnesses mentioned religion as one of the major coping strategies[26]. The over-reliance on the supernatural for healing may obstruct the optimum compliance with medical instructions and affect medical rehabilitation processes. There may be instances where a patient may refuse to take medications and comply with medical directions due to their religious beliefs.

Inadequate support from families, the society and the nation were identified as key bottleneck to the optimal functioning and rehabilitation of persons with low vision in this analysis. The situation aggravates the feeling of hopelessness and even suicidal tendencies among participants. A previous study by Shim and Hahm in 2011, mention lack of support and hopelessness as factors that may promote suicidal tendencies by persons living with debilitating chronic health conditions[27].

In contrast to this observation, other participants mentioned they had emotional, financial, social and spiritual support from spouses, families, friends, society and religious bodies. In Ghana family and social informal social support systems play a key role in sickness and rehabilitation of persons with chronic conditions. Sarpong in his book 'Ghana in retrospect' reported the significance of the family network to Ghanaians in all spheres of life including; sickness, marriage, education, death and birth[28]. The formal social welfare system is weak and people depend mainly on the family and community and social groups for support in Ghana.

It was evident from the assessment that the National health Insurance Scheme (NHIS) in Ghana does not support medical costs associated with the devices for rehabilitation of persons with low vision. This imposes huge burden on the patients most of whom are unemployable or have lost their jobs as a result of their visual impairment. Any national health and social policy on eye care which considers the blind should consider the plight of persons with low vision as well. The NHIS could include basic and less expensive devices for improving the everyday lives of persons with low vision in the benefits package of the scheme.

In the Ghanaian society marriage is normative for both males and females, marriage and child birth is very much adored [26.] The analysis showed low vision made it very difficult for the unmarried person and they had given up the likelihood of ever getting married. This potentially may have ill effects and negative self-image. In being able to cope with their situation, the development of a positive self-concept is very important. Self-concept a set of attitudes which are held by an individual may help them to groom their identity, self-esteem and self-image. This has the tendency to enable the individual to cope and overcome debilitating health conditions[29]. López-Justicia in 2009, concluded that negative self-concepts has the tendency to

encourage isolation, depression and psychosocial challenges among low vision patients[29].

In addition, studies have shown that persons with low vision patients have greater degree of depression, anxiety, insecurity, loneliness, negative perception about their state with feelings of isolation when compared to the sighted[30,31]. The fear of danger and insecurity due to low vision was expressed among some of the respondents in the study. Lee and colleagues in 2003 reported proneness to accidents and falls and higher mortality rates among persons with low vision[32]. Structured counselling sessions included as part of the care package for persons with low vision visiting large tertiary hospital such as the Korle-Bu Teaching Hospital is essential. The role of the clinical psychologist in the care team is imperative.

Limitations

This study focused on adult low vision patients and did not consider the peculiar challenges for children and young adults. The exploratory study had participants from only one low vision center in Ghana, therefore the findings should be interpreted in this context and cannot be generalized for all patients with low vision in Ghana.

Conclusion and Recommendations

Emotional feeling, depression, fear of eventual blindness, dependency on family and society, difficulties in coping with low vision, loss of hope in life, reduced quality of life were key challenges for persons with low vision. Any national health and social policy on eye care which considers the blind should consider the plight of persons with low vision as well. The NHIS could include basic and less expensive devices for improving the everyday lives of persons with low vision in the benefits package of the scheme. Structured counselling sessions included as part of the care package for persons with low vision visiting large tertiary hospital such as the Korle-Bu Teaching Hospital is essential. The role of the clinical psychologist in the care team is imperative.

Abbreviations

FG	Focus Group Discussion
KBTH	Korle-Bu Teaching Hospital
NHIS	National Health Insurance Scheme
SPSS	Statistical Package for Social Scientists
WHO	World Health Organization

Declaration

The authors declare that they have no competing interest. The views expressed in this paper are those of the authors. No official endorsement by the Korle-Bu Teaching Hospital Administration is intended or should be inferred.

Authors' contributions

AB and A-DE developed the concept; AB and MR assisted with data collection; AB and AEY analyzed the survey data; AB wrote the first draft manuscript, AB, A-DE, MR and AEY contributed to the writing and reviewing of the various sections of the manuscript before submission.

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CHALLENGES IN THE MANAGEMENT OF RETINOBLASTOMA AT PERIPHERAL EYE CLINICS IN GHANA

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Abstract

Introduction: Retinoblastoma is the commonest childhood intraocular tumour with fatal consequence if untreated. The study purposed to determine, from general ophthalmologists at peripheral eye clinics in Ghana, the clinical stage of the disease at presentation to such centres, the challenges associated with its management and to seek recommendations for improvement in the management of retinoblastoma.

***Methods*:** A comparative, cross-sectional study was conducted among general ophthalmologists over two time periods: Period 1 (2005-2007) and Period 2 (2014-2016). One ophthalmologist from each peripheral eye clinic in Ghana was interviewed face-to-face, by telephone or email using a structured questionnaire after verbal informed-consent.

***Results*:** Responses were received from 24 out of 26 general ophthalmologists in Period 1 and from 35 out of 37 in Period 2. On the average 82 and 95 cases were seen respectively for the two periods. Specifically, 69 cases were seen in the year 2007 and 64 in 2016. The estimated age-specific incidence rates (ASR) for Periods 1 and 2 were 20.3 and 17.3 per million person-years respectively. The common clinical presentations reported by the ophthalmologists were leukocoria followed by proptosis and redness of eyes in both study periods. Diagnosis of retinoblastoma using clinical features supported by imaging (ultrasonography and CT-Scan) was done by 10 out of 24 (41.7%) in Period 1, as compared with 18/35 (51.4%) in Period 2 (p=0.461). Majority of ophthalmologists referred all their patients for treatment elsewhere in both periods on account of lack of resources for management including lack of general anaesthesia. Management challenges included abandonment of treatment by caretakers, lack of resources for management and refusal of treatment by caretakers with reasons such as cost, distance, fear of surgery and fear of bigger hospitals. Recommendations for improvement in management included need for standardized treatment guidelines, early detection through health education and funding for care.

***Conclusion*:** Patients with retinoblastoma present with clinically advanced disease to ophthalmologists in peripheral eye clinics in Ghana. There is abandonment and refusal of treatment by caretakers in these centres citing cost and distance as some reasons, and very little improvement over the past decade. Early detection, health education among the general public and health workers, and standardised treatment guidelines are needed to improve on patients' management and survival.

Key Words: eye tumours, leukocoria, ophthalmologists, peripheral eye hospitals, retinoblastoma.

Introduction

Retinoblastoma is the commonest intraocular tumour in childhood.[1] It is sight threatening, and most importantly, if untreated, almost uniformly fatal[1-3]. In developed countries, more than 90% of children with retinoblastoma present with limited-stage disease and are cured on account of availability of resources for early detection and treatment; however, in developing countries, like Ghana, most patients present with advanced disease and survival rates are less than 50%.[2-10] Retrospective studies on patients with retinoblastoma presenting to the Ophthalmology and Paediatric Oncology Units at Korle-Bu Teaching Hospital (KBTH) found majority of the patients presented with clinically and histologically advanced disease.[11,12] The manifestations included leukocoria, proptosis, fungating mass, Reese-Ellsworth stage V disease and poor outcome.

Early diagnosis, prompt and appropriate treatment are some measures necessary to improve on the survival of such children with retinoblastoma in Ghana[10, 13]. In addition, it will require identifying the factors that contribute to the late disease presentation; how such patients are managed at the peripheral eye hospitals in Ghana and difficulties encountered in the management of these patients at these centres among others.

The objectives of the study therefore were to determine from general ophthalmologists at peripheral eye hospitals in Ghana, the clinical stage of the disease at presentation, the challenges associated with its management and to seek recommendations for improvement in the management of retinoblastoma.

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Secondly, to compare findings from 2 study periods, a decade apart to see if there has been any improvement in the factors understudied over the period. We hope this would help in part to plan interventions for improvement in the care and survival of children with retinoblastoma in Ghana.

Methods

Study design

This was a comparative, cross-sectional study.

Study Population

General ophthalmologists in government, quasi-governmental, mission and private hospitals and clinics in Ghana who consented verbally to participate in the study were recruited. Ophthalmologists in the 2 Teaching Hospitals with Paediatric Eye Units were excluded. One ophthalmologist per centre was interviewed. In centres where more than one ophthalmologist managed retinoblastoma, only one (the key person) was interviewed to avoid possible duplication of data. Ethical approval was by University of Ghana Medical School ethics and protocol review committee (now Ethical and Protocol Review Committee of College of Health Sciences, University of Ghana).

Data collection and statistical analysis

Data was collected using a semi-structured questionnaire from September 2008 to June 2009 for Period 1 (2005-2007), and from September 2017 to April 2018 for Period 2 (2014-2016). The questionnaire explored the average number of patients diagnosed with retinoblastoma at the peripheral eye centres for the periods (and specifically for years 2007 and 2016), their clinical presentations, modes of diagnosis, treatment offered, resources available for management and challenges with the management of such children. Depending on the accessibility of the participants, the questionnaires were self-administered, mailed or administered by phone interviews. Where clarifications were needed from the participants, a follow-up phone interview was made. The mailing list of the Ophthalmological Society of Ghana (OSG) was used for the administration. Data was captured by the biostatistician using Statistical Package for Social Sciences (SPSS) Version 20 and checked for accuracy by the lead investigator. Continuous numerical data were reported as Mean and Standard deviation (SD) and categorical data as percentages (%). Continuous numerical data in the 2-time periods were compared using Independent t-test and categorical data were compared using the Chi-square test. P-values < 0.05 were considered statistically significant.

We estimated the age-specific incidence rate (ASR) for each period under study using the specific incidence for 2007 and 2016 and the corresponding population estimates for children less than 5 years (the age group with the highest incidence for retinoblastoma) i.e. [Number of cases] / [Number of person-years]. The estimated population for children less than 5 years in Ghana were 3.4 million for Period 1 and 3.7 million for Period 2[14].

Results

Responses were received from 24 out of 26 ophthalmologists in Period 1 and 35 out of 37 in Period 2 giving response rates of 92.3% and 94.6% respectively. The number of participating centres corresponded to the number of reporting ophthalmologists i.e. 24 and 35 for period 1 and period 2 respectively; however, the total number of ophthalmologists at post in these participating centres were 30 and 56 in Period 1 and Period 2 respectively. Majority of the ophthalmologists who participated in this study were from private, quasi-governmental and mission hospitals and clinics. An average of 82 cases of retinoblastoma were seen in Period 1 and 95 cases in Period 2. Sixty-nine cases were seen specifically in the year 2007 and 64 cases in 2016 (Table 1). The estimated ASR for the study periods 1 and 2 were 20.3 and 17.3 per million person-years respectively.

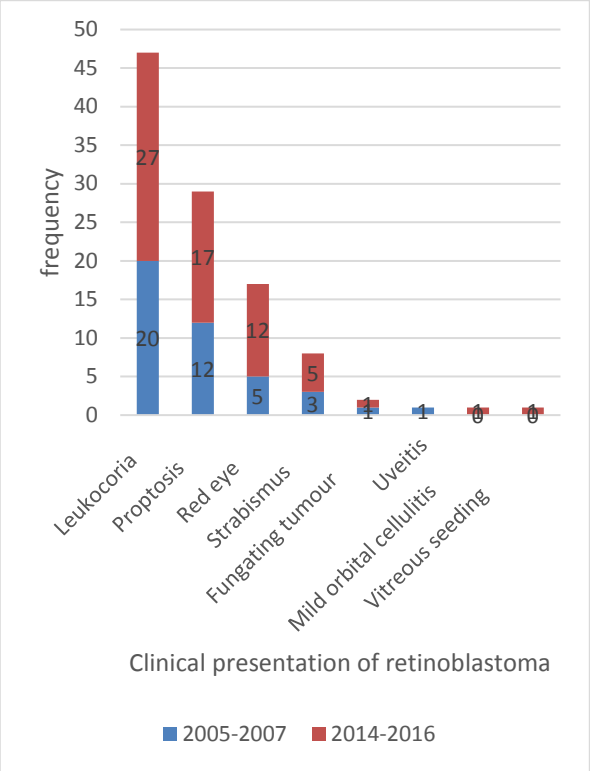

Fig 1: Clinical presentation of retinoblastoma to ophthalmologists at peripheral eye clinics

The common clinical presentations reported were leukocoria followed by proptosis in both periods (Figure 1). Reasons for late presentations to the peripheral eye centres included use of alternate medicine (34%), caretakers of patients being ignorant of prognosis (25%), and cost of care (12.5%) in Period 1 and for Period 2 the main reasons were cost of treatment

(31.4%) ignorance of prognosis (25.7%) and use of alternate medicine (14.3%) (Table 2).

Among the respondents, diagnosis of retinoblastoma using clinical features supported by imaging (ultrasonography and CT-Scan) was done by 10 out of 24 (41.7%) during Period 1, as compared with 18 out of 35 (51.4%) in Period 2 (p=0.461) (Figure 2). Nine out of 24 (37.5%) ophthalmologists managed retinoblastoma by enucleation and histopathological analysis of the enucleated eyes in Period 1; and 4 out of 35 (11.4%) (p= 0.014) did same in Period 2. These four ophthalmologists who managed retinoblastoma with enucleation and histopathology in Period 2 also offered chemotherapy when needed. Thirteen out of 24 (54.2%) of the ophthalmologists managing retinoblastoma referred all patients to the tertiary eye centres in Period 1 as compared with 26/35 (74.3%) in Period 2 (p=0.109). Reasons for referral were mostly because of lack of resources for management e.g. lack of general anaesthesia/ anaesthetists (Figure 3, Table 2).

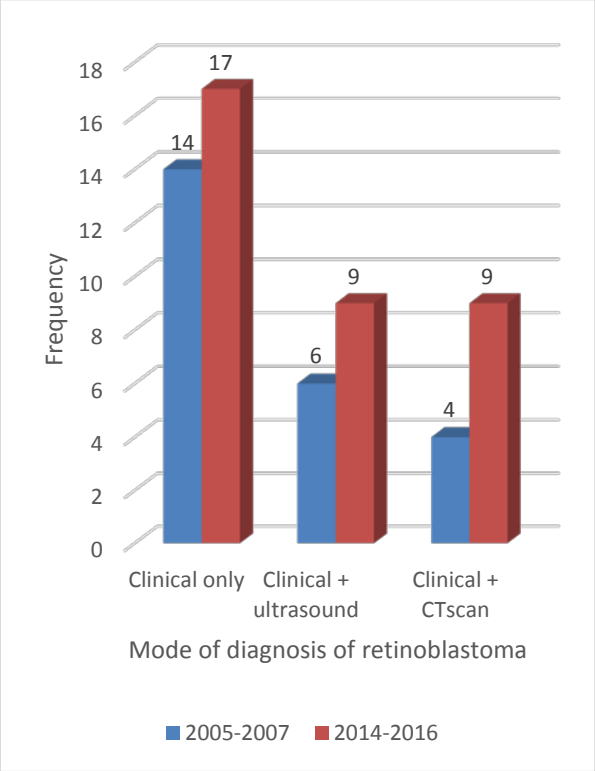

Fig 2: Modes of diagnosis of retinoblastoma by ophthalmologists at peripheral eye centres.

Challenges encountered by respondents in the management of children with retinoblastoma in the peripheral eye clinics in Period 1 included refusal of treatment by caretakers in 21 out of 24 respondents, with reasons such as cost, distance, fear of surgery and fear of bigger hospitals (Table 2).

Other difficulties included convincing parents for uptake of surgery and lack of facilities for management of retinoblastoma. Similarly, 6 out of 35 ophthalmologists in Period 2 reported refusal of treatment by caretakers as a challenge in the management of children with retinoblastoma. The main reasons for refusal of treatment were cost of treatment, fear of disfigurement and fear of death of the child.

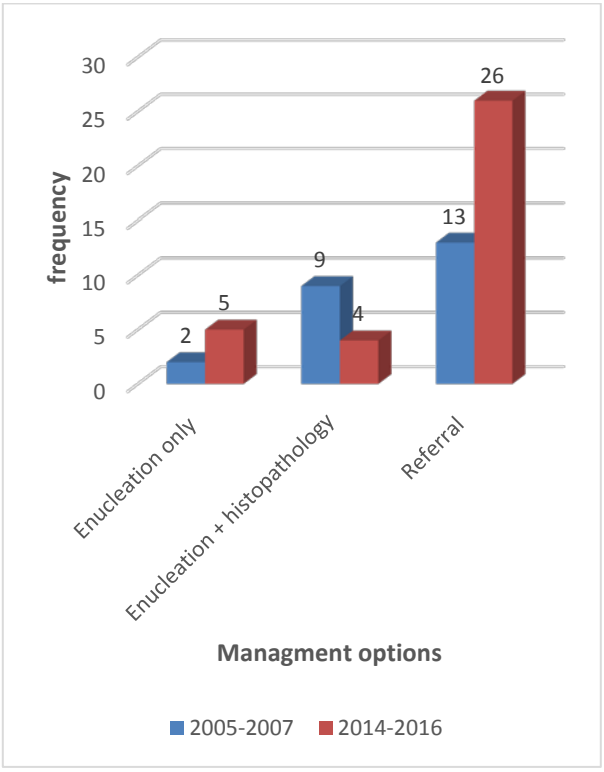

Fig 3: Retinoblastoma management options by ophthalmologists in peripheral eye clinics.

In addition, abandonment of treatment ranging from 1 to 6 children per year per centre was reported by 11 out of 24 ophthalmologists (45.8%) in Period 1 as compared to 7 out of 35 ophthalmologists (20.0%) in Period 2 (p=*0.034*). Reasons obtained from caretakers for such abandonment or default of treatment were similar in both periods and included avoidance of enucleation, prognosis not understood, cost of treatment, religious persuasions and seeking permission from families especially fathers.

Recommendations put forth by the ophthalmologists for improvement in the management of retinoblastoma in the country included the need for standardized treatment guidelines or protocols, early detection through health education, training of health personnel in the diagnosis and treatment of retinoblastoma, provision of resources for management and cheaper sources of funding for care.

Table 1. Ophthalmologists interviewed and reported retinoblastoma cases at peripheral eye clinics in Ghana

Region of the Country	**No. of Ophthalmologists interviewed**		**Average no. of Patients seen with RB**		**Specific no. of Patients seen with RB**	
	2005-2007	2014-2016	2005-2007	2015-2016	2007	2016
Upper East	1	1	5	5	5	3
Upper West	1	1	3	5	4	0
Northern	1	2	6	20	5	22
Brong-Ahafo	2	3	3	5	3	4
Western	1	1	10	1	11	0
Ashanti	4	4	20	6	13	5
Eastern	3	4	5	8	3	6
Volta	1	1	3	1	2	1
Central	1	3	2	9	2	5
Greater-Accra	9	15	25	35	21	18
Total	**24**	**35**	**82**	**95**	**69**	**64**

***Table 2.** Baseline information on peripheral eye clinics in Ghana.

Type of information	**2005-2007 N=24**		**2014-2016 N=35**	
Reasons why patients presented with late disease (Ophthalmologist's view)	N	%	n	%
Use of alternate medicine	10	41.7	5	14.3
Ignorance of prognosis	7	29.2	9	25.7
Cost of treatment	4	16.7	11	31.4
Fear of enucleation	3	12.5	2	5.7
Distance from clinic	2	8.3	3	8.6
Waiting to access NHIS	2	8.3	-	-
Others	2	8.3	5	14.3
Management challenges				
Centres with patients defaulting/ abandoning treatment	11	45.8	7	20.0
Average no. of patients defaulting/ abandoning treatment/centre/ year (Range)	2 (1-6)		1 (0-1)	
Centres with general anaesthesia services	17	70.8	16	45.7
Centres where caretakers refused treatment	13	54.2	6	17.1
Reasons for refusal of treatment				
Cosmesis / fear of disfigurement	8	33.3	1	2.9
Fear of death	5	20.8	3	8.6
Cost of treatment	4	16.7	5	14.3
Others (e.g. fear of bigger hospital, spiritual illness, ignorance, fear of surgery, hope of spontaneous recovery)	2	8.3	1	2.9

***Multiple response**

Discussion

The average number of new patients with retinoblastoma reported by the participating ophthalmologists in this study for the Period 1 was 82, with 69 seen specifically in 2007. The average number of cases for Period 2 was 95 cases, with 64 cases seen specifically in 2016**.** Their corresponding estimated ASR of 20.3 and 17.3 per million person-years compares favourably with the ASR for Ibadan, Nigeria, estimated at 19 per million person-years.[15] Ghana shares similar geographic and demographic features with Nigeria in the West African sub-region. These reported incidences of retinoblastoma for the two periods are higher than those seen in some developed countries such as United Kingdom where about 40 cases are seen a year[16] and less than 30 cases seen yearly in Canada[17]. The findings corroborate observations from developing countries indicating generally higher incidences, especially from Sub-Saharan Africa[18].

These differences in incidence between developed and developing countries may be due to differing exposure to infections or other environmental factors inducing the necessary mutations in utero or during infancy leading to more sporadic types[19]. It has been observed that very little difference exists in incidence of bilateral retinoblastoma cases, which are mostly germline mutations and heritable, between regions of the world or ethnic groups[20]. This differentiation however, was not examined in this current study.

Clinical presentation of retinoblastoma in children in peripheral eye clinics in Ghana is reported to be characterized by signs of late disease such as proptosis (28.5% in Period 1 vs 26.6% in Period 2), redness of eye (11.9% vs 18.8%) and fungating mass (2.4% vs 1.6%). There has been very little change over the decade under review in this current study. Signs of late disease tends to characterize presentations in developing countries such as Nigeria, where proptosis (84.6%) was the most common clinical presentation among 20 children with retinoblastoma[9]. In Ghana, the most common clinical presentation of retinoblastoma in a tertiary eye clinic where 23 children were studied, was leukocoria (87%) followed by proptosis (34.8%)[12]. Similar clinical presentations of leukocoria (71.8%) and proptosis (32.8%) were found in a review of 64 children with retinoblastoma in Malaysia[21]. The clinical presentations of retinoblastoma in this current study, thus corroborate findings from other Sub-Saharan African countries like Nigeria, East Africa and Congo [5,7-9,22,23] and from India[24]. However, it contrasts findings from USA, where a retrospective study of 1265 patients with retinoblastoma at New York Hospital in the USA, demonstrated leukocoria as present in 56.2% of patients followed by strabismus (23.6%), with orbital disease being extremely rare[25]. The finding of leukocoria corroborates findings worldwide as the commonest presentation of retinoblastoma[12,24,25].

Lack of awareness of retinoblastoma by the public and heath care workers, poor access to eye care doctors, initial employment of alternative forms of care and delayed diagnosis are some known factors that account for advanced disease presentation[8,9,26-30]. Early diagnosis is important in improving survival of patients. Distance from eye centres, cost of transportation and treatment of retinoblastoma mainly in tertiary eye centres may lead to delay in initiating treatment and may promote adoption of alternative medical care which may further reduce survival rates. Some of these factors were alluded to in the reasons for late disease presentations in this study. In Honduras and Brazil, public health campaigns to create awareness among the population and healthcare workers have led to improvement in early diagnosis and reduction in extra-ocular retinoblastoma[26,29]. This intervention may contribute to a reduction in late disease presentation, if employed in Ghana.

The diagnosis of retinoblastoma is clinical using indirect ophthalmoscopy. Imaging modalities such as ultrasonography, computed tomography and magnetic resonance imaging are helpful in establishing the diagnosis, excluding diseases that simulate retinoblastoma and in staging the disease[31]. In this study, about half the number of ophthalmologists in peripheral eye clinics diagnosed retinoblastoma only clinically without supportive imaging modalities in the first period of study (58.3%), and in Period 2 (48.6%). This practice is not acceptable, as it may result in misdiagnosis and inappropriate staging of the disease and treatment of patients.

Histologic analysis of enucleated eyes is useful in confirming the diagnosis and identifying high risk histopathologic features such as scleral invasion, massive choroidal invasion (>3mm in maximum diameter) and post-laminar optic nerve invasion.[32] Histology will also help in determining the presence of microscopic residual diseases such as involvement of optic nerve resection margin or trans-scleral involvement[31]. Without recognizing these features and hence not offering adjuvant chemotherapy, the risk of systemic metastasis would increase leading to death[32]. It is of concern that only 37.5% of ophthalmologists interviewed managed retinoblastoma by enucleation and histopathological analysis in Period 1; and even significantly lesser proportion (11.4%, p= 0.014) did so in Period 2. The rest either managed with enucleation only or referred all cases to the tertiary centres for further management. This practice of performing enucleation without histopathological analysis, is also unacceptable, and if continued, would delay detection of microscopic extra-ocular disease and thus contribute to poor patient outcomes.

Increasingly, many general ophthalmologists (54.0% in Period 1, and 74.3% in Period 2; p=0.109), referred children with retinoblastoma to the two main tertiary eye centres in Ghana for treatment with the main reason being lack of resources including general anaesthesia and anaesthetists. It is worthy of note however, that 71% of respondents in Period 1 and 46%

in Period 2 reported having general anaesthesia services. Further investigations need to be done to ascertain how best to get at least the centres that have general anaesthesia services to perform enucleation with histopathological analysis. This will reduce the proportion of referrals to the tertiary centres which may be too distant for parents and caretakers to access care for their children and may subsequently lead to a delay in initiation of treatment or abandonment of treatment. A retrospective study of retinoblastoma referral pattern in Kenya found that 35% (58/168) of children were lost to follow up after referral.[33]

Refusal of treatment or abandonment of treatment will promote systemic spread of the disease and reduce the survival rates. Luna-fineman et al reported that 22% of 172 children diagnosed with retinoblastoma in Central America either refused or abandoned therapy[34]. In a prospective study of 105 patients with retinoblastoma in Malaysia, 31% children deferred treatment for 6 months or more and 26% children were lost to follow-up.[27] A retrospective study of 23 patients with histologically confirmed retinoblastoma in a tertiary hospital in Ghana found 35% children abandoning treatment.[12] Leander et al reported that one third of their patients either refused or abandoned treatment[26]. Bekibele et al in Nigeria reported that 11(42%) of patients refused treatment[35]. This present study showed 54% of the ophthalmologists in peripheral eye centres encountered refusal of treatment by caretakers in Period 1, with the number reducing to 17% in Period 2. The reasons for their refusal included cost, distance, fear of surgery and fear of bigger hospitals. In addition, between one to six children had their treatment abandoned by their caretakers per year in more centres (45.8%) in Period 1, but these numbers also reduced to about one per centre in Period 2 and in fewer centres (20.0%), p= 0.034. These positive trends, if continued, would contribute to early treatment and improvement in survival. Refusal and or abandonment of treatment may be reduced by public education and appropriate counselling and formation of support groups of caretakers of children with retinoblastoma and surviving retinoblastoma patients[26, 36]. The development of a retinoblastoma programme in Central America has reduced the abandonment/refusal rate and has improved the care of retinoblastoma by ophthalmologist and paediatric oncologist[36].

To improve access to appropriate care and survival of children with retinoblastoma in Ghana, suggestions proposed by the ophthalmologists included the establishment of a national retinoblastoma programme with a focus on setting up guidelines and protocols for retinoblastoma care, training of ophthalmologist in peripheral eye centres on the appropriate management of retinoblastoma, awareness creation on how to recognize retinoblastoma among the public and all health care workers especially community and public health nurses, paediatricians, general practitioners and family physicians; advocacy for inclusion of retinoblastoma screening in the National immunization programme, advocacy for the inclusion of total retinoblastoma care in the National Health Insurance Scheme of Ghana, and provision of resources for retinoblastoma treatment in the peripheral eye centres. The advantage Ghana has is that, 46% of the peripheral eye centres presently have the resources (human and infrastructure) for the provision of general anaesthesia, mainly in Government hospitals, therefore retraining of the ophthalmologists to improve on their surgical skills coupled with arrangement for enucleated eyes to be sent to regional hospitals with the services of a pathologist, would contribute to better patient outcome.

Strengths and limitations

The retrospective nature of this study coupled with possible recall bias of the general ophthalmologists may be limitations for this study. However, this is the first published data that has highlighted the magnitude of retinoblastoma and challenges involved in its management in peripheral eye clinics in Ghana, where the bulk of these patients are seen. In addition, the study explores providers' viewpoint unlike most studies that dwell only on the patients. Recommendations from these providers when taken on board would strengthen teamwork and collaboration between peripheral and tertiary referral centres. The findings may help the country, in part, to adopt strategies for early detection, appropriate management and timely referrals of patients with retinoblastoma.

Conclusion

The estimated ASR for Ghana in this study, compares with those in developing countries where rates are generally much higher than developed countries. Patients with retinoblastoma present with advanced disease clinically to general ophthalmologists at peripheral eye clinics in Ghana. There is widespread abandonment or default of treatment, and refusal of treatment by caretakers among other challenges encountered by the ophthalmologists in these centres with very little improvement over the decade of study. Early detection, intensive health education including health promotion among the general public and health workers, and standardised treatment guidelines are needed in order to improve on patients' management and survival.

Acknowledgement

Our appreciation goes to all ophthalmologists in the peripheral eye clinics in Ghana who participated in this study.

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SPECIAL ARTICLES

THE ROLE OF THE CLINICAL CHEMISTRY LABORATORY PHYSICIAN IN HEALTH CARE DELIVERY

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Introduction

Chemistry

Chemistry is the science of matter and the changes it can undergo. The world of chemistry therefore embraces everything material around us. Chemistry is the centre of science. In one direction lies physics and how the principles of chemistry are based on the behaviour of atoms and molecules. In the other direction lies biology and the contributions being made by chemists to an understanding of that most awesome property of matter, life. Traditionally the field of chemistry has been organized into three branches:

- **Organic Chemistry**, the study of the compounds of carbon
- **Inorganic Chemistry**, the study of all other elements and their compounds.
- **Physical Chemistry**, the study and application of the principles of chemistry to physical phenomena.

But modern chemistry is now more than test tubes and beakers. New regions of study have developed as information has been acquired in specialized areas or as a result of the use of particular techniques. We therefore nowadays speak of:

- **Analytical Chemistry,** the study of techniques for identifying substances and measuring their quantities.
- **Biochemistry**, the study of chemical compounds, reactions and other processes in living systems.
- **Chemical Engineering**, the study and design of industrial chemistry processes, including fabrication of manufacturing plants and their operation.
- **Computational Chemistry,** the study of the computation of molecular properties.
- **Medicinal Chemistry**, the study and application of chemical principles to the development of pharmaceuticals
- **Theoretical Chemistry,** the study of molecular structure and property in terms of mathematical models.
- **Molecular Biology,** the study of the chemical and physical bases of biological function and diversity, especially in relation to genes and proteins.

Various interdisciplinary branches of knowledge with roots in chemistry have arisen, including:

- **Materials Science**, the study of the chemical structure and composition of materials.
- **Nanotechnology**, the study of matter at the nanometer level where structures consisting of small numbers of atoms can be manipulated.
- **Environmental ("green") Chemistry**, the economical utilization and renewal of resources coupled with hazardous waste reduction and concern for the environment.
- **Clinical Chemistry,** clinical chemistry, chemical pathology, clinical biochemistry, pathological biochemistry, molecular medicine and molecular diagnostics are all names for the same subject, that is, that branch of laboratory medicine in which chemical and biochemical methods are applied to the study and treatment of disease.

Already, some teaching hospitals abroad, particularly in Scandinavia, have merged clinical chemistry with clinical pharmacology into single departments. This makes sense, because they both deal with how the body handles molecules, either internally generated (for example, glucose) or administered as drugs (for example insulin). Besides, clinical chemistry and chemical pharmacology use the same types of equipment.

Laboratory Medicine

The Royal College of Pathologists of UK, in describing the place of laboratory medicine in health delivery defines laboratory medicine as "the science behind the cure". Clinicians draw heavily on the resources of the medical laboratory, as no clinician can tell the level of blood glucose in a diabetic under treatment until it has been measured, and whether a "pale" patient is anaemic or not can only be determined after measurement of the patient's haemoglobin level (B-Hb).

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The practitioner of clinical chemistry (laboratory physician) must be thoroughly schooled in science and equipped with knowledge in chemistry in general and biochemistry and molecular biology in particular. The laboratory physician as a hospital consultant should be engaged in the care of patients in emergency medicine and intensive care as well as patients in "ordinary" wards, special clinics (eg diabetic/metabolic clinics, dialysis units, toxicology), paediatric and neonatal units.

Metrology

Metrology is a new science, the science of measurement. Measurements are of crucial importance in metrology. In the 1950's the International Organization for Standardization (ISO) through its various committees and related organizations, such as the International Union of Pure and Applied Chemistry (IUPAP) decided to try and device a simple, common system of metric units to replace the plethora of units then in force and simultaneously standardize the symbols used in scientific literature.

The resultant SI system (Système Internationale) consists of the basic units, supplementary units, derived units and the decimal multiples and sub-multiples of these units formed by the use of prefixes. The logical strength of the SI lies in the basic six units, from which practically all units in clinical chemistry and medicine can be derived by multiplication or division of the basic units.

Measurement	Name of Unit	Symbol
Length	metre	m
Mass	kilogramme	kg
Time	second	s
Electric current	ampere	a
Temperature	degree kelvin	°K
Amount of substance	mole	mol

The metre was originally defined as the distance, under standard conditions, between two marks engraved on a platinum/iridium bar at Sèvres in France, but in 1960 it was redefined in terms of a specific wavelength of light (1650763.73 wavelengths) in a vacuum emitted from a lamp containing ^{86}Kr and operating under well reproducible conditions.

The kilogramme was the mass of a platinum/iridium alloy prototype kept in France.

The unit of time was based on the frequency of emission of light from a caesium atom excited under closely standardized conditions.

The Kelvin scale of temperature was defined by the decision to fix the thermodynamic temperature of the triple point of water at exactly 273.15 °K; the triple point of water being the point at which ice, liquid water and water vapour co-exist in a stable equilibrium.

The ampere was based on the force measured in newtons between parallel conductors 1meter apart in a vacuum.

The mole was the amount of substance containing as many elementary units as there are atoms in 0.012kilogram of ^{12}C

The elementary units could be an atom, molecule, ion, radical, electron, photon or a specified mixture of such entities.

The IFCC and AFCC

The International Federation of Clinical Chemistry (IFCC) was formed primarily to make recommendations regarding standardization - the use of reference materials as calibrators and use of reference methods in analytical work in clinical chemistry. The IFCC and the International Committee for standardization in Haematology (ICSH) have made recommendations on the derivation and use of reference values. A few years ago, the African Federation of Clinical Chemistry (AFCC), the African chapter of the IFCC, was formed with a clinical pharmacologist, Prof. Vanessa Steenkamp of the University of Pretoria, South Africa, as its first president.

Quality Assurance

Quality assurance is always at the heart of the laboratory physician leading a medical laboratory, especially in the setting of a teaching hospital, as the laboratory physician is acutely aware of the fact that an erroneous result reported from the laboratory can easily lead to wrong treatment or even death of the patient. This involves daily batch-wise control of the analytical work ("internal quality control") and less frequently (once every quarter of the year), the external quality control system.

The recommended external quality control system is the WHO collaboration Centre, UK NEQAS, Birmingham Quality, P.O BOX 3909 Birmingham B152UE, U.K. Hundreds of laboratories all over the world take part in it and it provides opportunities for pitting one's laboratory's performance against those of some of the world's best laboratories. For each analysis the laboratory 's result is compared with the target value and specimen percentage bias and accuracy index calculated. Persistently poor performers are given advice about what to do to achieve better results.

Reporting of results

A WHO/IFCC-standardized system of reporting results, with reference limits beside them for ease of interpretation, is recommended.

There should be space on the report for comments from the laboratory, eg. that the specimen was haemolyzed, lipaemic or insufficient, or that the laboratory requests another specimen for confirmation of an unexpected result.

Concluding remarks

An academically as well as professionally qualified consultant laboratory physician is indispensable in the setting of a teaching hospital. He or she is the only one of the laboratory staff qualified to solve clinical problems at the laboratory - clinical interface. A teaching hospital (in any part of the world) that operates without a medically qualified consultant chemical pathologist is rendering substandard service.

Unfortunately, as far as chemical pathology is concerned there are only two such persons in the whole of Ghana, whilst the projected needs of the country for the next five years is at least 10 medically qualified consultant chemical pathologists. Of the two medical consultants, only one is currently in active service, at Komfo Anokye Teaching Hospital (KATH) in Kumasi. This information is given to the Ministry of Health and the Ghana College of Physicians and Surgeons in the hope that in the apportioning human resources (including sponsorship of residents) to the various sectors of the health service, due priority is given to Laboratory Medicine in general and Chemical Pathology in particular.

CASE REPORT

DIAGNOSIS AND MANAGEMENT OF TWIN REVERSED ARTERIAL PERFUSION SEQUENCE AT THE KORLE BU TEACHING HOSPITAL, GHANA

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Abstract

Twin Reversed Arterial Perfusion (TRAP) sequence is a rare complication of twin gestation unique to monochorionic twins, reported to occur in about 1% of all monochorionic pregnancies. In this condition, an acardiac twin, with an absent or non-functioning heart, is perfused by its co-twin (referred to as the "pump" twin) via placental anastomoses. It is associated with a high mortality for the pump twin without intervention. We report two cases of TRAP sequence diagnosed prenatally by ultrasound at the Korle Bu Teaching Hospital. We describe how this rare anomaly can be diagnosed and managed successfully even in a low resource setting to yield good perinatal outcomes.

Key Words: TRAP sequence, monochorionic, twin gestation, acardiac twin, pump twin, congenital anomalies

Introduction

Twin Reversed Arterial Perfusion (TRAP) sequence is a rare complication of monochorionic twin pregnancies. It is also known as acardiac twinning due to the fact that one twin (the "recipient") lacks a functioning cardiac system and so is perfused by the normally developing "pump" (donor) twin with deoxygenated blood through anomalous vascular connections in the placenta. Without treatment, mortality in the "pump" twin may be as much as 50-75%.[1]

Based on data published in 1953, the incidence of TRAP sequence is about 1 % of monochorionic twin pregnancies and 1 in 35,000 pregnancies overall.[2] However, a recent study by van Gemert *et al* indicates that this condition may not be as rare as was once thought, occurring in about 1 in 9,500 to 1 in 11,000 pregnancies.[3] The rate of recurrence is estimated at 1 in 10,000.[4]

This case series describes two such rare occurrences diagnosed in Accra, Ghana. The challenges and pitfalls in the diagnosis and management of these patients in low-resource settings will also be discussed in comparison with recommended guidelines. This case series hopes to create awareness about this seemingly rare conditions and highlight the need for increased vigilance in prenatal diagnosis.

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Conflict of Interest: None Declared

Case report

Case 1

The patient was a 32-year-old primigravida, who presented at 40 weeks gestation for a routine ultrasound evaluation of foetal wellbeing. She was a regular antenatal care attendant and had had six uneventful visits during the index pregnancy as at the time of presentation. Her gestational age had been estimated from an ultrasound scan done in the 10th week which had reported a singleton pregnancy. She however had not had any other ultrasound evaluation of the foetus until she presented.

The findings of the ultrasound done at 40 weeks documented a live foetus in cephalic presentation with an increased amniotic fluid volume. The estimated foetal weight was 2.4 kg with no gross anomaly seen. Umbilical artery Doppler was also normal.

In addition to this, a well circumscribed heterogeneous mass was found adjacent to the placenta. It demonstrated low velocity non-pulsatile flow seen around the central echogenic foci.

The initial differential diagnoses based on a history of a singleton pregnancy included a placental chorioangioma or teratoma. Based on the ultrasound features described, an impression of TRAP sequence was still considered. The patient was counselled and she opted for a Caesarean section. A live male infant was delivered weighing 2.5 kg. Apgar scores were 8 and 9 at 1 and 5 mins respectively.

An amorphous mass weighing 1.5kg, with vestigial limbs was removed following the delivery of first baby. It had no other distinct foetal features apart from hair on the presumed cranial region. There was a two-vessel umbilical cord that had a velamentous cord insertion onto the monochorionic placenta. There was no dividing

membrane. Based on these unique findings, a diagnosis of TRAP sequence was confirmed. **(**Figures 1-2)

The new-born was evaluated by the paediatric team and found to be grossly normal. Further investigations of the pump twin were declined by the parents. An autopsy of the acardiac twin was also declined.

Both mother and pump baby were discharged on the third post-operative day having had an uneventful post-operative period. They continued to be well and healthy at both postnatal visits at 2 and 6 weeks respectively.

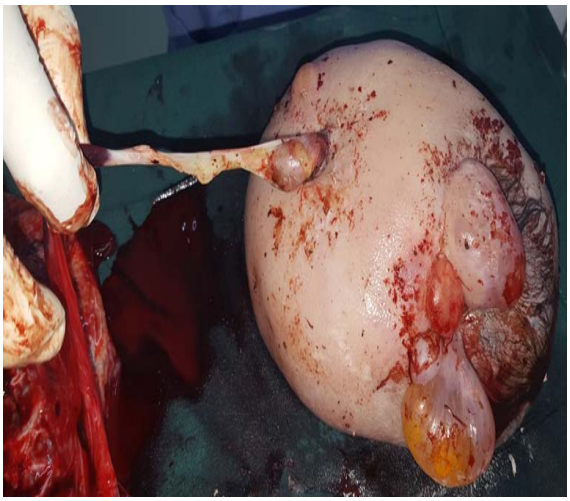

Fig 1 Anterior view of amorphous acardiac twin showing its two-vessel cord

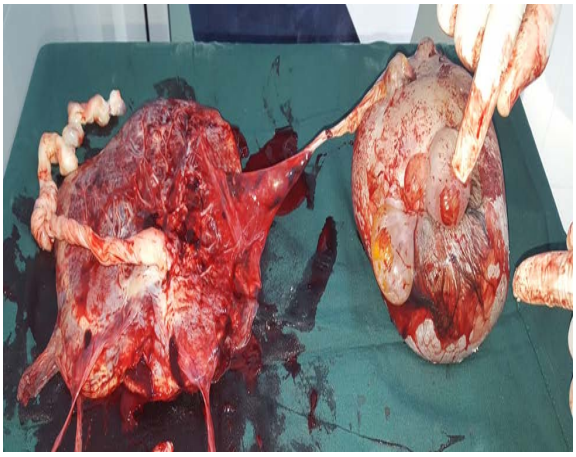

Fig 2 Acardiac twin with monochorionic placenta

Case 2

The baby demonstrated normal developmental milestones during the 6-month follow-up period.

Case 2

The second patient was a 33-year-old primiparous who was referred to our hospital at 28 weeks with a provisional diagnosis of twin gestation with intrauterine foetal demise of one twin made during routine antenatal care. Her antenatal period had been uneventful before this finding.

During the repeat ultrasound scan at our facility, a diamniotic twin gestation was found with a single anterior placenta associated with a very thin dividing membrane (2mm thick), suggestive of monochorionicity. Twin A was a live foetus in transverse lie with an estimated foetal weight of 1.26kg. No gross foetal abnormalities were seen. An umbilical artery Doppler showed a normal waveform. There was however, marked polyhydramnios and funnelling of the cervix.

Twin B presented as an acephalic mass with poorly formed thorax and abdomen. It also had rudimentary asymmetrical limbs with unilateral talipes. There was active movement of the lower limbs despite the absence of cardiac activity in the thorax. Blood flow was demonstrated in the umbilical vessels. **(Figures 3-4)**

Fig 3 Ultrasound image of acardiac twin showing its dimensions

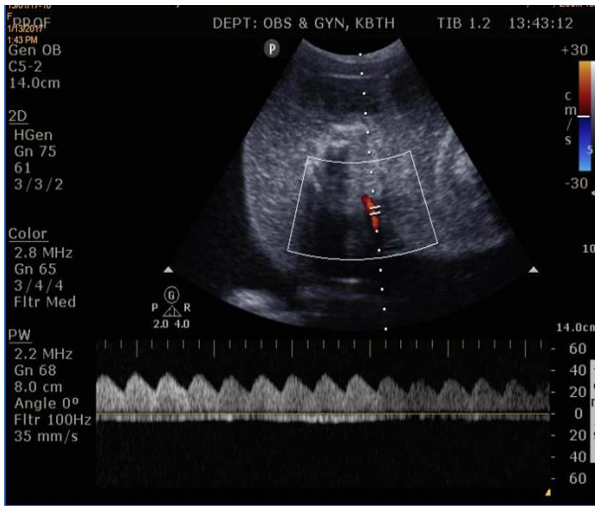

Fig 4 Umbilical Doppler ultrasound of acardiac twin

A diagnosis of TRAP sequence was made and the parents were duly informed and counselled. The patient was admitted and antenatal dexamethasone was administered to aid in lung maturation. She had an amnio-reduction done a week after corticosteroid therapy. Samples of amniotic fluid were taken for karyotyping and a shake test was performed to determine foetal lung maturity. It was negative. She was given indomethacin as tocolysis post-procedure.

Conservative management was continued with twice weekly foetal ultrasound monitoring until she went into spontaneous preterm labour at 31 weeks' gestation. She had an emergency Caesarean section, the findings of which were a live female in breech presentation with a birth weight of 1.26 kg and Apgars of 6 and 7 at 1 and 5 minutes respectively. The baby was morphologically normal. A 3.0kg acephalic mass with rudimentary lower limbs and torso was removed following the delivery of the first twin. **(**Figure 5)

Fig 5 Acephalic acardiac twin

The first twin was admitted to the neonatal intensive care unit (NICU) and managed for prematurity. Investigations done on this baby were normal. The mother was discharged on the third post-operative day and remained well at both her postnatal visits. The baby was discharged from NICU after 5 weeks and remained well with appropriate development during the 6-month follow-up.

Discussion

TRAP Sequence is a rare diagnosis that is considered to be a severe variant of Twin-to-Twin

Transfusion Syndrome (TTTS)[5]. The condition is characterized by a malformed twin which lacks a well-formed cardiac system and so is completely dependent on the other twin for its perfusion. The pump twin is often structurally normal although in 9% of cases, may also have congenital abnormalities[2].

It is called a reversed arterial perfusion sequence because blood from the pump twin flows through the umbilical artery to the recipient or acardiac twin through arterial-arterial anastomosis on the placental surface. The acardiac twin has no direct communication with the placenta. As a result, the acardiac twin is perfused with deoxygenated blood which enters the iliac vessels leading to discordant caudo-cranial development.[6] In addition, the pump twin receives further deoxygenated blood from the acardiac twin through vein-vein anastomosis leading to chronic hypoxia and growth restriction.

Depending on its morphological appearance, the acardiac twin may be classified into four different types[6].

• Acardius acephalus: cranial and thoracic structures are absent but lower limbs are present and distinguishable. It accounts for 60–75% of cases

• Acardius amorphus: no recognizable foetal shape. Accounts for approximately 20% of cases

• Acardius anceps: areas of head, thorax and abdomen are present but are poorly developed.

Seen in approximately 10% of cases

• Acardius acormus: only the head is present. It is quite rare and occurs in approximately 5% of cases.

This case series describes two different types of acardiac twins: the amorphous type in case 1 and the acephalus type in case[2].

As a consequence of these anomalous vascular connections, the pump twin may develop high-output congestive cardiac failure, polyhydramnios leading to preterm labour (and the attendant complications of prematurity) and anaemia. The mortality rate in the acardiac twin is 100% and varies from 50-70% in the pump twin[7]. The prognosis is primarily influenced by the weight of the acardiac twin in relation to the pump twin, with worse outcomes associated with weight differences greater than 70%[8].

Estimating the weight of the acardiac twin is not possible using the standard formulas. We attempted to calculate the weight of the acardiac twin in both cases using the weight regression formula proposed by Moore and Gales[8] and the prolate ellipsoid formula put forward by Oliver et al[9]. We however found a huge disparity in the weight estimation and actual weights in both instances using both formulas. For example, the estimated weight of the acardiac twin in case 2 was 345g (giving a weight ratio of 27%) and 1100g (91%) using the Moore et al and Oliver et al formulas respectively [8,9]. The actual weight of the mass was 3kg. The results of these studies were based on much earlier gestational ages (average gestational ages of 29 and 19 weeks respectively) and so may not be applicable in advanced gestation as in our case series.

In addition, rapid growth of the acardiac twin and the development of hydrops, heart failure, polyhydramnios or abnormal Doppler waveforms in the pump twin are also poor prognostic factors. Although there was evidence of polyhydramnios in both our case

reports, neither of the pump twins showed any other signs of heart failure. Furthermore, the pump twin in Case 1 survived to term. This may be due to the fact that the Acardius amorphous type (described in our first case) has a better prognosis for the survival of the pump twin[10].

Prenatal diagnosis is feasible as early as 11-13 weeks with ultrasound. The diagnosis hinges on the recognition of a normally-appearing foetus with an abnormally-formed co-twin. Placentation is monochorionic, demonstrated by a single placental mass without the twin-peak (lambda) sign. Doppler ultrasound of the acardiac twin shows a reversal of flow[11]. This helps distinguish TRAP sequence from intrauterine foetal demise of a normal co-twin. However, in mono-amniotic pregnancies, the acardiac twin can be easily mistaken for a yolk sac as may have happened in the first case discussed.

In our first case report, the diagnosis was missed during her initial ultrasound done at 10 weeks and subsequently, she had no further sonographic evaluation of her pregnancy. A foetal anomaly scan between 18 and 22 weeks would likely have aided in early diagnosis and management. Had the diagnosis been made earlier, the patient could have then been adequately counselled and offered the options of continuous foetal surveillance or an elective termination based on the prognostic indicators present in the pump twin.

Early detection and assessment of the severity of complications in the pump twin can improve perinatal outcomes. In case 2, the diagnosis was made at 28 weeks. This afforded us the opportunity to provide her with the options of expectant management according to the recommended guidelines with consideration for local limitations.

Expectant management for pregnancies complicated by TRAP sequence involves increased foetal surveillance and foetal intervention[6, 8]. This includes weekly sonographic and echocardiographic surveillance of the pump twin with careful attention paid to its cardiac function[1]. In the event of any evidence of cardiac failure or hydrops such as atrial or ventricular enlargement, early delivery is necessary to improve survival outcomes in the twin.

Antenatal corticosteroid administration between 24-34 weeks is recommended in all patients with pregnancies complicated by TRAP sequence to aid lung maturation[8]. This recommendation was followed in our second case.

In addition, the option of serial reduction amniocentesis or the use of indomethacin may be offered to prevent preterm labour (and the attendant risks associated with prematurity) which may ensue from polyhdramnios[12]. Other authors recommend the use of digoxin to improve cardiac function in the pump twin[13]. The patient in our second case report had amnio-drainage of 200mls of amniotic fluid. Post-procedure, she had tocolysis with indomethacin. Despite these interventions, however, she went into preterm labour at 31 weeks.

The advent of surgical interventions such as laser or radiofrequency ablation techniques to correct the anomalous vascular connection has significantly aided in improving perinatal outcomes. These interventions are most effective if offered before 20-24 weeks[14]. This further emphasizes the importance of early prenatal diagnosis. In settings where prenatal diagnosis is available, it is important to karyotype the normal co-twin before instituting these interventions as up to about 9% have congenital anomalies[2].

Delivery is recommended at 34-36 weeks in a tertiary hospital with a paediatric cardiologist or neonatologist on hand for the delivery[1]. Vaginal delivery is the preferred route and Caesarean section is indicated for obstetric reasons. Both patients in our case series had Caesarean sections. The first patient was offered a Caesarean section due to the uncertainty of the diagnosis and the second due to preterm labour and malpresentation.

Conclusion:

TRAP sequence is a severe complication of monochorionic twin gestation with mortality rates ranging between 50-70% in the untreated pump twin. Prenatal diagnosis is feasible using ultrasound and every effort should be made to recognize the condition early enough to optimize the survival of the pump twin. This is possible even in low resource settings and can result in good outcomes.

Acknowledgments

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ACUTE MYELOGENOUS LEUKEMIA IN PREGNANCY IN A 32YR OLD WOMAN

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Abstract

Background: Generally a disease of the elderly, Acute Myelogenous Leukemia (AML) very rarely occurs in pregnancy with an estimated incidence of 1 in 75,000 - 100, 000 pregnancies[1, 2]. There is hardly any data on the difference in its incidence between pregnant women and non-pregnant women in the reproductive age. However, management options are more in the non-pregnant, as they are in the elderly. Because there is yet no globally agreed standard way of managing this clinical dilemma in pregnancy, various institutions have proposed different management protocols depending on the AML type, degree of symptomatology, gestational age at diagnosis and the patient's wishes.
The objective of this publication is to present our experience with this condition at the Korle Bu Teaching Hospital, to bring attention to the possibility of the condition in our environment as part of differential diagnoses of anaemia or coagulopathy in pregnancy.
Case: We report the case of a 32yr old G3P1+1A, at 32weeks 2days gestation diagnosed with and managed for Acute Myeloid Leukemia at the Korle Bu Teaching Hospital, and review of the available literature on this condition in pregnancy.
Conclusion: Acute Myelogenous Leukemia is a very rare condition in pregnancy that lacks universally accepted treatment protocols. Management can pose a challenge to clinicians, patients and their relatives. Early accurate diagnosis is difficult in resource-constrained settings, and management options are limited when trying to save both fetus and mother. Early accurate diagnosis and prompt referral for appropriate interventions are key in improving outcomes, even in the face of other obstetric complications.

Key Words: Acute, Leukemia, Non-Lymphocytic, Promyelocytic, Myelogenous, Myeloid.

Introduction

Acute Myelogenous Leukemia (AML) is also known as Acute Myeloid Leukemia or Acute Non-lymphocytic Leukemia (ANLL). It is a neoplastic proliferation of the myeloid line of blood cells in the bone marrow and is characterized by abnormal growth of white blood cells. These myeloid cells get arrested at one of the early stages of development[3]. Subsequently, the immature cells accumulate in the bone marrow and impair the normal production of blood cells. It is the most common leukemia affecting adults and the incidence increases with age. It is a rare condition with an associated mortality rate of approximately 1.06% in Ghana[4]. Most of the cases detected in pregnancy are acute with less than 10% being chronic[5].

Israel Henig et al, conducted a systematic review of leukemia in pregnancy from 1967 to 2013 during which they reviewed 173 reported cases - 120 (69%) AML and 53 (31%) Acute Promyelocytic Leukemia (APL). They found the median age of diagnosis as 28yrs (range 15-45), thirty-seven women (21%) were diagnosed during 1st trimester, 85 (49%) in 2nd and 47 (28%) in 3rd trimester. The trimester was not reported in 4 (2%) cases. One hundred and twenty-five (72%) of the affected women received chemotherapy during pregnancy across the trimesters while 46 patients had their treatment either after elective abortion or after delivery of a live baby. Delay in therapy beyond 1 week from diagnosis did not affect the overall survival compared to that obtained in women treated promptly. They concluded that the outcome of AML diagnosed during pregnancy appears to be worse than that reported in age-matched non-pregnant women and that survival of fetuses were encouraging with low incidence of birth defects and low birth weights[6].

Known risk factors include ionizing radiation, chemical exposures, genetic predisposition, or other blood dyscrasias.

Symptoms of AML result from replacement of bone marrow cells with malignant cells resulting in a drop in the levels of erythrocytes, thrombocytes, and normal white blood cells. The symptoms include anorexia, fever, fatigue, joint pains, weight loss, dyspnea on exertion, easy bruising, bleeding gums and increased risk of infections, with some masked by pregnancy. Clinical signs are often vague, non-specific and usually associated with those of common cold, anemia, bruised skin or bleeding gums, and petechial hemorrhage. Hepato-splenomegaly are usually mild and asymptomatic. Lymphadenopathy is uncommon[7].

An abnormal full blood count (FBC) finding of leukocytosis with blasts on differential counts, or peripheral blood smear is usually the initial pointer to a suspected case. It can also present with isolated anemia, thrombocytopenia or even a leukopenia. Although

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peripheral blood smear can lead to a presumptive diagnosis, the definitive diagnosis is clinched with a bone marrow biopsy examination, as demonstrated below:

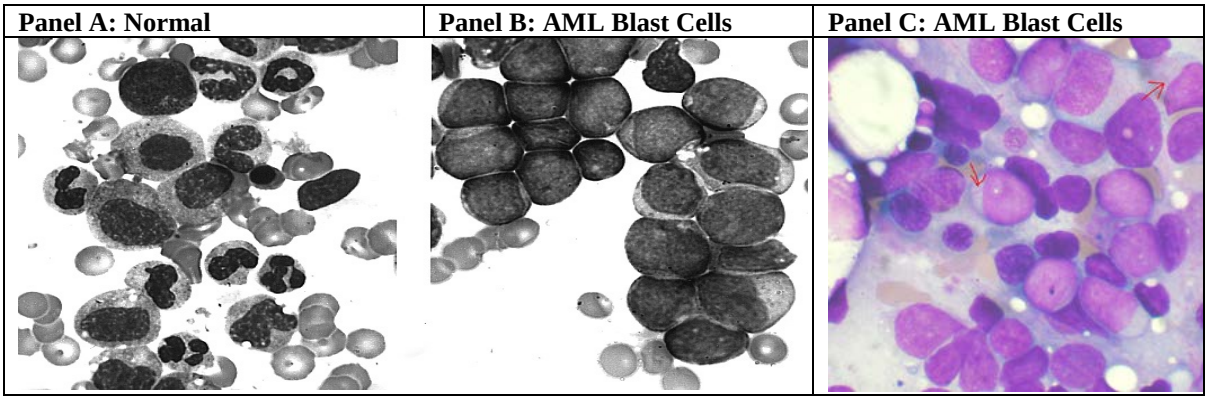

Fig1: Slide showing normal bone marrow (panel A) and AML blast cells (panels B & C). Curtesy: (1)

The disease progresses fast and kills in weeks if untreated. Available data suggest that maternal outcomes for acute myeloid leukemia (AML) following chemotherapy are analogous to nonpregnant patients, and recommend avoiding delays in commencing treatment[8]. AML has several subtypes with the acute promyelocytic leukemia type (M3) in particular having a high curability rate. This subtype also requires a unique form of treatment and so it's important to distinguish subtypes using Fluorescent in situ Hybridization (FISH) techniques[1].

Treatment consists primarily of chemotherapy placed into two phases: induction and post-remission (consolidation) therapy. Induction aims at achieving complete remission by reducing the number of leukemic cells to undetectable levels – cytarabine (200mg/m^2 for seven days) and doxorubicin (60mg/m^2 for three days). Consolidation on the other hand, aims at eliminating any undetectable residual disease to achieve a cure using 3 to 4 cycles of cytarabine given in high doses for 5days at a time in conjunction with Etopocide, Daunorubicin, or Idarubicin. The available evidence suggests that postponing treatment until postpartum is associated with increased maternal mortality[5, 2].

Case Presentation

A 32 years old woman G3P1+1A was referred from a Regional Hospital in Ghana to the Korle Bu Teaching Hospital at 32W2D gestation with complaints of a worsening episodes of total hematuria, sub-conjunctival hemorrhages and bleeding gums of about a week's duration. These had been preceded by generalized weakness, malaise and easy fatigability. She had been admitted and transfused two units of blood for symptomatic severe anemia three weeks earlier.

She had no significant medical or surgical history of note. She attained menarche at 10 years with 28 days regular cycles, coitarche at age 20 with 2 lifetime sexual partners. She has had an elective termination of pregnancy at age 20 years and a spontaneous vaginal delivery at 29 years.

At presentation she looked stable, fully conscious, alert and well oriented. She was moderately pale, anicteric, satisfactorily hydrated, but with sub-conjunctival hemorrhages, bleeding gums, bruises on tongue, and diffuse petechiae as well as ecchymosis over different parts of the skin.

Her cardiorespiratory system findings were normal with a blood pressure of 110/70mmHg, pulse 80bpm and normal heart sounds I and II with no murmurs.

The abdomen had a palpably gravid uterus, moved with respirations, with no scars or scarifications, but had petechiae and ecchymosis, linea nigra from umbilicus to symphysis pubis with a flat umbilicus. The symphisio-fundal height measured 33cm, with the fetus in a longitudinal lie, cephalic presentation, descent 5/5, and fetal heart rate of 140bpm, which was regular.

The full blood count that accompanied her referral note revealed: Hemoglobin 10.1g/dl, Platelet count 3 x10^9/L, and white blood cell count 10.1x101^9/l. The patient had been started on oral Amoxicillin/Clavulanic acid 625mg BD prior to referral. Her laboratory results on admission revealed: Hemoglobin 7.7g/dl, Platelet count 1 x10^9/L. Her renal and liver function parameters were all within normal limits, as well as urine analysis. A routine obstetric ultrasound scan detected a placenta previa type 1A. She was subsequently reviewed by the Hematologists who performed bone marrow biopsy that confirmed the diagnosis of Acute Myelogenous Leukemia, and then managed by a multi-disciplinary team comprising the Obstetricians, Hematologic-Oncologists, Anesthesiologists and Neonatologists. She was planned to have chemotherapy following delivery at 34weeks. Patient was therefore continued on routine prenatal supplements, transfused 12 units of platelet concentrate, two units of whole blood and a 48 hour course of intramuscular dexamethasone injections for fetal lung maturation.

Fig 2: Photographs of patient showing sub-conjunctival hemorrhage, bleeding gums and oral mucosal petechiae

She was delivered through an elective Caesarean section at 34 weeks with findings of a live male in cephalic presentation, weighing 2.1kg, Apgar scores of 6/10 and 7/10 at one and five minutes respectively. Amniotic fluid was clear and normal in volume, placenta previa type1A was confirmed. Her tubes and ovaries looked normal and she lost approximately 300mls of blood intra-operatively. She received routine prophylactic intravenous antibiotics and was transfused a further 8 units of platelet concentrate post delivery.

She was nursed at the intensive care unit post-operatively and was stable on the first day post surgery, but developed a fever (temperature 38.4^0 C) with a significant serosanguinous wound and vaginal discharge, and followed with vaginal bleeding with clots (estimated 800ml) in the morning of the second day post surgery. She was pale, anicteric, and well hydrated. Chest examination revealed basal crepitation, but with normal oxygen saturation. There was a moderate abdominal distension that was soft, non-tender with a palpable splenomegaly (about 6cm below the left costal margin). Uterus was 22weeks in size and firmly contracted, with a heavy lochia but no active bleeding per vaginam subsequently. She had received 4,310mls of intravenous fluid but made only 2,008mls of urine. Her antibiotic cover was scaled up to intravenous ceftriaxone 2g daily and metronidazole 500mg tid, intravenous anti-malarial course started with transfusion of 3 units of packed red blood cells. She was started on intravenous paracetamol 1g tid, 2 liters of intravenous crystalloids in 24hours, rectal misoprostol 800mcg inserted, and she started on graded oral sips, her wound dressing was changed twice daily.

Over the next 4-6 hours, the patient's fever worsened with temperatures above 38.8^{o}C, and pallor became severe, but she remained alert and well oriented with only complaints of dizziness. She was started on intravenous Meropenem 500mg tid, blood transfusion continued and seven units of platelet concentrates transfused. She was also started on intravenous Hydroxyurea 1.5g daily.

In the morning of the third post-operative day, she still complained of dizziness. She was fully conscious and alert, now afebrile (T 37.2^0), mildly pale, with a tinge of jaundice, and mild bilateral pedal edema. She was tachypnoeic, had adequate air entry, coarse crepitation in both lung bases with $Sp0_2$ of 97% on room air. Her blood pressure had risen to 163/100mmHg, with a low-grade diastolic murmur. Abdominal distension had worsened with tympanitic percussion notes and no free fluid demonstrable. Her repeat laboratory findings were Hb 7.5g/dl, Platelet 3x10^9/L and WBC 21.81x10^9/L. She was transfused a unit of platelet concentrate and further intravenous fluids withheld while the blood pressure was controlled with intravenous hydralazine infusion and maintained at 148/84mmHg.

By the evening of the third post-operative day, the patient started desaturating with $Sp0_2$ 73-86% and so was immediately started on intranasal oxygen by facemask, which did not improve her oxygen saturation. She was subsequently intubated and given oxygen at 6litres per minute, transfused 2 units of blood, given intravenous calcium gluconate and furosemide and blood pressure now monitored through the radial artery.

Her saturation however persistently declined overnight while on oxygen via the endotracheal tube, until her blood pressure begun dropping around 3:00am on the fourth post-operative day (not responding to interventions). She had a cardiac arrest with attempts at resuscitation unsuccessful till she was declared clinically dead at 4:00am.

Discussion

Acute Myelogenous Leukemia is a very rare condition in pregnancy and the paucity of data, as well a lack of internationally accepted clear-cut management guidelines make the management a real clinical dilemma.

The proposed guideline by The British Committee for Standards in Hematology's, appears to be the most comprehensive one available. It recommends that a multidisciplinary team that includes hematologists, obstetricians, neonatologists and anesthetists should manage pregnant women with the condition as was done in our case presented above[9].

As per the WHO guidelines, bone marrow is required in order to confirm the diagnosis of AML, and our patient did have same after admission in the teaching hospital. This is applicable in both pregnant and non-pregnant patients[4].

There is the general principle to treat pregnant women diagnosed with AML promptly without delays. Patients diagnosed of AML in the first trimester usually carry considerable risk for spontaneous pregnancy loss. The recommendation would therefore be to discuss reasons for and against elective termination with the patient[4]. Between 24 and 32 weeks, risks of fetal chemotherapy exposure must be balanced against risks of prematurity following elective delivery at that stage

of gestation. This would pose another challenge in our setting where preterm babies below 1000g have very minimal chance of survival. In cases of patients presenting beyond 32 weeks gestation, it may be reasonable to deliver the fetus prior to commencement of chemotherapy. The management plan for our patient, in agreement with this recommendation, was to deliver at 34 weeks before commencing chemotherapy.

In managing AML in pregnancy, the risk-benefit ratio must be carefully considered before using any of the chemotherapeutic agents. Where AML induction chemotherapy is delivered, a standard Daunorubicin, Cytarabine 3+10 schedule is the strongly recommended regime. The British Committee for Standards in Hematology's guidelines further recommend that doses should be worked out based on the patients' actual body weight and adjustments made for weight changes during treatment. While it is recommended to avoid the use of Quinolones, Tetracyclines and Sulphonamides in pregnancy, Amphotericin B or lipid derivatives are the antifungal of choice in pregnancy. Cytomegalovirus (CMV)-negative blood products should be administered during pregnancy regardless of CMV sero-status. Even though our patient did not get screened for CMV, this did not prevent her from being transfused when the need arose. Our patient was given a course of steroids for fetal lung maturation in line with the Royal Infirmary recommendation that a course of corticosteroids should be considered if delivery is anticipated between 24 and 35 weeks gestation, given over a 48-h period during the week prior to delivery[9].

The administration of magnesium-sulphate in the 24hr prior to delivery before 32 weeks gestation has been found to be beneficial. Since the patient in our case had gone past 32 weeks, this was not considered. In women receiving chemotherapy prior to delivery, it is recommended to plan delivery for at least 3 weeks post-chemotherapy to minimize risk of neonatal myelosuppression from the chemotherapeutic agents[4]

Planned delivery is beneficial compared to spontaneous labour. Even though induction of labour is usually advised, our patient's placenta previa precluded her from being suitable for induction and hence the choice for Caesarean delivery. This is because elective caesarean delivery is to be considered if there are obstetric indications. Epidural analgesia should be avoided in a woman who is significantly thrombocytopenic (platelet count <80 x 109/l) and / or neutropenic (white blood cell count <1 x 109/l). Antibiotic administration is recommended during and after premature rupture of membranes and delivery as was done in the case presented, and further upgraded when the patient developed worsening fever[9].

The two-weeks spent by the patient in our facility before delivery afforded us the chance to investigate and also mobilize the needed blood and blood products. There was an extensive consultation and team approach in managing this patient with remarkable support from the laboratory department that facilitated her management. It is still unclear whether a splenectomy at the time of elective caesarean section would have benefitted the patient in this case. It is also our view and recommendation that patients (especially pregnant women) who present with sudden onset of severe anaemia be investigated thoroughly and appropriately referred promptly so that any serious diagnoses such as AML are confirmed early for appropriate interventions in a timely manner to avert mortality. In our patient the disease had advanced before referral and this, compounded by the stress of surgery (definite indication for Caesarean) most likely accounted for her grave outcome.

Conclusion

AML is a very rare condition in pregnancy that lacks universally accepted treatment protocols. Management can pose a challenge to clinicians, patients and their relatives. Early accurate diagnosis is difficult in resource-constrained settings, and management options are limited when trying to save both fetus and mother. Prompt referral for appropriate interventions is key in improving outcomes, even in the face of other obstetric complications.

Ethical Considerations

Consent was sought from the deceased's husband (the next of kin) before writing up this case for publication.

Acknowledgements

Our sincere appreciations to the staff of the Korle Bu Teaching Hospital at the departments of Anesthesiology and ICU, Hematology, Oncology, Pediatrics / Neonatology, Laboratory Medicine, and General Surgery for all their tireless efforts in attempting to save this woman's life. Even though we lost her we came out of this stronger, more experienced, closer and just more ready to serve our patients together.

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LEPROSY

Leprosy is a nonfatal, chronic infectious disease caused by Mycobacterium leprae, whose clinical manifestations are largely confined to the skin, peripheral nervous system, upper respiratory tract, eyes, and testes.

The propensity of the disease, when untreated, result in certain characteristic deformities and the recognition in most cultures that the disease is communicable from person to person have resulted historically in a profound social stigma.

The first leprosarium in Ghana was established at Dome, Ho by Dr Cook in 1925.Thereafter,the British Empire Leprosy Relief Association (BELRA) made a considerable contribution in the establishment of leprosy services in the country.

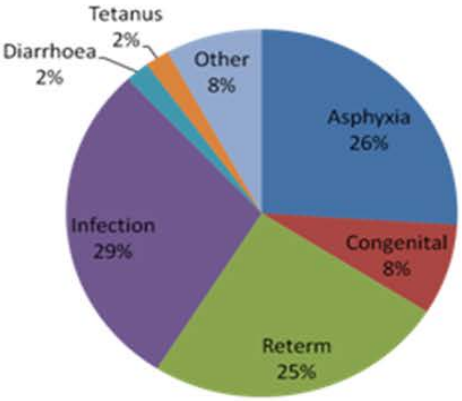
Also, the first modern leprosarium was opened at Ankaful in 1949 by Dr McKilvie. The Medical Field Units took leprosy services to rural areas in Ghana in the 1940s, 1950s and 1960s.

There are two extreme types of leprosy. They are Lepromatous leprosy, which is associated with free multiplication of the causative organism, and tuberculoid (or neural) leprosy in which the multiplication of the organism is restricted by an active defensive tissue.

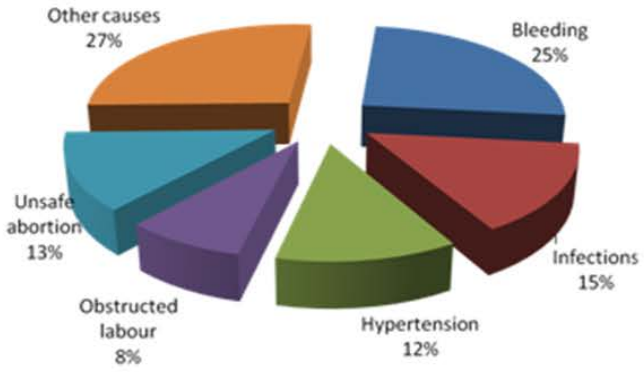
Treatment:Crude oils and ethylesters which contain fatty acids are being given orally, by intravenous.It is also infilterated into lepromatous area of skin. The residue of the dose is then injected.

INFANT/ MATERNAL MORTALITY

Estimated causes of Neonatal Deaths in 2000



Causes of maternal mortality in Ghana



Because of African exclusion from the medical services, problems of maternal and child health in Africans were ignored by the Medical Department until 1915 when Dr. F. V. Nanka-Bruce gave prominence to the need for the proper training of African midwives and the construction of a properly equipped maternity hospital to reduce the high loss of lives among mothers and babies.

Governor Clifford appointed a committee to enquire into the causes of maternal and infant mortality but was unable to do much about the committees recommendations because of the First World War.

Governor Guggisberg appointed another committee in 1920 to consider the construction of a maternity hospital and training centre for midwives. In keeping with the committees recommendations the construction of a maternity block in Korle Bu was commenced in 1924, and the foundation stone of a children's hospital laid by Princess Marie Louis in 1925.

During the period 1998 to 2003 infant mortality rate rose from 57 per 1000 live births to 64 per 1000 live births. It has dropped to 50 (2008).

Maternal mortality ratio in Ghana is estimated at between 256 and 540 per 100,000 live births with a lifetime risk of 1 in 35.

GHANA COLLEGE OF PHYSICIANS AND SURGEONS

ADMISSION TO POSTGRADUATE MEDICAL AND DENTAL TRAINING COMMENCING SEPTEMBER 2019 (MEMBERSHIP)

Applications are invited from qualified Medical and Dental practitioners for the following Programmes:

1. **3-year Residency training in any of the following:**
Anaesthesia and Intensive Care; Paediatrics/Child Health; Dental Surgery; Family Medicine; Internal Medicine; Laboratory Medicine; Obstetrics and Gynaecology; Psychiatry; General Surgery; Otorhinolaryngology; Ophthalmology and Emergency Medicine.

2. **4-year Residency training in the following:**
   - Radiology
   - Radiation Oncology
   - Modular Programme in Family Medicine

3. **2-year Residency training in Public Health**

Entry requirements common to all Programmes

a) Full registration with the Medical and Dental Council of Ghana.
b) Must have completed two (2) years housemanship/rotation in all four (4) major disciplines
c) Applicants for (1) and (2) above must have passed the Primaries of GCPS or Primaries of the West African Colleges.

Selection will be by interview only.

Specific Requirements

- Applicants for (1) and (2) above must have served one (1) year in a District Hospital, as defined by the Ministry of Health, after Housemanship.
- Applicants for the Modular Residency Programme above must have served three (3) years in a District Hospital, as defined by the Ministry of Health, after Housemanship.
- Applicants for (3) above must have a Masters degree in Public Health (MPH).

All the Interviews for items (1), (2) and (3) above are scheduled for Monday, 3rd and Tuesday 4th June, 2019 at the Ghana College of Physicians and Surgeons, 54 Independence Avenue, Ridge, Accra from 9.00am each day.

Registration

-Application Forms are available at the Ghana College of Physicians and Surgeons, 54 Independence Avenue, Ridge, Accra.
Applicants can also download the Application Forms from the College website (www.gcps.edu.gh).

- Registration fee of **Six hundred Ghana cedis (¢600.00)** must be paid into the Ghana College of Physicians and Surgeons Donor Pool Fund Account Number **0010 1344 04648401, ECOBANK GHANA LTD., RIDGE WEST BRANCH** (swift Code: ECOCGHAC). Payment can also be done at any GT Bank branch through GCPS Pay. In addition, payment can be done electronically online using VISA or Mastercard on the College website by clicking GCPSPAY.

Closing Date:
Completed Application Forms must reach the Examinations Officer on or before **Friday, 19th April, 2019.**
Late registration will end 26th April 2019 and will ATTRACT a fee of GHS200.00.

Tel. No.: 0302-238650 / 238703/
024-3690073
Address: P.O. Box MB 429, Ministries, Accra

GHANA COLLEGE OF PHYSICIANS AND SURGEONS

ADMISSION TO SENIOR RESIDENCY TRAINING COMMENCING JANUARY 2020 (FELLOWSHIP)

Applications are invited from qualified specialists in Medical and Dental professions for the following Programmes:

1. **Fellowship Training in any of the following:**

Anaesthesia and Intensive Care; Obstetric Anaesthesia; Paediatrics/Child Health; Paediatric Nephrology; Paediatric Oncology; Dental Surgery; Family Medicine; Sports, Exercise and Rehabilitation Medicine; Geriatrics & Palliative Care; General Internal Medicine; Gastro-Enterology and Hepatology; Nephrology; Cardiology; Rheumatology; Neurology; Endocrinology; Laboratory Medicine; General Obstetrics and Gynaecology, Reproductive Health & Family Planning; Gynaecological Oncology; Uro-Gynaecology; Maternal Fetal Medicine; Psychiatry; Public Health, Radiology; Radiation Oncology; General Surgery; Trauma/Orthopaedics; Urology; Plastic and Reconstructive Surgery; Paediatric Surgery; Cardiothoracic Surgery; Neurosurgery; Otorhinolaryngology; Ophthalmology, Paediatric Ophthalmology, Emergency Medicine.

Duration of all programmes are available on the College website (www.gcps.edu.gh)

2. **Entry Requirements (common to all programmes)**

a) Full registration with the Medical and Dental Council of Ghana.
b) Membership of the Ghana College of Physicians and Surgeons and in good standing
c) Post Membership work experience in Ghana of one (1) year in a Regional or District Hospital.

3. **Specific Requirement**

· Applicants for Neurosurgery are exempted from item 2© above.

4. **Selection is by Interview only.**

The Interview is scheduled for Monday, 3rd and Tuesday, 4th June, 2019 at the College of Physicians and Surgeons, 54 Independence Avenue, Ridge, Accra from 9.00am prompt each day.

Registration

· Application Forms are available at the Ghana College of Physicians and Surgeons, 54 Independence Avenue, Ridge, Accra. Applicants can also download the Application Forms from the College website (www.gcps.edu.gh).

· Registration fee of **Six hundred Ghana cedis (¢600.00)** must be paid into the Ghana College of Physicians and Surgeons Donor Pool Fund Account Number **0010 1344 0464 8401, ECOBANK GHANA LTD., RIDGE WEST BRANCH** (swift Code: ECOCGHAC). Payment can also be done at any GT Bank branch through GCPS Pay. In addition, payment can be done electronically online using VISA or Mastercard on the College website by clicking GCPSPAY.

Closing Date:

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EXAMPLES
Article
McLendon WW. A historical perspective as a compass for the future of Pathology. Arch Pathol Lab Med 1986; 110: 284-288.

Book
Talbot CH. Medicine in Medieval England.Oldbourne, London. 1926 p 120-136.

Book Chapter
Philips SJ, Whisnan JP. Hypertension and stroke. In: Laragh JH, Bremner BM, editors, Hypertension: pathophysiology, diagnosis and management. 2nd Ed. New York: Raven Press, 1995, p465-478.

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References: 1. Garber AJ, Abrahamson MJ, Barzilay JI, *et al.* Consensus statement by the American Association of clinical endocrinologists and American College of Endocrinology on the comprehensive type 2 diabetes management algorithm – 2017 executive summary. *Endocrine Practice* 2017;23(2):207-238. **2.** IMS Health Database, MIDAS August 2015. **3.** Rosenstock J, Hansen L, Zee P, *et al.* Dual add-on therapy in type 2 diabetes poorly controlled with metformin monotherapy: a randomized double-blind trial of saxagliptin plus dapagliflozin addition versus single addition of saxagliptin or dapagliflozin to metformin. *Diabetes Care* 2015;38(3):376-383. **4.** Bailey CJ, Gross JL, Pieters A, *et al.* Effect of dapagliflozin in patients with type 2 diabetes who have inadequate glycaemic control with metformin: a randomised, double-blind, placebo-controlled trial. *Lancet* 2010;375:2223-2233. **5.** Sjöström CD, Johansson P, Ptaszynska A, *et al.* Dapagliflozin lowers blood pressure in hypertensive and non-hypertensive patients with type 2 diabetes. *Diab Vasc Dis Res* 2015;12(5):352-358.

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