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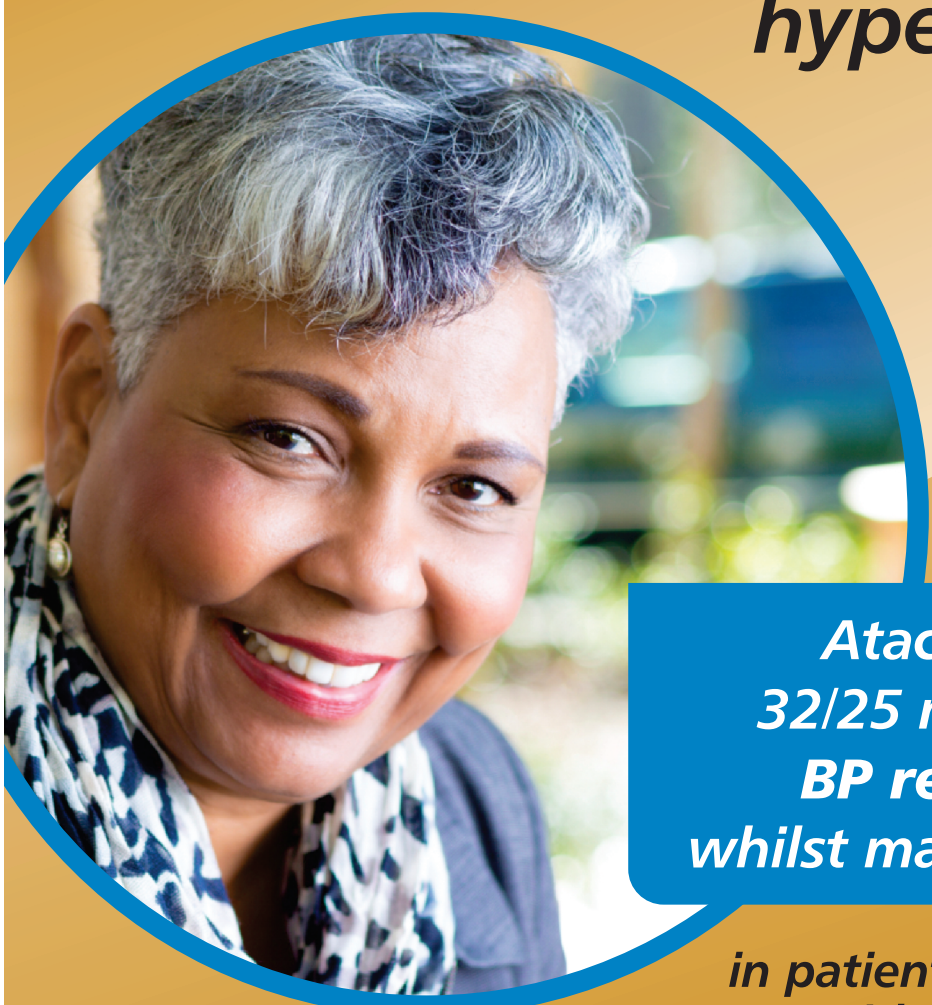

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EDITORIAL

NEW APPROACH TO MENTAL HEALTH AND THE IMPLEMENTATION OF MENTAL HEALTH LAW IN GHANA

Mental illnesses result from a complex interplay of brain circuitry, neurotransmitters, genetics, psychosocial and environmental factors. Stigma based on ignorance continues to be a significant barrier to care in Ghana, as noted by T.A Ulzen in Vol 5 No.2. He further states that the high cost of mental illnesses resulting from prolonged disability, lost productivity and direct and indirect treatment costs should inform strategic plans for the prevention and treatment of psychiatric illnesses. With a psychiatrist to patient ratio of 1:2 million people, it is imperative that all physicians and other healthcare providers be psychiatrically informed, if we are to adequately care for our mentally disabled citizens.

Psychiatric illnesses are significant in at least 50% of primary care visits but these illnesses may not be diagnosed. Untreated, they contribute to poor medical outcomes and suicide. Major psychiatric and substance use disorders are chronic medical illnesses of the brain, and are essentially no different from other chronic illnesses such as diabetes and hypertension.

In this issue, the journal introduces two articles on psychiatry. JJ Lamptey et al write about attention deficit which is a very important disorder. J Clegg-Lamptey et al also write about anxiety and depression as very important associations to be studied in depth in managing our women who are afflicted with breast cancer.

T.P Ulzen's advice on the implementation of the Mental Health Law is that it should be guided by scientific evidence and proven multi-modal treatments, including psychopharmacology and culturally informed psychotherapeutic and community-based inventions. The law should form the basis for inter-disciplinary training in public mental health education and stigma reduction among teachers, nurses, physicians, social workers, judiciary, law enforcement agencies, pastors and others. Modern communications technology which is currently underutilized must be employed in supporting sustainable solutions that offer protection of human rights and the promotion of resiliency and recovery.

JD SEFFAH, Editor-in-Chief.

ORIGINAL ARTICLES

VISUAL IMPAIRMENT IN GHANAIAN PATIENTS WITH BRAIN TUMOURS, FACTORS AFFECTING THIS AND THEIR PROGNOSTIC SIGNIFICANCE

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Abstract

Background: Anecdotally, Ghanaians with brain tumours present late with visual impairment. Contributory factors are unclear.

Purpose: To determine the degree of visual impairment in Ghanaians with brain tumours, factors affecting this and their prognostic significance.

***Methods*:** A prospective study of 70 consecutive patients newly diagnosed with brain tumours seen from November 2010 to July 2013, at Korle-Bu Teaching Hospital(KBTH), Accra, Ghana. Patients had clinical diagnosis of brain tumour with confirmation by Computerized tomography(CT) or Magnetic Resonance Imaging(MRI).

Outcome measures: presenting visual acuity, pre-presentation symptom interval (PPSI), tumour size and location at presentation.

***Results*:** Data on 70 patients was analyzed. Ages ranged from 8 days to 70 years, mean(SD) 41.8±1.8. Forty-seven (67.1%) were females. Histology was confirmed in 22(75.9%) of 29 who had surgery, comprising: pituitary adenoma, 17(77.3%) meningioma, 2(9.1%) craniopharyngioma, 2(9.1%) and combined pituitary adenoma and meningioma,1(4.5%). Common presenting symptoms were blurred vision, 65(92.9%), headache, 51(72.9%) and ocular pain, 22(31.4%).

Common signs were impaired colour vision in 97(79.5%) of 122 eyes and optic atrophy in 49(35%) of 140 eyes. Fourteen (20%) patients were visually impaired and 18(25.7%) blind. Visual impairment 20(14.3%) and blindness, 61(43.6%) were present in 140 eyes.

Pre-presentation symptom interval(PPSI) was longer in the blind than the visually impaired. However, no significant association was found between PPSI and visual impairment or blindness (p=0.660). No association was found between diagnosis and visual status at presentation (p=0.629)

Conclusions: Early detection of brain tumours to avoid blindness and visual impairment is needed in this population since majority (57.9%) of eyes were blind or visually impaired at presentation.

Key Words: brain tumour, visual impairment, blindness, optic atrophy, Ghana.

Introduction

Half of all patients with brain tumours may first present to the ophthalmologist with ophthalmic signs and/or symptoms[1, 2]. Visual symptoms are commoner in suprasellar tumours which comprise 25% of tumours in the chiasmal region[1]. Pituitary tumour (50%), craniopharyngioma (25%) and meningioma (10%) are the three most common tumours in this region[1, 3].

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Conflict of Interest: None Declared

Anecdotal data at the Korle Bu Teaching Hospital (KBTH) showed that a number of patients with brain tumours presented late with visual impairment or blindness. This study therefore purposed to determine the prevalence of visual impairment in Ghanaian patients with brain tumours presenting to the KBTH, factors affecting this and their prognostic significance. This may provide the basis for advocacy for early detection of brain tumours in Ghana.

Methodology

This is a prospective case series involving 70 consecutive patients newly diagnosed with brain tumour seen from November 2010 to July 2013 at the Ophthalmology Department of the KBTH. Only those who consented to participate in the study through

informed consent were included. Patients and carers who did not consent to participation were excluded from the study. Ethical approval was obtained from the Ethical and Protocol Review Committee of the University of Ghana School of Medicine and Dentistry.

All patients had neurological, endocrine and ophthalmic examinations and confirmation of diagnosis of brain tumour was by computerised tomography (CT) or magnetic resonance imaging (MRI). Demographic *(*age, sex, community of residence*)*, clinical (symptoms, ophthalmic,endocrine,neurologic) and histopathological data were recorded using a predesigned questionnaire.

Ophthalmic Evaluation

Visual acuity (VA) testing was done using appropriate test type for age: Fixing and following objects in infants, Cardiff charts for ages 3 months to 2 years, matching tests such as Kay pictures and Sheridan-Gardner charts for children aged 3 to 5 years and Snellen's chart for children over 5 years and adults. Illiterate patients had visual acuity testing using the tumbling E optotypes. The following test sequence was used for patients who were unable to see letters at the closest test distance: count fingers (CF) at 1 m, hand movement (HM) at 1 m, light perception (LP) and no light perception (NLP). Best Corrected Visual Acuity with spectacles (BCVA) was recorded using WHO categories of visual impairment adapted from the International Classification of Diseases (9th revision, 1975). [4] Visual status was graded as:

(a) 'Blind' when visual acuity (VA) was < 3/60–1/60 (equivalent to CF at 1 m, LP and NLP),

(b) 'Impaired' when VA was <6/18–3/60

(c) 'Normal' when VA was 6/6–6/18.

Colour vision was tested using Ishihara Colour Vision Charts (38 Plate Edition 1994).

External eye examinations included evaluation for proptosis using Hertel's exophthalmometer (G.Rodenstock Instrument; Munchen Hamburg, Germany), assessment of ocular movements, diplopia and nystagmus. Anterior segment assessment included slit lamp examination using (Topcon ATE-600 serial number 800175, 2004, Germany) as well as pupil reaction to light and relative afferent pupillary defect (RAPD). Fundus examination was done using biomicroscopy with a + 90D lens, indirect ophthalmoscope with +20D/ +28D lenses and direct ophthalmoscope through dilated pupils (using tropicamide 1%, and or cyclopentolate eye drops 1% with phenylephrine 2.5% eye drops). Visual field was assessed using a Humphrey visual field analyser (SITA, Carl Zeiss Meditec; Dublin CA.USA, 2005).

Tumour size was assessed radiologically using Computerised Tomography scan (CT scan) Hitachi Eclos -2009 or Magnetic resonance imaging (MRI) Hitachi Airis elite (OPEN)

Endocrine Evaluation*:*

All patients were examined by the endocrinologist on the study team and an assay of anterior pituitary hormones was performed. Hormones assayed included leutinizing hormone(LH), follicle stimulating hormone(FSH), 9am serum cortisol, prolactin (PRL), triiodothyronine (free T3), thyroxin(free T4), and thyroid stimulating hormone(TSH)

Neurosurgical Evaluation

Neurosurgical evaluation by the neurosurgeons included history and examination of the nervous system. The mental state, cranial nerves, coordination, motor and sensory examinations were performed on each patient.

Outcome measures

Primary outcome measures studied were visual acuity at presentation and pre-presentation symptom interval (PPSI).

Secondary outcome measures were tumour size at presentation, tumour location at presentation and type of visual field defect at presentation.

Statistical Data Analysis

Data was captured using Microsoft Access and analysed using Statistical Package for Social Scientists (SPSS) Version 16.0. Categorical data were summarized as percentages (%) and continuous numeric data as Mean and Standard deviation (SD). Results were presented as frequencies, tables and charts. To prove significant outcomes, t-test was used to compare mean levels of visual acuity between right and left eyes. Mann-Whitney Test was used for establishing significant association between, duration before presentation and, visual acuity, optic atrophy and RAPD. Chi-squared test was used to compare proportions, at 0.05 significant levels.

Results

All 70 patients referred to the Ophthalmology Department with a diagnosis of intracranial tumours from November 2010 to July 2013 were recruited and their data analysed. Patients' ages ranged from 8 days to 70 years, mean of 41.8 years with a standard deviation of 1.8 years. Forty-seven (67.1%) were females and 23 (32.9%) males (female: male ratio of 2:1).

The commonest tumour types by neuro imaging diagnosis encountered were pituitary adenomas 44 (62.9%) and meningiomas 12 (17.1%). Other tumour types are shown in Table 1. Twenty-nine (41.4%) out of the 70 patients had surgery (Figure 1) and histology was confirmed in 22 (75.9%) of those who had surgery. The histological diagnoses comprised: pituitary adenoma,17(77.3%)meningioma,2(9.1%) craniopharyngioma, 2(9.1%) and one patient (4.5%) who had both frontal meningioma and pituitary adenoma.

The majority of tumours, 56 (80%), were in the parasellar and thalamic region. There were 5(7.1%) each in the frontal and tempo-parietal regions and 4(5.7%) in the posterior fossa.

The pre-presentation symptom interval (PPSI) was 18.5 ± 25.7 months [range of 1 day to 10 years, median of 7 months]

Table1. Neuro-imaging diagnosis of brain tumours

Tumour type	Frequency	Percent
Pituitary adenoma	44	62.9
Meningioma	12	17.1
Haemangioblastoma	3	4.3
Acoustic neuroma	2	2.9
Craniopharyngioma	2	2.9
Choroid plexus tumour	1	1.4
High grade glioma	1	1.4
Medulloblastoma	1	1.4
Cancer of the breast (metastases)	1	1.4
Pilocytic astrocytoma	1	1.4
Brain stem glioma	1	1.4
Thalamic tumour	1	1.4
Total	70	100.0

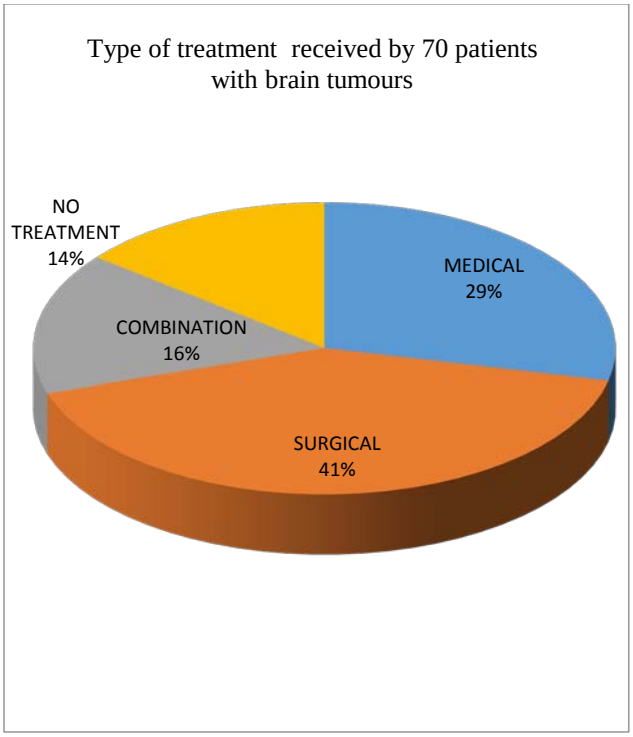

Fig 1: Type of treatments received by 70 patients diagnosed with brain tumours

. Sixty-five (92.9%) of the 70 patients seen complained of blurred vision, bilateral in 42 (60%) of them. Other common non- ocular symptom reported was headache 51(72.9%). Other symptoms are shown in Table 2.

The commonest neuro-ophthalmic signs seen were impaired colour vision in 79.5% of eyes and bilateral optic atrophy in 51.4% of patients. Other signs are shown in Table 3

Table 2. Ocular and non-ocular symptoms in 70 patients with brain tumours

Symptoms	Number (%)
Ocular	
Visual blur	65(92.9)
Ocular pain	22(31.4)
Diplopia	8(11.4)
Non – ocular	
Headaches	51 (72.9)
Seizure	7(10.0)
Galactorrhoea	9(12.9)
Irregular menses	10(14.3)
Amenorrhea	11(15.7)

Table 3. Ocular and non-ocular signs in 70 patients with brain tumours

Signs	Number (%)
Ocular	
Proptosis	6(8.6)
Red eye	6(8.6)
Unilateral disc swelling	3(4.3)
Bilateral disc swelling	9(12.9)
Unilateral optic atrophy	13(18.6)
Bilateral optic atrophy	36(51.4)
Nystagmus	1(1.4)
Ptosis	2(2.9)
RAPD	20(28.6)
Impaired colour vision	97(79.5%)
Non - ocular	
Cranial nerve III, IV, VI paresis	1(1.4)
Cranial VI paresis	2(2.9)

Tumour volume was assessed in 29 of the 70 patients examined and this ranged from 0.33cm^3 to 266cm^3 with an average of 41.7cm^3 ±6.0.

Blindness and visual impairment at presentation

Thirty eight (54.3%) of the 70 patients had normal vision (Table 4). Four (5.7 %) patients had visual acuity of No Perception of Light (NPL) in both eyes at presentation. Considering monocular blindness, 61(43.6%) eyes were blind in either eye. Eighty-nine (63.6%) of the 140 eyes examined were either visually impaired or blind (Table 4). There was however no significant difference in the level of visual impairment or blindness in the right or left eye (p=0.092). Though patients with long PPSI were more likely to present blind than visually impaired (Table 5) there was no significant association found between PPSI and level of visual acuity (p=0.660). No significant association was found between visual status at presentation and neuro-imaging diagnosis, (p=0.629) tumour location (p=0.227) or tumour volume. (p=0.595)

Table 4. Unilateral and bilateral visual status of patients diagnosed with brain tumours.

Visual status	Right Eye	Left Eye	Total Eyes	Bilateral
	No. (%)	No. (%)	No. (%)	No. (%)
Normal	28(40.0)	23(32.9)	51(36.4)	38(54.3)
Visual Impair-ment	10(14.318)	(25.7)	28(20.0)	14(20.0)
Blind	32(45.7)	29(41.4)	61(43.6)	18(25.7)
Total	70(100.0)	70(100.0)	140(100.0)	70(100.0)

Table 5. Prepresentation symptom interval (PPSI) by visual status

Visual Status	Pre Presentation Symptom Interval(PPSI), months				
Number (%)	0-6	7-12	13-18	19-24	Total
Normal	22(52.4)	7(16.7)	4(9.5)	9(21.4)	42(100)
Visually impaired	7(70.0)	1(10.0)	1(10)	1(10.0)	10(100)
Blind	6(33.3)	5(27.8)	2(11.1)	5(27.8)	18(100)
Total	35(50.0)	13(18.6	7(10.0)	15(21.4)	70(100)

Predicting mortality was difficult because there were only two deaths. Both deaths were in patients who had large frontal meningiomas.

Discussion

Intracranial tumours are among the leading causes of morbidity and mortality in patients suffering from neurological disease[5]. In developing countries, severe visual impairment and blindness from optic atrophy have been attributed to late presentation of such tumours[2,5]. In this series of 70 patients, 92.9% reported blurred vision at presentation. This is similar to other studies [3, 5, 7].

Blurred vision, one of the commonest presenting symptoms in any eye clinic, is a symptom shared by many other eye diseases[7]. Some ophthalmologists might misdiagnose the cause of the blurred vision and try to treat it inappropriately, thus delaying further investigations to rule out optic nerve or chiasm compression from intracranial tumours. This may then lead to axon damage or even blindness[7].

The male to female ratio in this study was 1:2. This corroborates findings from Thailand and Australia[5,8] but in contrast with other studies[6,9] from Nigeria, which shares similar geographical and socio-economic factors with Ghana. The higher proportion of females in our series may be reflective of more of the tumours encountered being pituitary adenomas as opposed to meningioma seen in both studies from Nigeria.

This current study demonstrated a wide PPSI (1 day to 10 years, median 7 months). This wide variability in symptom interval is similarly evidenced in a South-Western Nigerian study[6]. In this Ghanaian study, though patients with long PPSI were found to be more likely to present blind than visually impaired, there was statistically no significant association found between PPSI and level of visual acuity (p=0.570). Studies have indicated however, that patients with longer duration of symptoms had less recovery of vision[3].

Twenty percent of patients in this study were binocularly blind and 25.7% were visually impaired at presentation. The number of bilateral blindness is similar to a Kenyan study of 60 patients which found 18% bilaterally blind[2]. However,the proportion of bilateral blindness in this current study is lower than that found in a series of 88 patients in South-Western Nigeria which reported bilateral blindness of 52%[6]. Considering monocular blindness and visual impairment however, majority (63.6%) of the 140 eyes examined were either blind (43.6%) or visually impaired (20%). This high number of blind patients is similar to a study in Saudi Arabia[10]. However, this finding is higher than that seen in Ile Ife, Nigeria in which 3.4% patients were unilaterally blind and 6.8% visually impaired[6]. This disparity may be related to the difference in the pattern of brain tumours studied; parasellar tumors (pituitary adenoma, meningioma and craniopharyngioma) constituted 55.6% of all brain tumours studied in Ile Ife, Nigeria as compared to 80% in the present study. The anatomical location of these parasellar tumours predisposes them to higher frequency of mass-compression effect on the optic nerve, optic chiasma and optic tract with resultant visual impairment and blindness[6]. There was however no significant difference in the level of visual impairment or blindness in the right or left eye (p=0.092). This may be explained by symmetrical involvement of right and left eyes in this study, confirmed by 10 cases each of RAPD in right and left eyes.

Pituitary adenomas (62.9%) and meningiomas (17.1%) were the most common tumours in this series as was the case in some series[3,7], but this is in contrast with other studies which reported meningioma as the commonest[5,6,8,11,12,13]. This difference is difficult to explain.

Majority (80%) of tumours in the current study, were in the parasellar and thalamic region. Tumours in the parasellar region, cause visual impairment and blindness by compression of the optic nerves and chiasm due to their close proximity to these structures[2,3,7,11]. Interestingly, there was no correlation found between tumour location and visual status(p=0.227) in this study, a finding that contrasts with that from a Kenyan study which found statistically significant correlation between tumours compressing the anterior pathway (frontal, suprasellar) and degree of visual impairment[2]. This difference in findings between the two studies may be due to a difference in the pattern of the tumours in the two studies. Other studies on suprasellar tumours did not test association between tumour location and degree of visual impairment[3,5,7].

There was no correlation found between tumour volume and visual status in this study. (p=0.595) This contrasts findings from Saudi Arabia[10]. This difference may be as a result of tumour volume being assessed in only a few of the patients. Mean tumour size has been

found to be greater in the blind than the non-blind and loss of vision found to be significantly related to tumour size, as well as perifocal oedema in a study from Ibadan[14]. Our study however, did not establish this relationship.

Conclusion and recommendations

Early detection of brain tumours to avoid blindness and visual impairment is needed in this population since majority (57.9%) of eyes were blind or visually impaired at presentation. We therefore recommend education of the public and health care providers to ensure prompt diagnosis and referral.

Strengths and Limitations

The main strengths of this study included its prospective nature which aided proper documentation of clinical signs. However, the lack of histological diagnosis and the two dimensional measurement of tumour size which posed a challenge on tumour volume assessment in the majority of patients, were known limitations.

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THE PREVALENCE OF ATTENTION DEFICIT HYPERACTIVITY DISORDERS IN A CLUSTER OF PRIMARY SCHOOLS IN THE AYAWASO SUBMETRO, ACCRA, GHANA

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Abstract

Background: Attention deficit hyperactivity disorder (ADHD) is a heterogeneous group of disorders characterized by a high level of inattentive, hyperactive and impulsive behaviour that begins in childhood. It is developmentally inappropriate and impairs the functional life of the affected child at home and at school. Although ADHD is a very common childhood developmental disorder, it is not given the attention it deserves in childhood disorders in Ghana. Children affected by ADHD present with numerous psychosocial problems in the communities they live, wherever they find themselves, and in later life. These psychosocial problems include substance, child and sexual abuses. They also present a range of psychiatric and behavioural disorders e.g. suicides and homicides. They are prone to becoming school dropouts, armed robbers and prostitutes. The present study looked at the prevalence of ADHD in a cluster of primary schools in Accra, Ghana. This study is expected to give evidence for early secondary prevention.

Methods: Using random sampling, 18 primary schools were selected from 58 primary schools in the Ayawaso sub metropolitan area in Accra, Ghana. Six out of the eighteen primary schools refused to take part in the study for various reasons. The final cohort of pupils, were from 12 schools with a total population of four hundred and four (404). Their ages ranged from 5 to 9 years. Parents, guardians and teachers were asked to complete the rating scores of symptoms of ADHD by Corners which is based on DSM-IV. The study also assessed the educational status of guardians and parents from the questionnaires.

Results: The total number of ADHD males and females was forty (40) and thirty seven (37) respectively. The prevalence of ADHD in the males and female cohorts were ten percent (10%) and nine-point one percent (9.1%) respectively, making a total prevalence of nineteen-point one percent (19.1%).

Conclusion: The prevalence of ADHD in the selected primary schools was nineteen-point one percent (19.1%). The study also showed that lower socio-educational status may be a positive risk factor for ADHD.

Key Words: Prevalence rates, ADHD, selected primary schools, Ayawaso Sub Metro, Accra

Introduction

Attention deficit hyperactive disorder (ADHD) is a heterogeneous group of disorders characterized by a high level of inattentive, hyperactive and impulsive behaviour that begins in childhood. It is developmentally inappropriate and impairs the functional life of the affected child at home and at school[1].

Indeed, attention deficit hyperactive disorder (ADHD) is the most common of the childhood developmental disorders which may persist into adolescence and adulthood[2]. Children who are affected by this disorder present medical and psychosocial problems in the community they may find themselves later in life. These problems include substance abuse, child and sexual abuse, suicides and homicides, school dropouts, difficulties with relationships, prostitution, armed robbery and many other criminal activities[3].

The International Consensus Statement on ADHD (2002)[4] observed that children with ADHD have few or no friends, poor performance at work and are likely to experience teenage pregnancy and sexually transmitted diseases. They are more likely to be involved in multiple road accidents due to over speeding. As adults, they mismanage their lifes and endanger the lifes of others. The prevalence of ADHD is reported to range from two percent (2%) to twenty percent (20%) in grade-school children[5]. However, a more conservative figure is 3-5% of elementary school children. ADHD is more common in boys than girls with a lower gender ratio of 3 to 1 and a higher ratio 5 to 1.

Even though the causes of ADHD are unknown, there are numerous associated findings which may be etiologically significant. Recently, a gene has reliably been demonstrated to be associated with ADHD and currently there are more than twelve different scientific teams worldwide in search of more genes which may be associated with ADHD. The recently demonstrated

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Conflict of Interest: None Declared

genetic basis is reported to be a rare chromosome deletion and duplication known as Copy Number Variant (CNV) which is associated with increased risk of different neurodevelopmental disorders such as autism, schizophrenia, intellectual disability, and recently ADHD. Since these Copy Number Variants (CNV) are rare, it raises the possibility that mutation may be associated developmentally with ADHD[6,7]. Langley et al[8] have also reported significant amount of Copy Number Variants (CNV) to be more common in children with ADHD than those without the disorder. There is also greater concordance of ADHD in monozygotic than dizygotic twins. It has been noted that siblings of hyperactive parents have twice the risk of having ADHD as compared to the general population. Thapan et al[9] have observed that the heritability from twin studies ranges from 0.5-0.9 and there is also a five-fold increase in first degree relatives. Biedermann et al[10] reported that biological parents of children with ADHD have a higher risk of developing ADHD than adoptive parents. ADHD also has long been thought to be a result of minimal or subtle brain damage during prenatal, perinatal and post natal periods of early life[5].

Neuro-physiological studies have also shown dysfunctions in certain parts of the brain. These areas include the frontal lobe with its connections to the basal ganglia and the central cerebral aspect of the cerebellum. These areas also show less reaction to brain activity on electrical stimulation. Neuro-imaging studies have shown some areas of less metabolic activity when compared to a control group[11,12]. Several indirect lines of evidence suggest that abnormalities of dopamine transmission occur in ADHD. There is an increasing complication of D_4 dopamine receptor in the causation of ADHD[13]. Environmental risk such as low birth weight, maternal alcohol consumption during pregnancy, nicotine, lead, idiosyncratic reaction to certain food substances, additives, colouring and preservatives have also been implicated as a cause of ADHD[14]. In short, the etiology of ADHD is highly complex and still poorly understood with genetic, epigenetic, neurobiological, environmental and psychosocial factors all contributing.

ADHD is an important area of childhood disorder to investigate because of the behavioural problems which may occur later in life. The present study was to evaluate the prevalence of ADHD in selected primary schools. Permission was also sought from the ethical committee of the Ministry of Education, District office, Accra.

Materials

The study evaluated the prevalence ADHD in Ayawaso Sub metro area in Accra, Ghana. Ayawaso Sub metro consists of five electoral areas; namely Abelemkpe, Dzorwulu, Roman Ridge, Airport Residential area, Okponglo and Legon. All primary schools in the above locality with pupils aged between five years and nine years were included in the study. After random selection of one in every three schools, eighteen (18) schools were obtained. The ages of the pupils ranged from five years to nine years. Of the 18 primary schools, fourteen were privately owned, four were public schools, five participating private schools declined to take part in the study and one address of the public school could not be located. The cohorts were therefore from 12 schools (four public and eight private). After a workshop on ADHD with parents, guardians and teachers, a modified version of DSM-IV by Corners (1969)[15] on ADHD symptoms were administered to parents, guardians and teachers. The parents, guardians and teachers were taught how to evaluate and score the behaviour on the questionnaire. This was done for two hours daily for three days. At the end of the workshop, research assistants were satisfied with the evaluation and scoring of the parents, guardians and teacher's assistance.

Research Settings and Methods

According to the 2009 estimated residential population, Ayawaso West has the lowest population density in Accra Metropolitan Assembly survey, with 1851.7 people per square kilometer, reflecting the large land surface area and the small resident population of about 70, 667, with 37,065 being males and 33,602 being females. Ayawaso west is a large and first class residential area and thus is well planned. It has well developed infrastructure and spacious landscaped properties. According to the 2010 Ghana citizens report survey, 64% of households in Ayawaso West have their children attend private basic schools while 36% attend public basic schools.

All registered primary schools in circuits 21 and 22 of the Ayawaso sub metropolis were demarcated for sampling purposes. All schools that had pupils that fell within the age ranges of 5-9 years qualified for inclusion in the study. Teachers, parents and guardians of pupils at every school also participated in the research. The selected schools cut across all residential areas or neighborhoods existing in the Ayawaso sub metropolis. Table 2[a] provides insight into the different sectors of schools represented in the sample. Random sampling technique of one (1) out of every three (3) schools was used. Eighteen (18) schools were selected out of the fifty-eight (58) schools.

Table 1: A table representing the total number of private and public schools in both circuits of Ayawaso Sub metropolis

Circuits	Public Schools	Private Schools	Total
21	6	18	24
22	8	26	34
Total	14	44	58

Table 1 shows the total number of private and public schools in both circuits. Circuit 21 has six public schools and eighteen private schools making a total number of schools in the circuit twenty-four. Circuit 22 has eight public schools and twenty-six private schools making thirty-four. Thus, the total number of private and public schools in the two circuits was fifty-eight (58).

Table 2[a]: A representation of the number of schools selected

Category	Number	Percentage (%)
Public	4	22.2
Private	14	77.8
Total	18	100

Table 2[a] represent the number of schools selected from the two sector schools. The number of public schools selected was four representing (22.2%) while the number of private schools selected was fourteen representing 77.8%.

Table 2[b]: Shows the actual number of schools which participated in the research

Category	Number	Percentage (%)
Public	3	25%
Private	9	75%
Total	12	100%

There were three public schools (25%) and nine private schools (75%) which took part in the project, after the decline of five (5) private schools and one (1) public school whose address could not be located.

Research Instrument

The guideline used for the diagnosis of ADHD was the Teachers' and Parents' check-list by Corners[15]. which is a modified form of Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV). The DSM-IV requires for ADHD diagnosis, evidence of inattention and/or hyperactivity-impulsivity (combined-symptoms). For the purpose of this study, parents' and teachers' check-list was used. It is mainly based on the DSM-IV guideline.

This DSM-IV guideline includes six or more symptoms of inattention and/or six or more symptoms of inattention and hyperactivity-impulsivity to be noticed six or more months prior to assessment, and also the inattention and hyperactive-impulsive symptoms to be noticed prior to 6 years of age. It also requires a persistent pattern of inattention and or hyperactivity-impulsivity that is more frequently displayed and is more severe than is typically observed in individuals at comparable level of development. The guideline also requires some impairment from these symptoms to be present in at least two settings and there must be clear evidence of interference with developmentally appropriate social, academic or occupational functioning. It further requires that the symptoms do not occur in a pervasive developmental or other psychotic disorder, or are not accounted for by another mental disorder. The study did not cover social, academic and occupational functions of the cohorts. The investigation only dealt with prevalence rate and socio-educational levels of cohorts' parents and guardians.

Corners'[15] symptoms of ADHD which was administered is categorized into a checklist; the teachers' checklists and the parents'/guardians' checklists. Ten critical items are scored in one of four categories: not at all (0), just a little (1), pretty much (2), or very much (3). The critical items scored on the teachers' checklist include; restless in the squirmy sense, demands must be met immediately, distractibility or attention span problem, disturbing other children, restless, always "up and on the go", excitable and impulsive, fails to finish things that he starts, childish and immature, easily frustrated with efforts, and difficulty in learning.

The ten critical items scored on the parents'/guardians' checklist include; excitable and impulsive, difficulty in learning, restless in the squirmy sense, restless "always up and on the go", denies mistakes or blames others, fails to finish things, childish or immature, distractibility or attention span a problem, mood changes quickly and drastically, and easily frustrated in efforts.

The maximum score is thirty (30) points. Scores for children with ADHD vary with age, but a score of eighteen (18) for boys or fifteen (15) for girls supports the diagnosis of ADHD. These symptoms must have been noticed by respondents before the age of six (6) prior to evaluation and scoring. The age range of cohorts for the research was 5-9years.

Research Procedure

The research was approved by the ministry of education and as such there was cooperation from the sub metropolitan area of primary schools involved. The researchers received a list of registered schools within Ayawaso that had pupils within the age range of 5-9 years. This list contained both private and public schools as illustrated in Figure 1.

Before the commencement of the research, introductory letters from the researchers and the ministry of education were sent to selected schools, unfortunately due to wrong address listing, one of the selected public schools couldn't be located. Out of the 17 remaining schools, 5 private schools were unable to participate. The data collected was therefore based on 12

schools in the sub metro. The researchers conducted workshops for parents, teachers and guardians in selected schools that were willing to participate in the research. The workshops provided basic education on ADHD and the role teachers, parents and guardians play in the proper and accurate ADHD diagnoses. The workshops also educated them on treatments options and ways to manage ADHD. The participating schools submitted a list of their pupils whose ages ranged from five (5) to nine (9) years. From the list submitted, the researchers selected one out of every three pupils. The total number of cohorts for the study was four hundred and four (404). Table 3 represents a list of willing participants and the number of randomly selected pupils in respective schools. To maintain the privacy of the schools participating, they are lettered A-L.

Table 3: A representation of the number of selected pupils in participating schools

School	Number of selected pupils	Sector
A	30	Public
B	9	Private
C	44	Public
D	25	Private
E	53	Private
F	20	Private
G	24	Private
H	11	Private
I	23	Private
J	60	Private
K	71	Private
L	34	Public
Total	404	

Table 3 shows the number of selected pupils in participating schools. There was a total of twelve sector schools (A to L) of which three were public sector schools. The total number of pupils selected for the research was four hundred and four pupils (404).

The parents' checklists or questionnaires were given to every parent or guardian of each selected pupil or participant. In addition to this, the parents were also given a questionnaire to determine their socio-educational status and the options included: tertiary educational level (A), secondary educational level (B), basic educational level (C) and others not mentioned above (D). Concurrently, the teachers' checklists were also given out to teachers of selected pupils. After a period of 3-6 weeks, the checklists were then collected from parents, in most cases the fathers and mothers (if they are single), guardians and the teachers. The checklists were then scored and tabulated.

Results

Data obtained from the scores of the checklists were summarized in table 4[a]. Raw data were converted into percentages. Table 4[a] clearly shows the number of diagnosis of ADHD in both the male and female cohorts in the twelve participating schools (A-L).

Diagnosis was made if both parent's, guardian's and teacher's scores were above the cut-off point for ADHD on the questionnaire.

Table 4[a]: A representation of suspected cases of ADHD based on respondents scores

School	Cases of Suspected ADHD (males)	Cases of Suspected ADHD (females)	Total	(%)
A	1	2	3	3/30= 10
B	3	0	3	3/9= 33.3
C	2	1	3	3/44= 6.8
D	2	0	2	2/25= 8
E	4	5	9	9/53= 16.9
F	5	3	8	8/20= 40
G	1	3	4	4/24= 16.7
H	0	1	1	1/11= 9.1
I	2	3	5	5/23= 21.7
J	9	5	14	14/60=23.3
K	4	10	14	14/71 19.7
L	7	4	11	11/34=32.4
Total	40	37	77	77/404=19.1

There were forty males (40) and thirty seven (37) females with suspected diagnosis of ADHD. The total number of pupils with suspected cases of ADHD is seventy seven (77). This represents 19.1% of the total number of selected pupils. Ten percent (10%) were

males and nine point one percent (9.1%) were females. There was no female suspected cases of ADHD in sector schools B and D and no male suspected cases of ADHD in sector school H.

Primary school C has the lowest (6.8%) cases of ADHD with the highest level of tertiary education of the parents and guardians. This is followed by primary school D which has 8.0% of ADHD cases and also has parents and guardians with tertiary level of education. Primary schools H and A have 9.1% and 10% respectively with cases of ADHD, with basic educational levels of parents and guardians. Primary schools G and E have 16.7% and 16.9% of cases respectively with surprisingly high tertiary level of education in both schools. The following schools (K, I, J, L, and F) with high numbers of suspected cases of ADHD had parents with basic or lower levels of education.

Table 4[b]. Shows primary schools, the respective percentage of suspected cases of ADHD diagnosis in increasing order and the level of educational status of the parents and guardians.

Rank	Primary School	Percentage of ADHD Cases	Educational Levels of Parents and Guardians
1st	C	6.8%	Tertiary
2nd	D	8.0%	Tertiary
3rd	H	9.1%	Basic
4th	A	10%	Basic
5th	G	16.7%	Tertiary
6th	E	16.9%	Tertiary
7th	K	19.7%	Basic
8th	I	21.7%	Basic and Others
9th	J	23.3%	Basic
10th	L	32.4%	Basic
11th	B	33.3%	Tertiary
12th	F	40%	Others

It is surprising to note that primary school B, with 33.3% of cases, has parents and guardians with tertiary educational levels. Primary schools B and H have significantly few parents and guardians respondents, this may explain the surprisingly unexpected results of percentages of cases in these primary schools. There appears to be more cases of ADHD in primary schools K, I, J, L and F. The latter schools have the highest basic and other forms of educational levels. The only exception is school B which has significantly few respondents.

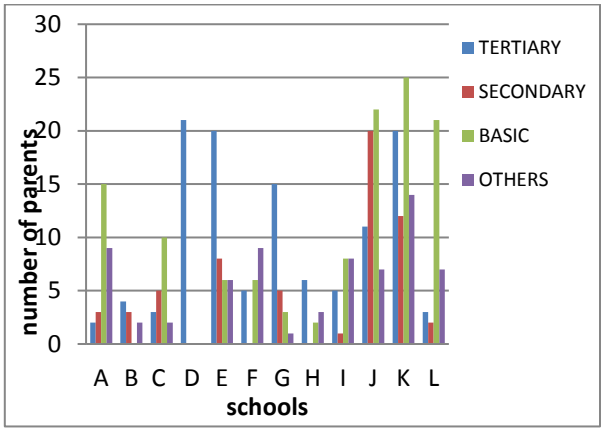

Fig 5: A chart representing the socio-educational status of the parents and guardians in each selected school

Figure 5 shows a chart representing the socio-educational status of parents and guardians. The highest level of tertiary parents and guardians is represented in primary school D which is followed by primary schools E and K. The highest level of secondary educational status is represented by primary school J followed by primary school K. The highest level of basic educational level is represented by primary school K followed by primary school J. The highest level of other educational status is represented in primary school K followed by primary schools A and F. There are no parents and guardians with basic level or secondary level of education in primary schools B and F respectively. Primary school F does not also have parents or guardians with secondary education. Primary school D does not also have any parent or guardian with secondary, basic or other form of educational status but has the highest parents and guardians with tertiary education.

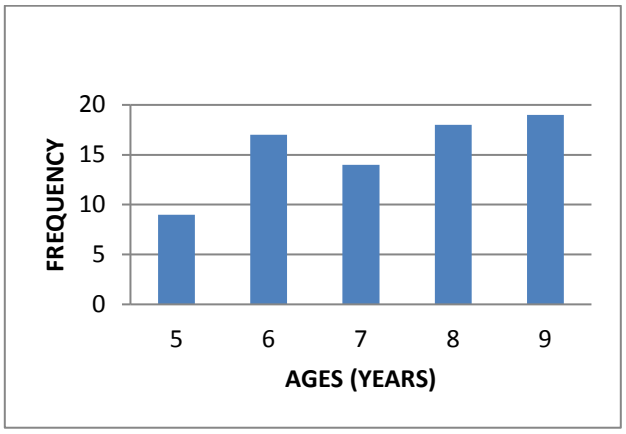

Fig 5b: A representation of the age distribution of the suspected cases of ADHD

Figure 5[b] shows the chart of age distribution of positive cases. The highest age group of pupils selected was nine years. This was followed by eight years old pupils and the lowest being five years old.

Discussion

This study is an attempt to evaluate the prevalence of Attention Deficit Hyperactive Disorder in randomly selected primary schools in the Ayawaso sub metro. To our knowledge, this study is the first of its kind to be undertaken in Ghana. The prevalence rates of ADHD in the cohorts for both males and females were 19.1%, of this figure 10% was for males and 9.1% was for females. The prevalence rates of ADHD in the literature show a wide variation ranging from 2% to 20%[5]. A survey of 10,438 children between the ages of 5 and 15 in the U.K. found overall prevalence rates of 4.45% with 3.6% of boys and 0.85% of girls had ADHD[16]. In Columbia, the overall prevalence rates estimated for males and females were 32.1% of which 19.8% were for boys and 12.3% were for girls[17].

A systematic review of the literature on prevalence studies by Polanczyk and colleagues concluded that a great majority of the variability is due to the methods used, such as the way in which the symptoms were measured and the exact definition used. The variability may also be due to difference in the training of investigators and other humans factors[18]. It is therefore impossible to draw any firm conclusions from the large variation of studies on prevalence rates cited in the literature, since culture and cultural tolerance to ADHD symptoms and other socio-cultural factors and practices may affect the prevalence rates. Indeed, one study in the U.S using the same diagnostic procedure reported small but significant differences in prevalence between African-Americans (5.65%), Hispanics (3.06%) and Whites (4.33%)[19]. Such differences might however be explained by different cultural practices and tolerance to symptoms of ADHD. There may therefore be notably and significantly higher rates in people of African descent. It is likely that other social and cultural characteristics may have influenced our prevalence rates. Furthermore, a range of factors which adversely affect brain development during prenatal, perinatal and postnatal or early childhood may be associated with an increase in the risk of ADHD. These include maternal smoking[20] alcohol consumption[21] heroin abuse during pregnancy[22] very low birth weight[23] fetal hypoxia, brain injury, exposure to toxins such as lead and deficiency in Zinc[24].

Ghana is a developing nation with less developed antenatal, perinatal and postnatal facilities. Furthermore, access to these antenatal facilities may be difficult or non-existent. It is therefore likely that such less efficient and poorly developed services may lead to poor nutritional status especially the anaemias. Pregnancy may also be complicated by pre-eclamptic toxaemia (PET) leading to hypoxia and subsequent minimal brain damage of the fetus. Most pregnant women in Ghana may also not be aware of the negative effects of alcohol and other drugs on the fetus. The lack of perinatal facilities and access to health facilities lead to high rates of home deliveries by local native midwives or untrained elderly women. These factors may significantly contribute to higher risks for ADHD especially in the rural areas in Ghana through obstetric malpractices leading to minimal or subtle brain damage. The high prevalence rates of ADHD in this study may therefore partially be explained by the above negative factors in the care of pregnant women and babies in Ghana.

The effect of the educational status of parents or guardians as a risk factor for ADHD is clearly seen in Figure 5. Sector schools J and K show the highest diagnosis of ADHD of fourteen (14) pupils in each sector and eleven (11) pupils in sector school L. It is interesting to note that Table 5 shows the highest rate of basic educational levels in parents and guardian in the same sector schools (J, K and L). It therefore appears that basic school educational status of parents and guardians is a risk factor for ADHD. These findings are in keeping with Fletcher et al[25], who found that low maternal education could confer risk for more severe symptomatology of ADHD through a combination of environmental and biology factors. Furthermore, the relationship between ADHD and level of education is clearly exemplified in Table 4b. Even though there are few explained findings e.g. significantly few parents and guardians responses in primary schools B and H, there is a strong tendency for cases of ADHD with lower educational levels of parents and guardians. Primary schools I, J, L and F with low educational levels (basic and other education) have higher number (percentage) cases at the respective schools.

Tertiary education of parents or guardians therefore seems to be protective factor against ADHD. The effects of other educational status of parents or guardians on ADHD in the present study have been partially explained. However, there may be other unidentified factors operating. These factors may include positive emotional relationships with children, single parenthood, effect of other siblings and other family dynamics which may be the characteristics of these groups of parents and guardians. Indeed, Galera C. et al[26] noted that family factors such as socio-economic status, parental education and mental health of parents or guardians may confound the association between ADHD symptoms and academic performance. Sector schools C and D, with lowest cases of ADHD have the parents with highest educational status. These research teams found a strong association between attention deficit hyperactive disorder and socio-economic status. They also found that single-parent families and welfare benefits were also associated with children receiving treatment for attention deficit hyperactive disorder. This study is only focused on the prevalence and educational levels of the parents and guardians. Since the illiteracy rate of Ghanaian women may be high when compared to

developed countries, it is likely that this may account for the high prevalence rate of ADHD in Accra, Ghana.

Most studies on gender distribution have shown that ADHD affects males more than females. In the present study, the gender distribution ratio is 1:1. Indeed some researchers have reported of a ratio of 3 males to 1 female while others have a higher ratio of 5 males to 1 female. The present study showed no differences between the gender ratios. The discrepancies may be due to the age range of cohorts and the sizes of the cohorts in these studies.

Conclusion

ADHD appears to be prevalent in the Ayawaso sub-metro primary schools. Most parents, guardians and teachers who are not aware of the disorder may physically and psychologically punish ADHD pupils because of their behaviour. They may also be punished because of their poor intellectual performance especially in the classroom. This may lead to absenteeism from school and subsequent aimless roaming and formation of gangs. The latter may lead to antisocial behaviours like substance abuse disorder, teenage pregnancy, armed robbery and other criminal activities. This state of affairs may not augur well for the child's development, the family and the nation at large. All these behavioural disorders may be prevented by early identification and intervention by psycho education and drug therapy.

Limitation

The small number of cohorts may affect the prevalence of ADHD in this study. The results may therefore not be compared to that of (Ford et al 2003)[16] with cohorts of ten thousand (10,000). These findings therefore may not reflect the true prevalence rates of ADHD in Ghana. The study also relied on the information given by parents and guardians which might make the data collected from informants probably biased. Thus, reports from parents and teachers may be a reflection of the higher or lower tolerance to ADHD behaviour by the respondents (teachers, parents and guardians). It is also generally accepted that mental health of parents or guardians is a positive risk factor in development of ADHD[27] and it is likely that their perception of the behaviours of cohorts might also be biased. These biases might have been reduced as a result of the workshops on ADHD conducted by the research team in the respective schools with the respondents. There was no post-workshop evaluation. Furthermore, six of the selected schools were not able to participate in the study.

Clinical Implication

Indeed, it is likely that many children with ADHD are psychologically and physically punished by ignorant parents and guardians or teachers at homes and schools respectively for their behaviour. This will often lead to school phobia, absenteeism and school dropouts. They are also likely to be punished because of their poor intellectual and academic performance, since there is an association between ADHD and poor scholastic performances[28, 29]. Even though ADHD is prevalent in Ghana, there has not been any effort to assess its prevalence. Physicians, teachers, parents and guardians should be aware of the behaviours which may require full assessment for ADHD diagnosis. This will only be achieved through frequent workshops on ADHD with parents, guardians and teachers who form the Parents Teachers Association (PTA) of respective schools. Because of the multifactorial causes of ADHD, research in this area will be difficult but not impossible. Such study should include a follow-up of pregnant mothers throughout their antenatal, perinatal and postnatal periods, the lifestyles and habits of these women particularly with regard to alcohol intake and other substances. The mental state and the family dynamic of the parents or the guardians should be assessed. Their socio-educational status should also be assessed since this is also a risk factor for ADHD. The babies should be monitored from birth and followed up through their preschool years and to school until the age of 10 or 15years. It will also be borne in mind that ADHD may persist to adulthood with less hyperactivity[2]. Parents and guardians whose children are diagnosed of ADHD are assured of drug treatment and psycho-educational interventions.

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COMPARING VAGINAL AND ORAL ADMINISTRATION OF MISOPROSTOL FOR CERVICAL RIPENING AND INDUCTION OF LABOUR IN PROLONGED PREGNANCIES

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Abstract

***Background*:** Dinoprostone (prostaglandin E2), is presently used as the approved standard protocol for cervical ripening and labour induction. In search for a cheaper alternative, misoprostol (prostaglandin E1) has been found to be a good substitute. The ideal dose, route and frequency of administration of misoprostol are, however, still under investigation. Although, vaginal application of misoprostol has been validated as a reasonable means of induction, there is patient resistance to digital vaginal examination and there is a risk of ascending infection. For these reasons, oral administration of misoprostol for cervical ripening and labour induction has been tried.

***Objective*:** The efficacy and safety of oral and vaginal misoprostol for the elective induction of labour with prolonged pregnancy and unfavourable cervix was compared through a prospective study over a period of one year at the Military Hospital, Accra.

***Methods*:** A prospective, non-blinded randomised study of 148 women with prolonged pregnancy. Data was collected using a prepared structured case record form (data profoma). The study population was randomized into two groups and given 50 µg misoprostol orally in one group and 50 µg vaginally in the other. The main outcomes were measured as induction to delivery time, vaginal delivery achieved within 24 hours and the incidence of uterine hyperstimulation with fetal heart rate (FHR) changes.

***Results*:** The mean induction to delivery interval was shorter in vaginal group than oral group but the differences did not reach statistical significance (12.9hrs vs 14.3hrs; mean difference -1.42, *P* value = 0.24). The shorter duration of vaginal misoprostol, however, was significant for nulliparous women (13.4hrs vs 17.9hrs; mean difference 4.53, p<0.05). There was less failure to achieve vaginal delivery within 24 hours of induction in the vaginal route group, but the differences did not reach statistical significance (6.1% vs. 6.8%; p = 0.81). Fewer women needed oxytocin augmentation in the vaginal group (24.2% vs.17.4%, p = 0.11). There was a higher incidence of uterine hyperstimulation in the vaginal group but not significant (14.7% vs 6.1%, p = 0.10). APGAR scores at 5 minutes showed no difference between the two groups (1.49% vs. 2.99%, p =0.42).

***Conclusions*:** Compared with oral misoprostol, vaginal misoprostol for induction of labour at term resulted in a shorter induction-to-delivery time and a lesser need of oxytocin for women to deliver within 24 hours of induction. Both maternal and neonatal safety outcome were comparable in both groups. However, the more frequent occurrence of hyperstimulation in the vaginal group could lessen its preference to the oral route. More trials are needed to determine the right oral dosage that combines efficacy with safety.

Key Words: Induction of labour, vaginal misoprostol, oral misoprostol, induction delivery interval.

Introduction

Induction of labour is extensively used all over the world in cases in which continuation of pregnancy is hazardous to the mother and/or her fetus. Data from the WHO Global Survey on Maternal and Perinatal Health showed that 9.6% of the deliveries involved labour induction[1].

Over the years, various professional societies have recommended the use of induction of labour in circumstances in which the risks of waiting for the onset of spontaneous labour are judged by clinicians to be greater than the risks associated with shortening the duration of pregnancy by induction. One of these is pregnancy beyond 41 weeks, due to the increased risk of perinatal death[2,3].

Many evidences have highlighted the importance of prostaglandins to induce cervical ripening and stimulate uterine contractions at a variety of doses and routes of administration i.e. orally or vaginally[4-6]. However, prostaglandin preparations (Prostaglandin E2-dinoprostone) that have been registered for cervical ripening and labour induction are expensive and unstable, requiring refrigerated storage. In the developing countries with high average parity, there is an urgent need for an affordable drug to optimize induction outcome. Misoprostol (a prostaglandin E1 analogue) is a methyl ester of prostaglandin El additionally methylated at C-16[5,7] with several potential advantages: it is stable at room temperature, it is

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relatively inexpensive and it can be given via several routes (oral, vaginal, sublingual and buccal). These properties make misoprostol an ideal agent for induction of labour, particularly in settings where the use of prostaglandin E2 is not possible owing to lack of available facilities for storage, or financial constraints. Misoprostol has been compared satisfactorily with the presently agreed agent dinoprostone (prostaglandin E2), the most advantageous dosing regimen, timing, and route of administration lingered the focus of enduring research[4,7,8].

Recently, some studies have demonstrated the efficacy of oral misoprostol for cervical ripening, comparable with that of vaginal misoprostol[9–11].The use of an oral medication for cervical ripening is appealing due to reduction in repeated digital examination necessary for placement of the agent and also reduction in the risk of ascending infection.

This study aimed to compare the efficacy and safety of misoprostol when administered in equivalent doses, (orally and vaginally) for cervical ripening and labour induction in prolonged pregnancy with a live fetus.

Materials and Methods

***Research setting*:** The study was carried out at The Military Hospital from May 2014 to January 2015. The hospital is the second biggest hospital in the city situated almost at the centre of Accra. Although it is primarily a military hospital, it provides services to both military personnel and the general civilian population. The hospital has a 600-bed capacity with the Obstetrics and Gynaecology Department having 65 Beds.

Sample Size Determination: A sample size of 148 (74 women in each group) was calculated using a two-tailed alpha of 0.05 and a power of 95%. A standard deviation of 506 minutes was derived from a previous publication describing vaginal misoprostol for induction of labour[12]. A 300-minute (5-hour) difference in induction-to-delivery time between the two groups was considered clinically significant.

Inclusion Criteria: The study population was all patients with gestational age between 41–43 weeks who were receiving antenatal care at the Military Hospital between May 2014 and January 2015, and without contraindication to vaginal delivery. These included all eligible and consenting patients with the following characteristics: Age between 20–40 years, accurately dated gestation by ultrasound biometry via Crown rump length (CRL) measurements in the first trimester of pregnancy or according to the date of the last menstrual period preceded by regular cycles without use of oral contraceptives, singleton viable pregnancy and cephalic presentation.

Exclusion Criteria: These included Patients with known contraindications to receiving prostaglandins, premature rupture of membranes, multiple pregnancies, previous uterine surgery, any other contraindication to vaginal delivery or induction of labour and those who refused to consent.

Study Design: The study was a prospective, randomized clinical trial. It was not placebo-controlled and once randomisation was completed, neither the staff nor the patients were blinded to the route of administration.

Participation in the study was voluntary and patients were free to withdraw consent at any time during the study. Withdrawal of consent did not result to a difference in the care received compared to those that did not withdraw consent.

A detailed history and general physical examination including abdominal examination were done to confirm the presentation of the fetus. Digital vaginal examination was also done to confirm the Bishop Score. Baseline investigations included complete blood count, blood grouping and Rh factor. A fetal cardiotocogram (CTG) trace to confirm fetal well-being was performed as well as ultrasound for fetal weight and liquor volume.

The participants were subsequently randomized into group A and group B for induction with oral or vaginal misoprostol respectively. The randomization was done by placing 148 numbered cards each in an opaque envelope stating the route for induction. These sealed envelopes were put in a box and drawn by lottery in a consecutive order by the participants, who were unaware of the route allocated until the envelope was opened.

Study Protocol: *Treatment schedules*- The attending doctor administered the drug. The oral solution was prepared immediately before administration by mixing the 200µg with 200 ml of water. The woman then took a 50ml aliquot of solution (50µg). The vaginal misoprostol of 50µg was administered in the posterior fornix. These were repeated after every four hours to a maximum of four doses if there was no uterine activity.

When uterine activity suggested the onset of labour, vaginal assessment was performed and the participant was sent to the labour ward for further monitoring by trained midwives. All care was according to local hospital guidelines.

The data was collected using a prepared structured case record form (data proforma) after administration of the misoprostol. Data collection was done by the investigator and trained personnel. The time of dose introduction, beginning of significant uterine contractions (significant uterine contractions mean 3–5 contractions of moderate to severe intensity in 10 minutes) and deliveries times were also noted.

Failed induction of labour was defined as vaginal delivery not achieved within 24 hours of initiating induction of labour[13]. Patients deemed to have failed induction were managed by local protocol of 4 doses of 4 hourly 50ug misoprostol vaginally after a rest period of 24 hours or offered caesarean section according to patients wish. The indications for Caesarean section

(CS) were maternal request after 24 hours of induction or an obstetric indication. Any complication encountered during the induction procedure was recorded and managed accordingly.

Main Outcome Measures- The primary outcomes used to evaluate efficacy were the induction-to-delivery interval in women who delivered vaginally and successful induction in 24 hours. The primary measures used to evaluate safety were the incidence of uterine hyperstimulation with fetal heart rate (FHR) abnormalities and neonatal outcome of low Apgar score (6 or less at 5 minutes).

Secondary outcomes related to measures of efficacy and safety included requirement for oxytocin and the rate of CS.

Ethical and Legal Considerations: Ethical clearance for the study was obtained from The Institutional Review Board of the Military Hospital (Appendix III). A written informed consent was obtained from all patients after a general description of the study and the essence of their participation was verbally explained to them in a language they understood.

Data Analysis: The data was collected and entered into epi-data for analysis. Statistical analysis included calculation of mean differences with 95% confidence interval for continuous data using STATA 12. The unpaired t-test was used to test the mean difference for induction-to-delivery times and all continuous variables, while chi-square test was used in cases of difference of absolute numbers. All statistical tests were evaluated at the 0.05 significance level.

Results

One hundred and forty eight participants were recruited for the trial. Of these, 74 received misoprostol orally and 74 vaginally. None of the women recruited requested to be withdrawn after enrolment and there were no cases of post-randomisation protocol violations. Of the 74 participants that received vaginal misoprostol route, 68 were analysed for the primary endpoint. Similarly, 66 were analysed for the primary endpoint out of the 74 participants that received the oral misoprostol.

This is because 6 and 8 persons respectively for vaginal and oral route had failed induction.

Some demographic characteristics and primary induction outcomes are presented in Table 1 while table 2 shows secondary induction outcomes and the chi-square test.

From Table 1, there were no significant differences in maternal demographic characteristics in terms of age and parity. It was however observed that the mean birth weight was significantly more for the oral route compared to the vaginal route when the two arms were compared. ($p = 0.001$).

From the same table, the mean induction to delivery interval was shorter in the vaginal misoprostol group (12.9hrs vs 14.3hrs; mean difference -1.42). This was however not statistically significant ($p = 0.24$).

The shorter duration of vaginal misoprostol, however, was held true when nulliparous and multiparous women were analysed separately. Whereas the nulliparous women had significantly shorter mean induction to delivery interval in the vaginal misoprostol group (13.4hrs vs 17.9hrs; mean difference -4.5 and $p = 0.01$); the mean induction to delivery interval in the vaginal misoprostol group was marginally longer for parous women (12.5hrs vs 11.4hrs; mean difference 1.1216). This was however not statistically significant ($p = 0.46$).

From Table 2, it was observed that achieving vaginal delivery within 24 hours of induction in the oral group was less (6.8% vs. 6.1 %, $p = 0.81$), the number of women who received oxytocin augmentation was higher in the oral group (24.2% vs.17.4%, $p = 0.11$) and failed induction was also observed to be high in the oral group (4.5% vs. 5.9%, $p = 0.53$). The differences did not however reach statistical significance in all these observations.

Uterine hyperstimulation without FHR changes was more frequent in women treated with vaginal misoprostol compared with the oral route (7.46% vs.2.99%, $p = 0.10$). It was observed again that, uterine hyperstimulation with FHR changes was more frequent in the vaginal group than those who received the oral misoprostol (4.5% vs.3.7%, $p = 0.53$). The difference in both findings were however not statistically significant.

Five women in the vaginal group (3.7%) delivered by emergency caesarean sections compared with six (4.5%) in the oral. This difference was again not statistically significant. In the women who had caesarean sections, fetal distress and failure to progress were the indications; fetal distress was suspected on the basis of worrying fetal heart tracings alone or with the presence of meconium.

The Apgar scores <7 at 5 minutes and NICU admission were similar represented as 2 (1.49%) infants in the oral group compared with 4 (2.99%) infants in the vaginal group.

Table 1: Some Demographic Characteristics and Primary Induction Outcomes

Characteristics	Vaginal Misoprostol N=74	Oral Misoprostol N=74	Mean Diff, T-Test	*P Value*
Maternal age(years)	29.7[4.5]	30.0[3.5]	0.38	0.57
Mean Birth weight (grams)	3101.5 [414.0]	3343.8 [442.7]	-242.2	0.001
Parity Nulliparous Multiparous	 38 **{**51.4%**}** 36 **{**48.6%**}**	 35 **{**47.3%**}** 39 **{**52.7%**}**	 0.243	 0.622
Induction-to-delivery (*hr*)	12.91 [6.31]	14.33 [7.00]	-1.42	0.24
Induction-to-delivery (*hr*) Nulliparous Multiparous	 13.4 [5.99] 12.5 [6.61]	 17.96 [6.58] 11.38 [5.90]	 -4.531 1.121	 0.01 0.46

Table 2: Secondary Induction Outcomes and The Chi-Square Test.

Characteristics	Vaginal Misoprostol	Oral Misoprostol	Chi-Square value	*P- Value*
Vaginal delivery not achieved in <24 h	9(6.08%)	10(6.76%)	0.0604	0.81
Failed induction	6 (4.48%)	8 (5.97%)	0.3893	0.53
Oxytocin augmentation	23 (17.42%)	32 (24.24%)	2.5247	0.11
Uterine hyperstimulation without FHR changes	10 (7.46%)	4 (2.99%)	2.6755	0.10
Uterine hyperstimulation with FHR changes	6 (4.48%)	5(3.73%)	0.3893	0.53
Caesarean section	5(3.73%)	6(4.48%)	0.1343	0.71
Apgar score <7 at 5 min	4 (2.99%)	2 (1.49%)	0.6370	0.42
NICU admission required	4 (2.99%)	2 (1.49%)	0.6370	0.42

There was no statistical difference between oral and vaginal misoprostol with respect to 5-minute Apgar scores and NICU admissions (p = 0.42). There were no perinatal deaths in both arms.

Discussion

There is increasing evidence that misoprostol, administered either vaginally or orally, is as effective as conventional methods for induction of labour at term[4,6,8]. Interest in oral misoprostol for cervical ripening and labour induction is also growing day by day[7,9–11]. This study compared oral and vaginal misoprostol in well homogenized groups where all of the women were with intact membranes, had Bishop's score <6 and were at more than forty weeks' gestation with no antenatal complications. The rationale was to identify efficacy and safety of oral misoprostol regimen compared with intravaginal regimen.

The results of this study showed that in equivalent doses, the vaginal route of administration of misoprostol, although not statistically significant, resulted in a shorter induction to delivery interval, and more women were delivered with fewer doses of vaginal misoprostol within 24 hours of the induction with less need for oxytocin. This may be because, vaginal misoprostol is steadily absorbed and slowly eliminated from the body making it available to act for a longer time as compare to oral, resulting in rapid progression of labour and leading to greater number of women delivering within 24 h of induction[14]. The findings agreed with different systematic reviews[7,15] which showed that both oral and vaginal misoprostol were similar with regard to the priority outcomes including induction to delivery time.

The shorter duration of vaginal misoprostol, however, was held true when nulliparous and multiparous women were analysed separately where the difference was statistically significant (13.4hrs vs. 17.9hrs; mean difference -4.53, p-value <0.05) for the nulliparous participants. In other previous studies,[5,16] 50µg of oral misoprostol given every 4 hours was associated with longer intervals to delivery compared with vaginal misoprostol. This further indicates the efficacy of the vaginal administration especially for nulliparous women.

The finding however contrasted that of Kambhampati K. et al.,[17] where the oral group, though not statistically different, had a shorter induction to delivery interval of 12.92 hours as compared to 14.04 hours in vaginal group. The reason for the disparity may be because that study compared 50µg of oral misoprostol versus 25µg of intravaginal misoprostol whereas this study used 50µg of misoprostol for both routes.

In this study, vaginal misoprostol was associated with a less need for oxytocin augmentation (17.4% vs. 24.2%, p = 0.11), reduced risk of not achieving vaginal birth within 24 hours of labour induction (6.1% vs. 6.8%, p = 0.81) and less failed induction rate (4.5% vs. 5.9%, p = 0.53). All these differences between the two groups were however not statistically significant.

These results were consistent with different systematic review,[7] which showed that both oral and vaginal misoprostol were similar with regard to these priority outcomes. It however contrasted with that of Kambhampati K. et al.,[17] where the oral group showed a tendency of less need of oxytocin augmentation, less failed induction and a reduced risk of not achieving vaginal birth within 24 hours of labour induction. Kambhampati K. et al. however compared 50µg of oral misoprostol and 25µg of intravaginal misoprostol whereas this study used 50µg of misoprostol for both routes.

Although vaginal misoprostol has been shown to be effective compared with other traditional methods of labour induction in terms of a shorter induction delivery interval and less oxytocin need,[4,8] there is however an increasing concern about the higher incidence of uterine tachysystole and hyperstimulation[4,7]. This fear of uterine tachysystole and hyperstimulation is dose related; higher doses result in greater uterine stimulation but shorter induction delivery interval[18]. The relatively long half-life of misoprostol and its metabolites in maternal serum after vaginal administration might account for the tachysystole in these women than those who received the medication orally[14].

In this study, uterine tachysystole or hypertonus abnormality was more frequent in women treated with vaginal misoprostol compared with the oral route (7.5% vs.3.0%). It was observed again that uterine hyperstimulation with FHR changes uterine (hyperstimulation syndrome) was more frequent in the vaginal group than those who received the oral misoprostol (4.5% vs.3.7%). The difference in both findings were however not statistically significant. Oxytocin, which has been considered safer than misoprostol, is also not devoid of uterine abnormalities incidence being 19.2%[19].

Other studies have also reported higher rates of non-reassuring fetal heart tracings and uterine hyperstimulation associated with vaginal misoprostol compared with oral misoprostol[16,19]. Toppazada *et al*[19] noted an increase in abnormal fetal heart patterns and uterine hyperstimulation with the vaginal route. Bennett *et al*[16] also found oral misoprostol in a dose of 50µg to be less effective when compared with an equivalent dose vaginally, but noticed a trend of increasing hyperstimulation in the vaginal group.

The relationship between misoprostol use and caesarean section is a complex one. The trend in previous randomized trials has been an increase in caesarean sections for fetal heart rate abnormality and a reduction for poor progress of labour. Despite high incidence of uterine contractile abnormalities with vaginal route, there was no significant difference between oral and vaginal misoprostol with respect to emergency caesarean sections. It is important to note that, there were more emergency caesarean sections in the oral group (4.5% vs. 3.7%). The indications for emergency caesarean section included non-reassuring fetal heart tracings such as the presence of late decelerations or prolonged bradycardia and failure of labour to progress. This is consistent with Shetty et al[20]. (24.6 vs. 22.8%) and How et al[18]. (33.0 Vs. 17.0%).

The treatment in this study was not blinded. Under the circumstance, there could be a real possibility of bias in the clinical decision-making. A clinician who is anxious about possible risks of the new treatment may be more likely to intervene.

Misoprostol whether by vaginal and oral route do not adversely affect neonatal outcome despite increases in uterine hyperstimulation[18,20]. A Cochrane review that compared oral and vaginal misoprostol suggested that the oral route was associated with a reduction in Apgar score of less than seven at five minutes[7].

Similarly, in this study, although not significant, there was higher number of infants in the vaginal misoprostol group with Apgar scores less than 7 at 5 minute. Four infants (3.0%) in the vaginal group compared with two infants (1.5%) in the oral group. These infants, admitted to NICU, required positive pressure ventilation at delivery but they had no clinical sequelae of asphyxia. They required no investigations and at the time of writing, none has had any further admissions to hospital. This finding concur with a Cochrane review[7] where there was a lower risk of Apgar score being less than seven at 5 minutes of life for the oral group.

Conclusions

The results of this study suggested that, in equivalent doses, vaginal misoprostol was associated with shorter induction-to-delivery times than oral misoprostol. Both maternal and neonatal safety outcome were comparable in both groups.

The results supported the use of 50µg doses of oral misoprostol for pre-induction cervical ripening and labour initiation because it had almost same efficacy and safety as its vaginal analogue. Oral route approach offered convenience and ease of administration.

Recommendation

Oral or vaginal misoprostol for cervical ripening and labour initiation in doses of 50µg four hourly is recommended. However more randomized controlled trials, preferably double-blinded, with a larger sample size is needed to categorically determine the right oral regimen and intervals that combines safety with efficacy.

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EXPERIENCE WITH PALLIATIVE PROCEDURES FOR CONGENITAL CYANOTIC HEART DISEASES IN GHANA: A 20-YEAR REVIEW

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Abstract

Background:Currently, in the management of congenital cyanotic heart diseases with favourable anatomy, primary correction is the preferred choice. But palliative procedures have still maintained an important role in resource-poor regions of the world. We sought to analyze our institutional results for such palliation over a 20-year period. The purpose of the study was to provide information that would guide both practitioners and referring doctors on the future management of congenital cyanotic heart diseases, and also to provide data for comparative studies in the sub region in the future.

Patients and Methods: A retrospective study was carried out in the National Cardiothoracic Centre involving all patients who had palliative procedures for congenital cyanotic heart diseases from January 1992 to December 2011.

Results: There were 264 patients, 59% males and 41% females. The case load increased from 2 cases per year in the first year to 34 in the last year of the study. The age range was 4 months – 42 years, with a mean of 7.1 ± 6.9 years. Tetralogy of Fallot comprised 257 (97.4%) of the cases, tricuspid atresia 4 (1.5%), and double outlet right ventricle 3 (1.1%). The modified Blalock-Taussig shunt (MBTS) was performed in 262 (92.2%), and the Waterston shunt in 2 (0.8%) of the cases. The overall complication rate was 11.8%, comprising shunt occlusion 7.6%, bleeding requiring re-exploration 0.8% and early mortality of 3.4%.

Conclusion: The modified Blalock-Taussig shunt provided good palliation for congenital cyanotic heart diseases in this environment. We consider it a suitable management alternative when financial and logistic constraints delay primary repair in resource-poor settings.

Key Words: Congenital cyanotic heart diseases, Palliative procedures, Good outcome, Ghana

Introduction

Children with congenital cyanotic heart diseases faced a very bleak future until Alfred Blalock performed the first subclavian artery-to-pulmonary artery anastomosis in 1944 on a severely cyanosed 15-month old girl[1]. The procedure, in its classical form, involved anastomosis of the divided subclavian artery to the ipsilateral branch pulmonary artery in end-to-side fashion. The Blalock-Taussig shunt (BTS), as it became known, immediately became popular due to its several advantages. Subsequently, many other palliative shunts were developed by other investigators.

The Pott's shunt involves an anastomosis between the descending thoracic aorta and the left pulmonary artery[1]. The Waterston shunt involves an anastomosis between the ascending aorta and the right pulmonary artery[1]. The Davidson shunt involves an anastomosis between the ascending aorta and the main pulmonary artery[1].And the Glenn shunt involves an anastomosis between the superior vena cava and the right pulmonary artery[1]. The BTS was subsequently modified by de Leval in 1981[2], by interposing a polytetrafluoroethylene (PTFE) graft between the subclavian artery and the ipsilateral pulmonary artery. This avoided division of the subclavian artery and its attendant complications. The modified Blalock-Taussig shunt (MBTS) of de Leval, has since been the most frequently performed palliative procedure for congenital cyanotic heart disease[1].

The current trend in the management of cyanotic congenital heart disease with a favorable anatomy is early primary repair. However, in resource-poor regions of the world, this strategy is not always feasible due to logistic and funding constraints. Palliative procedures have thus maintained their role in the management of such patients. The rationale for a palliative shunt is to increase pulmonary blood flow for improved oxygenation. The result is amelioration of cyanosis and its associated complications. Accompanying such improvement is a significant increase in effort tolerance, and over time, growth in size of the pulmonary vasculature occurs. The changes following palliation are advantageous for the outcome of definitive repair.

The aim of this study is to analyze the outcome of palliation for congenital cyanotic heart diseases in our institution over a 20-year period. The importance of this study is that it will guide us and other institutions in the sub region in the subsequent management of

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patients with congenital cyanotic heart diseases. It will also provide data for comparative studies in the future.

Patients and Methods

All patients who had palliative procedures for cyanotic congenital heart disease in the National Cardiothoracic Centre from January 1992 to December 2011 were entered into a retrospective study. The data were obtained from our institutional records database and the patients' case notes. The data included the history, physical examination, investigations, treatments and complications. The analysis for means, frequencies, and standard deviations was performed using Microsoft excel 2010 statistics software, Windows 7.

Results

There were 264 patients, with 156 (59%) of them being males while 108 (41%) were females, with a male to female ratio of 1.4: 1. The case load increased from 2 cases in the first year to 34 in the last year of the study. The age range was 4 months – 42 years, with a mean of 7.1 ± 6.9 years, and median of 5 years. The majority 130 (49.2%) of the patients were 0 – 4 years old. The age distribution is shown in Fig. 1

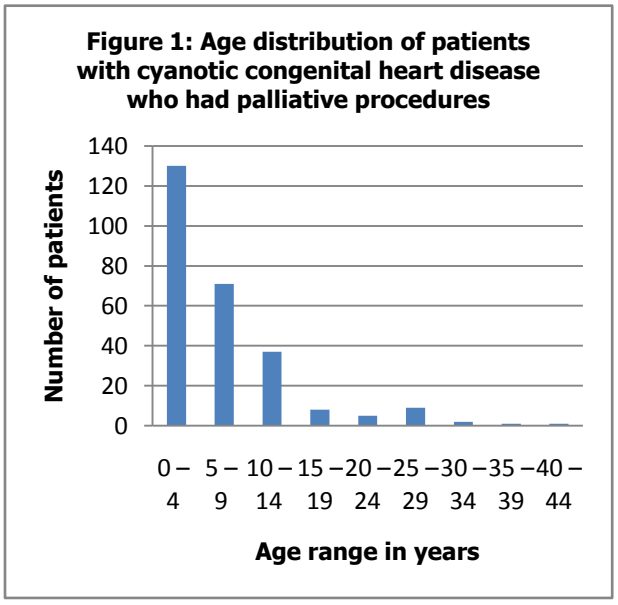

Fig. 1: Age distribution of the patients

In all, 257 (97.4%) of the cases were diagnosed with tetralogy of Fallot. The rest were tricuspid atresia in 4 (1.5%) patients and double-outlet right ventricle in 3 (1.1%). Two hundred and sixty-two (99.2%) MBTS were performed as against 2 (0.8%) Waterston shunts. Twenty-two (8.4%) of the 262 MBTS were performed on the left side; the rest were right-sided. The overall complication rate was 11.8%, comprising shunt occlusion in 7.6%, bleeding requiring re-exploration in 0.8% and early mortality of 3.4%. The constructed shunts remained patent for 2.3 ± 1.9 years (1week – 5.5 years, median 1.8 years).

Discussion

Two patients underwent palliation in the first year of the study, and 34 in the last year. This significant increment was due to the increase in the population of the country and referrals from other countries in West Africa. But more so, from increased referrals due to greater caretaker awareness, increased funding sources, better health education among the population, and other factors. The male to female ratio was 1.4: 1. The youngest patient was 4 months old and the oldest was 42 years. Both of them had tetralogy of Fallot. The modal age group was 0 – 4 years. This was when the disease conditions were most symptomatic, and also when the parents could afford the cost of the procedure. Majority (97%) of the cases were tetralogy of Fallot, the reason being that tetralogy of Fallot is the commonest cyanotic congenital heart disease[3,4]. Almost all the shunts (99.2%) were Modified Blalock-Taussig shunts. This is because of the advantages of the Blalock-Taussig shunt over the others, notably being the suitability of the blood flow through the shunt, which is determined by the subclavian artery blood flow and the less tendency to develop congestive cardiac failure, as opposed to the Potts and Waterston shunts. These and other features made the BTS the most effective palliative procedure[5]. Even a 60-year survival of the BTS had been reported.[6] Only two Waterston shunts were performed. These were during the earlier part of the study. The shift towards the BTS is in accordance with its better outcome[5].

The MBTS was offered to the patients with frequent hypercyanotic attacks, high haematocrits and narrow branch pulmonary arteries. The procedure was performed through a thoracotomy, entering the chest through the fourth intercostal space, retracting the lung inferiorly, and dissecting out the subclavian artery and the branch pulmonary artery. A PTFE graft about the size of the subclavian artery was chosen and interposed between the subclavian and branch pulmonary arteries. Most of the MBTS (91.6%) were performed on the right. This is due to the relative ease of dissection and takedown of the MBTS on the side contralateral to the aortic arch at the subsequent intra-cardiac repair. When preoperatively, a right sided aortic arch was diagnosed, the shunt was performed on the left. Re-do shunts were also performed on the left.

The overall complication rate was 11.8%, comprising shunt occlusion in 7.6%, early mortality in 3.4% and bleeding requiring re-exploration in 0.8%. The mean duration of the shunt occlusion was 2.3 ± 1.9 years. The causes of shunt occlusion are usually considered as early (within 30 days) or late (after 30 days). The early occlusion can be due to patient factors, graft factors or surgical technique. An example of a patient factor is a high haematocrit leading to a high viscosity which then leads to early shunt thrombosis.

This problem is solved by venesection intra-operatively. Graft factors can be due to a soft graft that collapses easily, a long graft that kinks, or a relatively small graft that thrombosis easily. Good surgical technique includes choosing the appropriate vessel, and also careful construction of the anastomosis. The late occlusion factor is a patient factor, which is due to the child outgrowing the shunt and thereby rendering the flow relatively insufficient, resulting in a gradual increase in the haematocrit, and finally leading to shunt thrombosis. The mean occlusion duration of 2.3 years reinforces the opinion that total intra-cardiac repair after an MBTS should be less than 2 years after the shunt (that is, before the shunt gets occluded). Re-do MBTS were done for the blocked shunts. Perigraft seroma has not been observed in this study, though some other studies have reported the complication[7,8]. The early mortality of 3.4% is comparable to that of Singh et al, of 4.5%[9]. The causes of our mortality were desaturation and deterioration after the procedure in 1.9%, clotted haemothorax in 0.8% and pleural effusion after discharge from hospital in 0.8%. The long term complications of the MBTS could not be assessed reliably in this study because of the limitations of the study.

Limitations of the study: The medium and long term complications of the study could not be estimated reliably because some of the patients' case notes could not be assessed. This problem is currently being solved by improved record keeping, and also by computerizing the data in the case notes.

Conclusion

The modified Blalock-Taussig shunt provided good palliation for cyanotic congenital heart disease. We consider it a suitable management alternative when financial and logistic constraints delay primary repair in resource-poor settings.

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EXTERNAL STRUCTURAL CONGENITAL ANOMALIES DIAGNOSED AT BIRTH IN TAMALE TEACHING HOSPITAL

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Abstract

***Background*:**In the year 2013, about 276,000 of the 2.71 million neonatal deaths were directly attributable to congenital anomalies of which an estimated 95%, occurred in low and middle-income countries.

***Materials and method*:** This study was part of surveillance on external structural congenital anomalies conducted in the Tamale teaching hospital from 1st January 2011 to 31st December 2015. Aggregate data on maternal characteristics and outcome of delivery were collected from the records in the antenatal clinics, labour and delivery room, and midwifery monthly returns.

***Results*:** A total of 35,383 live births were recorded in the study. Overall, 161 external congenital anomalies were recorded over the period. The overall incidence of external congenital anomalies over the five-year period was 455 per 100,000 live births. The gastrointestinal (GIT) system accounted for (77) 47.8%, Central nervous system (65) 40.4%, Major musculoskeletal (9) 5.6%, Genitourinary system about (2) 1.2%, Multi-systemic and syndromes accounted for (8) 5.0% of all external structural congenital anomalies. The incidence of specific congenital anomalies found during the study period were as follows; Spina bifida 104.6 per 100,000 live births, Exomphalus/ omphalocele 84.8 per 100,000 live births and Anencephaly 5.7 per 100,000 live births. The incidence of Oro-facial cleft, Hydrocephalus and Imperforate anus were 73.5, 48.0 and 39.6 per 100,000 live births respectively.

***Conclusion*:** External structural congenital anomalies rate in the northern sector of Ghana is unacceptably high. Trend analysis has demonstrated the steady decline in neural tube defects

Key Words: Congenital anomaly, Spina bifida, Exomphalus, Anencephaly, Oro-facial cleft

Introduction

Congenital anomalies are associated with significant morbidity and mortality. In the year 2013, about 276,000 of the 2.71 million neonatal deaths were directly attributable to congenital anomalies[1]. Also, congenital anomalies are associated with reduced quality of life, social stigma and the potential of endangering family resources[2]**.** Globally, congenital anomalies accounts for 49.1- 69.5 million disability adjusted Life-years (DALY) of which sub-Saharan Africa contributes over 80%[3,4]. It is estimated that, 94% of all congenital anomalies occurs in low and middle-income countries[2].

Congenital anomalies are critical global health priorities requiring urgent measures to address the unacceptably high incidence in developing countries[5]. It is estimated that the incidence of congenital anomalies is about 10 times higher in Africa compared to developed countries. Fortunately, most of congenital anomalies are preventable[6,7].

Congenital anomalies has been defined to include morphological, biochemical or physiological defects present at birth, which could be diagnosed prenatally, at birth or later in life[8]. It is broadly classified into structural and functional anomalies. Structural anomalies are further described as external or internal. It is believed that the incidence of birth defects were being underestimated in the low and middle income countries due to lack of equipment for the diagnosis of some congenital anomalies particularly the internal and functional anomalies[9,10]. Most studies about congenital anomalies in developing countries focused on external birth defects because of ease in diagnosis as opposed to the functional and internal birth defects that may require equipment lacking in developing countries.

It is absolutely essential to ensure that couples have healthy anomaly-free children so as to prevent the consequence of birth defects on the child, family and the community. To this end, many developed countries have programs, support and consensus statement aimed at addressing the issue of congenital anomalies[11]. However in many developing countries little is done beyond folic acid and other multivitamin supplementations. Data on the incidence and trends in congenital anomalies necessary to inform program

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implementation is significantly lacking. The aim of this study was to obtain the baseline incidence of congenital anomalies and also provide the needed information for surveillance.

Methods

Study settings and recruitment

This study was conducted in the Tamale teaching hospital. It used data from 1st January 2011 to 31st December 2015. The Tamale teaching hospital is the only teaching hospital located in the northern sector of Ghana. It has a walk-in delivery service for expectant women in the Tamale Metropolis but also accepts referrals from the district hospitals within its catchment area. All pregnant women presenting for delivery services were eligible for enrolment in the study. There were about 6400 to 7000 deliveries per annum during the study period. Aggregate data on maternal characteristics and outcome of delivery were collected from the records in the antenatal clinics, labour and delivery room, and midwifery monthly returns.

Physical examinations and diagnosis

All babies born in the facility were physically examined first by trained midwives or medical doctor, an obstetrician or a pediatrician whenever necessary to diagnose any congenital anomaly present. However, the obstetrician made the final ultimate diagnosis**.** Congenital anomalies found during the study period included Spina bifida, Exomphalus/ omphalocele, Anencephaly, Oro-facial cleft, Hydrocephalus, Imperforate anus and Talipes Equinovarus. Others included; Meningocele, Meningoencephalocele, Down syndrome, Gastrochesis, Siamin twins and Encephalocele. External Structural anomalies were studied because they are relatively easy to diagnose without the requirement of sophisticated investigative tools to attain a fairly accurate diagnosis. This provides a fairly accurate measure of incidence of the anomalies of interest in this baseline study. A congenital anomaly case is one diagnosed as having any of the above anomalies. A baby having multiple congenital defects that fits a syndrome is diagnosed as such. Where as those not fitting any particular defect/syndrome but with multiple major external structural anomalies were classified as others/ multiple defects. The study did not include congenital anomalies found in aborted fetus and maternal deaths with undelivered fetuses.

Data collection and analysis

Data were collected and stored by trained public health nurses and midwives. Data were first captured into registers and analyzed monthly to generate monthly statistics. This study puts together all the monthly data for this analysis.

Data were entered and managed using EpiData 3.1 (Atlanta, US). Data analysis was carried out using STATA version 11 (College Station, Texas) and Microsoft Excel. Maternal age was categorized a priori using a five year interval, 10 – 14, 15 -19, 20 – 24, 25 – 29, 30 -34 and 35 and above. Tabulations were carried out to obtain the characteristics of mother and baby. The Incidence per 100,000 live births was calculated by dividing the number of anomalies by total live births multiplied by 100,000. Anomalies were later grouped under their respective systems to generate the incidence by systems. Line graphs were generated for all the anomalies individually and then as total anomalies. However, only graphs showing significant trends were reported. The study used the proportion of women completing second dose of intermittent prophylactic therapy (IPT) for malaria as a proxy measure of the regular intake of folic acid. Folic acid and IPT were part of routine medications given at antenatal clinic in Ghana. First dose of IPT was served at quickening and the second dose after a month of quickening by directly observed therapy. It remains a challenge to know which of the women actually took the dispensed folic acids. Hence our decision to use the second dose of directly observed therapy for IPT as proxy measure of folic acid intake during pregnancy. It is assumed that a client that took at least two doses of the IPT is more likely to have taken the routine antenatal clinic medications including folic acid in previous pregnancies and the index pregnancy.

Results

Maternal and baby characteristics at delivery

A total of 37,303 births (live births plus still births) were recorded in the study. Total live births amounted to 35,383. The peak age group of mothers at time of delivery was within 25 to 29 years accounting for 31.1% of all deliveries. Vaginal delivery was the preferred mode of delivery accounting for 73.1% of all deliveries over the five-year period. Caesarean section was the method of delivery in 25.8% of the pregnant women while vacuum accounted for 1%. With regards to the sex of the baby, females accounted for 53.7% while males accounted for 45.7%. About 95.1% of all the deliveries were singleton deliveries with twin delivery accounting for 4.9%. Stillbirths constituted 5.2% of all births. Complete details of maternal and baby characteristics at delivery is shown table 1 below.

Incidence of selected congenital anomalies

Overall, 161 external congenital anomalies were recorded over the period. This overall incidence of external congenital anomalies over the five-year period was 455 per 100,000 live births. Spina bifida was the commonest congenital anomaly accounting for 23.0 % of all external structural anomalies. The incidence of spina bifida varied over the study period, however, the five-year incidence of spina bifida was 104.6 per 100,000 live births. Exomphalus was second commonest with a cumulative incidence of 84.8 per 100,000 live births. The incidence of Oro-facial cleft, hydrocephalus and imperforate anus were 73.5, 48.0 and 39.6 per 100,000 live births respectively. The

relatively rare congenital anomalies in our environment include siamin twin and Encephalocele, which recorded a cumulative incidence of 2.8 per 100,000 live births each. Incidences of other major structural anomalies at birth are included in table 2 below.

The gastrointestinal (GIT) system accounted for most of the anomalies representing (77) 47.8% of all external structural congenital anomalies, an incidence of 206 per 100,000 live births.

Table 1: Characteristics at delivery

Maternal and Baby Characteristics	Frequency	Proportion (%)
Mother characteristics		
Age of mother at Delivery (years)		
10 – 14	3	0.0(≈0.01)
15 – 19	1,837	5.1
20 – 24	8,094	22.6
25 – 29	11,134	31.1
30 – 34	9,617	26.8
35 and above	5,148	14.4
Mother completing two doses of Intermittent Preventive Therapy (IPT) for malaria		
Completed two IPT doses	31,731	89.4
Did not complete two IPT doses	3,761	10.6
Mode of Delivery		
Vaginal	25,958	73.1
Caesarean Section	9,168	25.8
Vacuum	366	1.0
Mother's Anti-Retroviral (ARV) medications history		
Taking ARV	102	0.3
Not taking ARV	35,390	99.7
Baby characteristics		
Sex of Baby		
Male	16,193	45.7
Female	19,015	53.7
Outcome of Delivery		
Singleton	33,414	94.9
Twins	1,739	4.9
Triplets	40	0.1
Quadruplets	1	0.0(≈0.003)
Births		
Live births	35383	94.9
Still births	1920	5.1

Central nervous system followed with (65) 40.4% representing 174 per 100,000 live births.

Major musculoskeletal system anomalies accounted for (9) 5.6%, 25 per 100,000 live births. Genitourinary system recorded the least anomaly rate with a five-year incidence of about (2) 1.2%, 6 anomalies per 100,000 live births. Multi-systemic and syndromes accounted for (8) 5.0% of all anomalies and recorded a cumulative incidence of 21.5 per 100,000 live births.

Table 2: Incidence of major structural anomalies at birth

	Congenital anomaly	No.	%	Incidence per 100,000 live Births
1	Spina bifida	37	23.0	104.6
2	Exomphalus/ omphalocele	30	18.6	84.8
3	Oro-facial cleft	26	16.1	73.5
4	Hydrocephalus	17	10.6	48.0
5	Imperforate anus	14	8.7	39.6
6	TalipesEquinovarus	9	5.6	25.4
7	Meningocele	6	3.7	17.0
8	Down syndrome	4	2.5	11.3
9	Gastrochisis	3	1.9	8.5
10	Anencephaly	2	1.2	5.7
11	Meningoencephalocele	2	1.2	5.7
12	Achondroplasia	2	1.2	5.7
13	Imperforate urethra	2	1.2	5.7
14	Siamin twins	1	0.6	2.8
15	Encephalocele	1	0.6	2.8
16	Others	5	3.1	14.1
	Total	**161**	**100.0**	**472.0**

*Total births – live births plus stillbirths

Trend analysis

Total structural anomaly rate has been sinusoidal over the study period as found in Fig 1.

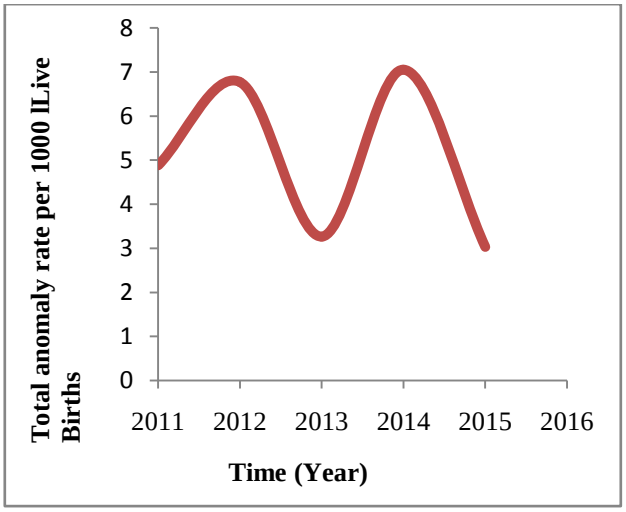

Fig 1: Trend in total anomalies at birth rate per 1000 live births

However, neural tube rate per 1000 live births continue to reduce as shown in Fig 2.

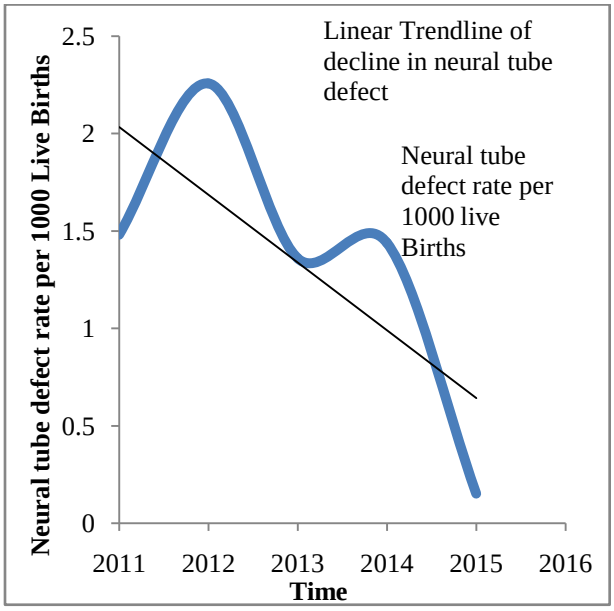

Fig 2: Trend in Neural Tube Defect Rate Per 1000 Live Births

A trend line showed a steady decline. This study used the proportion of women completing second dose of intermittent preventive therapy for malaria (IPT2) as a proxy measure for routine antenatal clinic (ANC) attendance and regular intake of the routine antenatal medications served at ANC including folic acid. Fig 3, demonstrated that with increase in folic acid supplementation there was a decrease in neural tube defects in our environment.

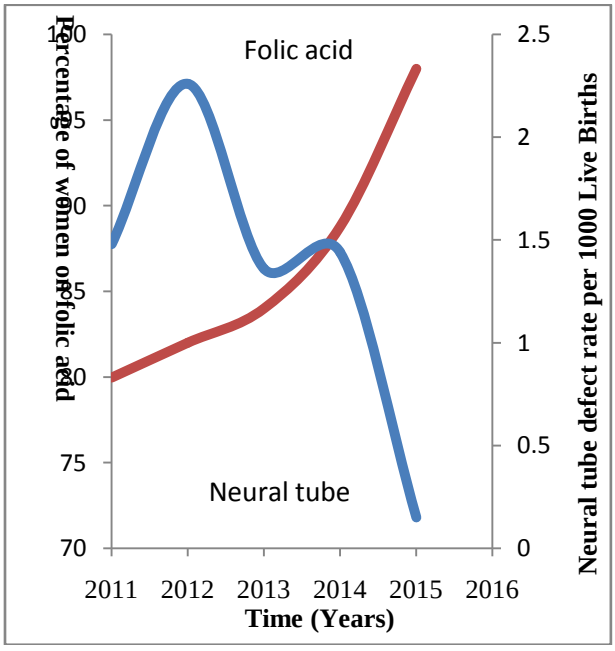

Fig 3: Trend in neural tube defect rate per 1000 live births versus percentage of women completing second dose of intermittent preventive therapy for malaria used as a proxy measure of folic acid intake during pregnancy

Exomphalus/ omphalocele rate has been sporadic over the period of study. However, between March 2013 and May 2015, there was a surge in the rate of exomphalus/omphalocele. Fig 4 demonstrates this trend.

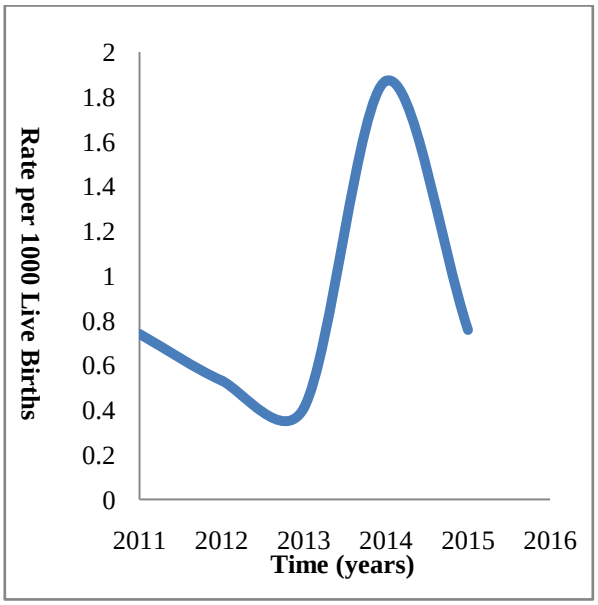

Fig 4: Exomphalus rate per 1000 live births versus time in years

Discussion

Main findings

Spina bifida was the commonest congenital anomaly found in this study. The annual rate decreased steadily over the five-year period. Conclusive evidence from several randomized controlled trials emphasized the beneficial role of preconception folic acid supplementation in the prevention of neural tube defects[12]. There is a demonstrated risk reduction in spina bifida through folic acid supplementation[13,14,15]. The general rule in prevention of neural tube defects is; two or three month of preconception folic acid supplementation and up to three month of antenatal folic acid supplementation[16]. Most pregnancies in Africa are unplanned. As such, some authors rank food fortification as the best approach to prevent neural tube defects[17,18]. In Ghana however, data on pre-conception folic acid supplementation as well as food fortification is scarce. Available data on folic acid supplementation is that of antenatal clinic folic acid supplementation program. Antenatal Folic acid supplementation program in Ghana is near universal for pregnant women attending antenatal clinic. Antenatal clinic attendance has progressively risen over the years with over 97% of women attending antenatal clinic[19]. This may contribute to the reduction in spina bifida over the study period. Also, the national health insurance

operates a free maternal health services for all pregnant women. This we believe had increased the access to folic acid and other supplementation for pregnant women who otherwise could not buy the supplements. There is the need for further studies in our environment to ascertain the prevalence of preconception folic acid supplementation among women in the reproductive age group.

Gastrointestinal system (GIT) anomalies were most common in this study. Exomphalus/ omphalocele were the most common GIT anomalies recorded. The literature on omphalocele suggests a generally stable pattern[20]. However, this study found, contrary to a generally stable pattern, a surge in the incidence of Exomphalus with a pattern suggestive of a common source exposure outbreak. Exomphalus also known as omphalocele is a defect in muscle development in-utero and has been strongly linked to chromosomal abnormality[21,22]. The curve obtained in this study suggests some environmental exposure, which might have precipitated the chromosomal changes. Some studies have found the association between congenital anomalies and ambient air pollution[23]. Another gastrointestinal defect of high incidence was cleft lip/palate. Oro-facial clefts remain a relatively common birth defect worldwide[24]. In Ghana, there are programs aimed at repair of clefts. However, little is done in its prevention. A study conducted in the United States found smoking to be associated with Oro-facial cleft. It was estimated that cessation of smoking in early pregnancy would prevent 430 Oro-facial cleft in the United States[25].

Application of the findings

The findings from the study with regards to the incidence of structural congenital anomalies have demonstrated a high incidence of some congenital anomalies in our environment. However, the success associated with the folic acid supplementation program should encourage practitioners to encourage women to strictly adhere to the folic acid supplementation guidelines. This study provides the baseline data for the establishment of surveillance on congenital anomalies in Tamale. This study also demonstrated a possible environmental exposure for the development of some congenital anomalies, which would require further studies into environmental exposures in our environment, which may be linked to congenital anomalies. The high incidence of congenital anomalies requires a more comprehensive approach at reducing the incidence that would include preconception prevention strategies, prenatal diagnosis and counseling, and post-natal interventions to reduce the incidence, morbidity and mortality associated with congenital anomalies.

Strengths and limitation of the study

Delivery information on large number of women and babies were included in this study. It also spanned a five-year period. The above reasons were likely to have estimated the true incidence of external structural congenital anomalies in our catchment area. However, congenital anomaly from pregnancies in which maternal mortality was recorded with fetus undelivered was not included in the study, which could underestimate the true incidence in our environment. Also the study included only women delivering in the hospital. This could underestimate the true incidence due to proportion of women in the northern region who prefer to deliver at home, with traditional birth attendants and private maternity homes. Nevertheless, health facility delivery in Ghana has been described as persistently high(26).

Conclusion

External structural congenital anomalies rate in the northern sector of Ghana is unacceptably high. Trend analysis has demonstrated the steady decline in neural tube defects over the five-year period, which is due to the success of folic acid supplementation program hereby strongly encouraged.

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STAB SUPRAPUBIC CATHETER INSERTION: INDICATIONS AND PERI-OPERATIVE COMPLICATIONS, A FOUR AND HALF YEAR REVIEW AT THE KORLE BU TEACHING HOSPITAL, ACCRA

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ABSTRACT

Background: Suprapubic catheter insertion is a common urological procedure, which is often considered to be simple and safe even in inexperienced hands. The objective of our study was to determine the peri-operative morbidity associated with Stab Suprapubic Catheter Insertion (SSPCI) (i.e. stab suprapubic cystostomy)

***Patients and Methods*:** A total of 429 patients who had suprapubic catheter insertion using the stab method (with trocar and sheath) at the Korle-Bu Teaching Hospital, Accra, between January 2010 and June 2014 were identified and their case notes reviewed to determine the peri-operative complication rate in relation to the categories of doctors who undertook the procedure.

Results: The commonest indication for a stab suprapubic catheter insertion was acute/chronic retention of urine secondary to benign prostatic hyperplasia (BPH). The overall complication rate was 3.5% with bowel perforation constituting 0.7% of the complications.

Conclusion:Stab suprapubic catheter insertion is a safe and effective bedside procedure for bladder drainage when urethral catheterization fails or is undesirable, and can be performed by all grades of surgeons/medical doctors, in selected patients. Complications associated with the procedure can be reduced to a minimum by strict attention to some technical details.

Key Words: *Urinary retention, Stab suprapubic catheter insertion, Complications, Reusable trocar and sheath, Surgeon grade*

Introduction

In the setting where a patient has urinary retention and yet urethral catheterization is either impossible or undesirable for the relief of the retention, suprapubic catheter insertion offers an effective alternative. Suprapubic catheter can be placed percutaneously either by means of a trocar and sheath after localization of the bladder[1,2] or by using the Seldinger technique using peel away sheath[3]. Relatively safer techniques may be by image guidance using ultrasonography (USG)[4] fluoroscopy[5] or cystoscopy guided percutaneous suprapubic catheterization[6].Suprapubic catheter insertion may also be achieved through a formal (open) cystostomy[7]. Although the stab percutaneous cystostomy is a safe procedure, it is not devoid of complications such as site bleeding, catheter blockade, malposition, dislodgment, or bowel injur[8,9].

We conducted an audit of all suprapubic catheter insertions performed at our unit using a reusable trocar and sheath. Our aim was to determine the safety of stab suprapubic catheter insertion in a relatively resource-poor environment where equipment for safer closed suprapubic catheter insertion is hardly available or affordable.

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Patients and Methods

A total of 429 patients who had SSPCI at the Urology Unit of the Korle-Bu Teaching Hospital, Accra, between January 2010 and June 2014 were identified and their case notes reviewed. All patients had a clinically distended bladder at the time of suprapubic catheter insertion. Ultra-sonography guidance was not used in any case. The following data was collected: patient's demographics, indication for the suprapubic catheter insertion, intra-operative difficulties or complications and the grade of the doctor/surgeon who performed the procedure.

The process and technique of SSPCI practiced at our unit is as follows: A written informed consent is obtained from each patient prior to undertaking the procedure. A commercially available, reusable cystostomy trocar and sheath made of stainless steel (Bard Medical 0488 26Fr) is used. The catheter to be inserted (which must be of a size that can pass through the sheath easily) is checked for patency and balloon function before use. Prophylactic antibiotic cover, usually with a single dose of gentamycin 160mg IV/IM is given if not contraindicated.

In the supine position, an incision (about 1cm) is made two finger breadths above the pubic symphysis after infiltrating the skin and underlying fascia with

10mls of 2% lignocaine with adrenaline solution. The needle is then advanced through the skin incision, aiming for the bladder and then urine is aspirated to confirm the position of the bladder. Thereafter the incision is deepened to the rectus sheath. The trocar and sheath is then advanced into the bladder with a gradual rotating motion of the hand, keeping a sustained pressure over it, the direction and depth being the same as determined by the needle, which is usually vertical or slightly towards the pelvis. Once the bladder is entered, the trocar is removed, holding behind the sheath inside the bladder. An assistant, who is ready with the appropriate Foley catheter (with attached urine bag) and a syringe prefilled with sterile water, inserts the catheter rapidly into the bladder through the sheath and inflates the balloon with 10mls of distilled/sterile water.

As soon as the balloon is inflated, the sheath is removed and the catheter pulled back to tuck it against the abdominal wall. Gentle traction is applied to the catheter for about five minutes to ensure complete hemostasis. A small sterile dressing is then placed around the catheter to cover any exposed part of the wound. Post operatively, a 7-day course of oral ciprofloxacin is prescribed for the patient. The patient is admitted for 24hours and monitored for bleeding, post obstructive diuresis and signs of peritonitis.

Results

Of the 429 cases studied there were 427 males (99.5%) and 2 females. Their average age was 56.4 years (range 11 to 105 years). The indications for the SSPCI are shown in Table 1. The commonest indication was bladder outlet obstruction secondary to BPH. Of the two women in the series one had urethral obstruction by infiltrating carcinoma of the cervix and the other a neurogenic bladder.

Overall, 15(3.5%) of the patients developed perioperative complications (Table 2). The commonest complication was urinary peritonitis with no associated bowel injury. Two patients sustained an additional perforation in the bladder in addition to the stab perforation, one in the dome of the bladder and the other in the posterior wall with no associated rectal injury. Small bowel perforation was the most serious complication found.

There were 2 misplaced catheters which resulted from the fact that although the tip of the catheter was in the bladder the balloon was found blown between the bladder and anterior abdominal wall

Table 3 shows the categories of doctors who undertook the procedure and the number of cases each group performed. Of the cases performed by junior residents, 24% (51 out of 212) had a consultant or senior resident supervision, as did all the cases performed by house officers. Overall, only 5.8% (25 out of 429) of cases were performed either by or under the supervision of consultant urologist.

Table 1. Indications for SSPCI

Indications	No. (%)
Bladder Outlet Obstruction – BPH	202 (47.08)
Urethral Stricture	141 (32.88)
Urethral injury	33 (7.69)
Bladder Outlet Obstruction – Prostate cancer	27 (6.29)
Neurogenic Bladder	8 (1.86)
Clot Retention	7 (1.63)
Bladder neck stenosis-post prostatectomy	4 (0.93)
Meatal Stenosis	4 (0.93)
Recurrent UTI/ Severe Urethritis	2 (0.47)
Carcinoma of the cervix	1 (0.23)

Table 2. Complications associated with SSPCI (No. Of procedures = 429)

Complications	Number (%)
Urinary Peritonitis	8 (1.86)
Perforation Dome of Bladder	1 (0.23)
Perforation Posterior wall of Bladder	1 (0.23)
Small Bowel Perforation	3 (0.70)
Misplaced Catheter	2 (0.47)
TOTAL	15 (3.49)

Table 3. Categories of doctors who undertook SSPCI and associated number of complications

Doctor/Surgeon Grade	No. of SSPCIs (%)	No. of Complications (%)
House Officer	71 (16.6)	4 (5.6)
Junior Resident	212 (49.4)	7 (3.3)
Senior Resident	125 (29.1)	3 (2.4)
Consultant	21 (4.9)	1 (4.7)
Total	429 (100)	15

Discussion

Suprapubic cystostomy, performed through a stab with a trocar and sheath, after localization of the bladder by palpation, is a well-established procedure for urinary drainage when urethral catheterization is not possible or is undesirable[1,2].It is usually a safe procedure when done in a well distended bladder. It is contraindicated in a non-distended bladder, a history that suggests bladder cancer, previous lower abdominal or pelvic surgery, pelvic cancer, with or without a history of irradiation and when there is placement of an orthopedic hardware for pelvic fracture repair.[9] When the procedure is performed
in a bladder that is not fully distended there is a risk of entry into the peritoneal cavity as the latter with its

contents may lie between the anterior abdominal wall and the bladder. To prevent this complication, we confirm that the bladder is fully distended by palpation and aspiration of urine percutaneously with a syringe and needle before the stab procedure. In our practice patients with any of the above contraindications were managed with an open suprapubic cystostomy.

The commonest indication for a stab cystostomy in our series was bladder outlet obstruction secondary to BPH, after failure of urethral catheterization. Subsequent urethral evaluation (using retrograde urethrogram or urethroscopy) showed no evidence of urethral obstruction in these patients. The high percentage of failure of catheterization in patients with BPH in our series may be due to inadequate lubrication for the catheterization process, poor technique, non-application of a catheter introducer when necessary or non-availability of coude tip urethral catheters. In the series by Ahluwalia *et al* the commonest indication for a suprapubic cystostomy was neuropathic bladder whereas the commonest indication for a stab cystostomy in the bladder outflow obstruction group was urethral stricture[8].

Clot retention was one of the indications for stab suprapubic cystostomy in this series. However, Hilton *et al* listed this as a contraindication for the procedure.[9] They argued that catheters used for stab cystostomy are generally of a fine caliber and should not be used when a risk of occlusion exists and instead a 22Fr catheter should be used by the open method. In our setting, it was much easier and quicker to do a stab cystostomy to evacuate the clot when this could not be achieved by urethral catheterization, especially because we could easily pass a 22Fr catheter through the sheath of our reusable stab set.

The complication rate of closed suprapubic catheter insertion is reportedly low (1.6%)[10]. Our overall complication rate of 3.5% was lower than the 10% intraoperative complication rate reported by Ahluwalia *et al*. Our small bowel perforation rate of 0.6% compares favorably to the 2.7% reported by Sheriff *et al*[11] and 2.4% reported by Ahluwalia et *al*[8] Ahluwalia *et al* reported a Suprapubic catheter malposition/expulsion rate of 3% in a large retrospective series of 219 patients[8]. In our series the malposition rate was 0.5%. The reason for the track loss is that once the trocar is removed during the procedure, urine leaks rapidly through the sheath, causing sudden bladder decompression, which in turn leads to catheter displacement out of the bladder. To avoid this problem, Goyal *et al* suggest advancing the sheath a little further inside the bladder while withdrawing the trocar, after the bladder has been entered during the stab cystostomy procedure[12]. Additionally we realized that it was important to check that the catheter size we selected for use was one that will easily slip through the sheath after removal of the trocar and that the balloon of the catheter was functioning properly prior to the start of the procedure.

We did not encounter any complication of rectal injury, unlike the cases reported by Rajmohan*et al*[13] and Ahmed *et al*[14]. This complication may arise if the procedure is performed in a restless patient, or the patient moves during the procedure or the surgeon applies too much force during the procedure. To avoid this problem, as soon as one has felt a give during the rotating downward pressure on the stab set, it is important to release the pressure and then advance the sheath a little further inside the bladder while withdrawing the trocar[12].

Even though the most severe complication i.e. bowel perforations in our study occurred when the procedure was done by either a house officer or junior resident, there was no statistically significant difference between the different categories of doctors/surgeons, with respect to their complications rates (P = 0.686). This was also the experience of Ahluwalia et al who found that the postoperative complication rates were comparable for cases by consultants and middle grade doctors[8, 1].

Conclusion

Stab suprapubic catheter insertion is a safe and effective bedside procedure for bladder drainage when urethral catheterization fails or is undesirable, and it can be safely performed by all grades of surgeons in selected patients. Complications can be minimized if the technical details mentioned in the discussion above are observed.

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INDIRECT OBSTETRICS CAUSES OF MATERNAL DEATH: A-20 YEAR RETROSPECTIVE AUTOPSY STUDY AT THE KORLE-BU TEACHING HOSPITAL

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Abstract

Background: The pattern and contributions of indirect causes of maternal deaths in Ghana from autopsy data have not been studied. The aim of this study was to estimate the proportions, the spectrum and demographic characteristics of maternal deaths that resulted from indirect obstetrics causes, and to offer recommendations.

Material and methods: This was a retrospective study of the above stated parameters from autopsy records in the department of pathology of Korle-Bu Teaching Hospital (KBTH).

Results: Approximately 15.2%, of all maternal deaths during the period of study were indirect obstetric causes with a mean age of 28.0 years. About 32.5% of the deaths were recorded in women within 25 – 29 year age group. A little more than a third (35.9%) of the deaths occurred in a health facility. The common underlying indirect causes of death were: infections 99 (39.4%), SCD 73 (29.1%), anaemia in pregnancy 32 (12.7%), chronic liver disease (CLD) 15 (6.0%), cardiovascular disorders (CVS) 10 (4.0%), pulmonary thromboembolism (PE) 8 (3.2%) and neoplastic lesions 5 (2.0%). The common infections were: HIV/AIDS 24 (24.2%), pneumonia 19 (19.1%), purulent bacterial meningitis 17 (17.2%), malaria 9 (9.1%) and tuberculosis 8 (8.1%). The common complications of SCD leading to death were: anaemia 40 (54.8%), haemolytic crisis 10 (13.7%) and acute chest syndrome 9 (12.3%). The major complications of anaemia and CLD in pregnancy leading to death were congestive cardiac failure 28 (87.7%) and septicaemia 7 (46.7%). Deaths due to CLD 3 (37.5%) CVS 6(40.0%) and neoplastic lesions 3 (60.0%) were commoner within the age group of 30 – 34 years. Deaths due to CVS disorders 6 (60.0%) and neoplastic lesions 3 (60.0%) occurred commonly in health facilities.

Conclusion: The study found that 15.2% of all maternal deaths were due to indirect causes. These commonly occurred in the community and in the 25 -29 year age group. Infections were the commonest cause of death. The authors conclude that indirect causes of maternal deaths cannot be ignored and that efforts should be focused on their reduction. Research is needed in this area of maternal death including the mechanisms by which these cause death and what programme could reduce it.

Key Words: Indirect obstetric causes, Autopsy, Maternal death,

INTRODUCTION

Indirect obstetric deaths are deaths resulting from previous existing disease or disease that developed during pregnancy and which was not due to obstetric causes, but was aggravated by physiologic effects of pregnancy[1].These deaths include infections, vascular disorders, mental disease, diabetes and many other medical conditions[2]. The proportions of maternal deaths due to indirect obstetric cause varies across the globe[3,4,5,8b].

Studies in both developed and developing countries have found a rising trend in the proportions of maternal deaths resulting from indirect obstetric causes[3,6,7,8]. Prompt programmes and appropriate actions to reduce the number of pregnant women dying from these preventable deaths are recommended. Available literature on indirect causes of maternal death in Ghana are usually from the clinicians[3,6]. The pattern and contribution of indirect causes of maternal deaths in Ghana from autopsy data has not been studied. Most maternal mortality prevention programmes have focused mainly on the direct causes with the indirect caused being least studied, prevented or managed. For instance, there are globally recognized guidelines for prevention and management of obstetric haemorrhage and hypertensive disorders in pregnancy but not much has been done concertedly regarding the causes of indirect maternal death. The contribution of this subcategory of causes of maternal death is remarkable and cannot be overlooked. In previous clinical studies conducted in the southern and northern parts of the country, indirect causes of maternal deaths accounted for 28.8%[3] and 29.0%[6] respectively. Yet, indirect causes of maternal deaths have not been given the needed recognition and therefore not explored

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independently as a plausible means of improving maternal health in Ghana. The aim of this autopsy study was to estimate the proportions of maternal death and the pattern of maternal death that resulted from indirect obstetrics causes and offer recommendation for reducing maternal deaths. The outcome of this study would provide local evidence to urgently stimulate the development of standardized multidisciplinary preventive and treatment protocols (with specific reference to indirect maternal deaths) for improving maternal health in Ghana.

Material and Methods

Study Site

All data were gathered from the files of the Korle-Bu Teaching Hospital Mortuary, the largest mortuary in the country, Ghana, where between 3,000 and 6,000 autopsies are performed each year. This mortuary receives cases from Korle-Bu Teaching hospital, the largest referral hospital in Ghana; as well as cases within the Accra Metropolis, neighbouring towns and districts, and in special circumstances, cases from other regions across the country. Not all pregnancy related deaths within the catchment area, automatically, had an autopsy. This is because some deaths that occur in the hospital are issued with death certificate by the clinicians. Similarly, deaths that occurred in the communities and were not reported to the police, or due to other reasons, did not have autopsy done on them.

Study design

Data Collection and Analysis

All autopsy logbooks, autopsy sheets and hospital files were reviewed for the period of 1st January 1995 to 31st December 2014, and all cases of pregnancy-related deaths were recorded. Data were collected and cross-checked by two doctors, to prevent double entry. For each case of maternal death, data were collected on age, cause of death and category of death (Coroner's or hospital). Coroner's deaths were deaths that occurred in the community or within 24-hours of admission to a health facility, where no definitive diagnosis was arrived at before death. Hospital deaths on the other hand were deaths that occurred in a health facility while the patient was on treatment for a given diagnosis. The cause of death was based on review of clinical and macroscopic autopsy findings. The data wereas entered into a computerized spreadsheet and analyzed using SPSS software (Version 23). Frequency distributions and descriptive statistics were calculated for each variable. Given the descriptive nature of this study, no multivariate analyses were attempted.

Results

Age characteristics and spectrum of the underlying indirect obstetrics causes of maternal deaths

A total of 251(15. 2%) out of the 1,656 pregnancy related deaths for which autopsy was performed from 1995 to 2014 at KBTH were classified as indirect obstetrics causes of deaths. Approximately 64.1% of the deaths occurred in the community, with 35.9% occurring within a health facility. The ages ranged from 15 – 43 years with a mean age of 28 years (SD± 6.1). Most (32.5%) of the deaths were recorded in women within 25 – 29 year age group (figure1).

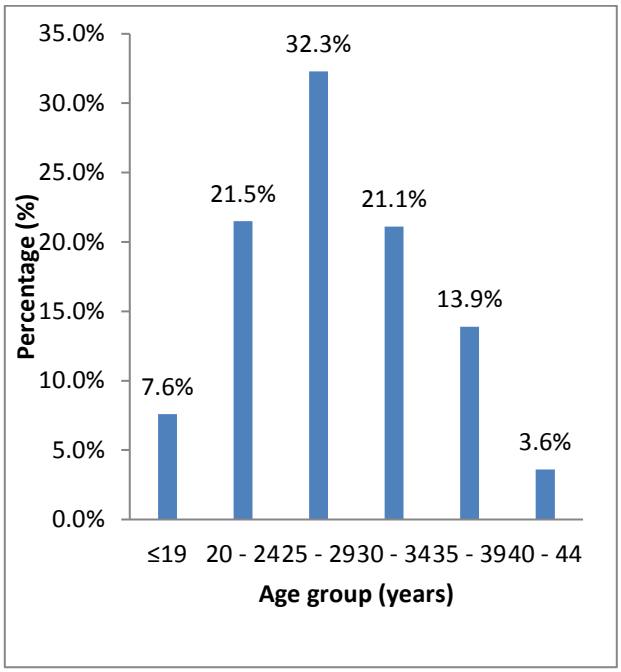

Fig 1. Age distribution of women with indirect causes of maternal death

The common underlying indirect causes of death were: infections 99 (39.4%), sickle cell disease (SCD) 73 (29.1%) and anaemia in pregnancy 32 (12.7%) (Table 2).

Infections as underlying causes of maternal deaths

The ages of women who died of infection ranged from 15 to 42 years with a mean of 27.7 years (SD ± 6.0) and a modal age group of 25 – 29 years (33.3%) table 1. The common causes of infection related maternal deaths were: HIV/AIDS 24 (24.2%), pneumonia 19 (19.1%) and purulent bacterial meningitis 17 (17.2%) table 2. The immediate causes of infection related maternal deaths were: septicaemia 50 (50.5%), anaemia 15 (15.2%) and cerebral toxoplasmosis 11 (11.1%) table 2. Most of the deaths occurred in the community (59.6%) table 3.

Sickle cell disease

Of the 73 (29.1%) cases of SCD as an underlying indirect obstetric cause of maternal death, the ages of

Table 1. Age characteristics and the various underlying indirect obstetrics causes of maternal death

Age (years)	Infections No. (%)	SCD No. (%)	Anaemia No. (%)	CLD No. (%)	PE No. (%)	CVS No. (%)	Neoplasms No. (%)	Others No. (%)
≤19	8(8.1)	6 (8.2)	2(6.3)	0(0.0)	2(20.0)	0 (0.00	0(0.0)	1 (11.1)
20-24	23(23.3)	18(24.7)	**10(31.3)**	1(12.5)	1(10.0)	0 (0.0)	1(20.0)	0 (0.0)
25-29	**33(33.3)**	**29(39.7)**	9(28.1)	1(12.5)	**4(40.0)**	3 (20.0)	0(0.0)	2 (22.2)
30-34	18(18.2)	13(17.8)	7(21.9)	**3(37.5)**	0(0.0)	**6 (40.0)**	**3(60.0)**	3 (33.3)
35-39	13(13.1)	6(8.2)	4(12.5)	1(12.5)	2(20.0)	5 (33.3)	1(20.0)	3 (33.3)
40-44	4(4.0)	1(1.4)	0(0.0)	2(25.0)	1(10.0)	1(6.7)	0(0.0)	0 (0.0)
Total	99(100.0)	73(100.0)	32(100.0)	15(100.0)	8(100.0)	10(100.0)	5(100.0)	9 (100.0)
Mean age	27.7	26.8	27.0	33.4	28.2	32.6	30.6	30.2

KEY; SCD = sickle cell disease, CLD = chronic liver disease, PE = pulmonary thromboembolism, CVS = cardiovascular system

affected women ranged from 16 – 40 years, with a mean of 26.8 (SD ± 5.4) and a modal age group of 24 – 29 years (39.7%) table 1. The immediate causes of SCD related maternal deaths were: anaemia 40 (54.8%), haemolytic crisis 10 (13.7%) and acute chest syndrome 9 (12.3%) Table 2. Approximately 61.6% of the deaths occurred in the community table 3.

Anaemia in pregnancy

The ages of the 32 (12.7%) women who died of anaemia in pregnancy ranged from 18 – 39 years, with a mean of 27.0 years (SD ± 6.2) and a modal age group of 20 – 24 years table 1. The commonest immediate cause of death was congestive cardiac failure (87.6%) table 2 and the great majority (78.1%) occurred in the community Table 3.

Chronic liver disease (CLD) in pregnancy

There were 15 (6.0%) women with chronic liver disease in pregnancy, with their ages ranging from 26 – 40 years and a mean age of 32.6 years (SD ± 4.2) and a modal age group of 30 – 34 years (40.0%) Table1. Septicaemia was the common immediate cause of death 7 (46.7%) Table 2. The majority (80.0%) of the deaths occurred in the community Table 3.

Cardiovascular (CVS) disorders in pregnancy

The ages of the 10 (4.0%) women who died of CVS disorders in pregnancy ranged from 17 – 40 years with a mean of 28.2 years (SD 7± 8) and a modal age group of 25 – 29 years (40.0%) Table 1. The commonest underlying cause of death was dilated cardiomyopathy 6 (60.0%) Table 2. Most of the deaths occurred in the hospital (60.0%) Table 3.

Pulmonary thromboembolism (PTE)

The ages of 8 (3.2%) women who died of PTE ranged from 22 – 43 years with a mean age of 33.4 years (SD ± 7.5). Most were within the 30 - 34 year age group 3 (37.5%) Table 2. Approximately 87.5% of the deaths occurred in the community Table 3.

Neoplastic causes of maternal death

There were 5 (2.0%) neoplastic causes of death. Three (60.0%) of deaths were due to hepatocellular carcinoma Table 2. Most deaths occurred in the hospital (60.0%) table 3.

Other indirect causes of maternal deaths

There were 9 (3.6%) cases in this category of maternal deaths with mean age of 30.2 years (SD ± 6.8) Table 1. The common underlying cause was epileptic attack 2 (22.2%) with head injury as the commonest immediate cause of death 3 (33.3%) Table 2.

Discussion

During the 20-year period of study, it was found that indirect obstetrics deaths constituted 15.2% of all pregnancy related deaths. This value is much lower than values from previous studies; such as 28.8% in Northern Ghana[3], 27.0% in Egypt[4], and 27·5% in Asia[5]**.**The low value in this current study, may be an underestimation, judging from the fact that most of the causes are medical and may have been diagnosed prior to pregnancy and death. Thus, clinicians may have issued a death certificate without requesting for autopsy in cases with relatively clear clinical diagnosis. However, this current study being the first in Ghana to deal with autopsy based data has shown the growing importance of indirect causes of maternal deaths as pointed out in previous studies within and outside Ghana[6,7,8]. This finding again, has given an insight into the proportions of maternal deaths that result from indirect causes. It further underscores the need for key policy strategy documents

Table 2: Categories of indirect causes of maternal deaths

Indirect causes	Underlying causes	No. (%)	Immediate causes	No. (%)
Infections				
	HIV/AIDS	24(24.2)	Septicaemia	50 (50.5)
	Pneumonia	19(19.2)	Anaemia	15 (15.2)
	Meningitis	17 (17.2)	Cerebral toxoplasmosis	11 (11.1)
	Malaria	9 (9.1)	Disseminated TB	9 (9.1)
	Tuberculosis	8 (8.1)	Haemorrhagic shock	4 (4.0)
	Diarrhoea	7 (7.1)	Acute liver failure	4 (4.0)
	Hepatitis	7 (7.1)	Acute renal failure	4 (4.0)
	Pelvic abscess	1 (1.0)	**Acute pyelonephritis**	**1(1.0%)**
	Chicken pox	1 (1.0)	**Lung abscess**	**1(1.0%)**
Sickle Cell Disease				
			CCF	40 (54.8)
			Haemolytic crisis	10 (13.7)
			Acute chest syndrome	9 (12.3)
			Septicaemia	8 (11.0)
			PE	5 (6.8)
			Cerebral toxoplasmosis	1 (1.4)
Anaemia in Pregnancy				
			CCF	28 (87.6)
			Septicaemia	2 (6.3)
			Acute renal failure	2 (6.3)
CLD in Pregnancy				
	Liver cirrhosis	12 (80.0)	Septicaemia	7 (46.7)
	Severe fatty liver	3 (20.0)	DIC	6 (40.0)
			Acute renal failure	2 (13.3)
CVS Disorder				
	DCC	6 (60.0)	CCF	8 (80.0)
	Valvular diseases	2 (20.0)	Cardiogenic shock	1 (10.0)
	PE	1 (10.0)	Septicaemia	1 (10.0)
	Aortic aneurysm	1(10.0)		
PTE			Acute right heart failure	6 (100.0)
Neoplasms				
	HCC	3 (60.0)	Haemorrhagic shock	3(60.0)
	Colonic ca	1 (20.0)	Anaemia	1 (20.0)
	Brain tumour	1 (20.0)	PE	1 (20.0)
Others				
	Epilepsy	2 (22.2)	Head injury	3 (33.3)
	Asthma	1 (11.1)	Anaemia	2 (22.2)
	ESKD	1(11.1	Asphyxia	2 (22.2)
	Cerebral oedema	**2 (22.2)**	**PE**	**1(11.1)**
	Grave's disease	1 (11.1)	Haemorrhagic shock	1 (11.1)
	GI bleeding	1 (11.1)		
	Malnutrition	1 (11.1)		

KEY: HCC = hepatocellular carcinoma, DCC, dilated cardiomyopathy, GI = gastrointestinal, UTI urinary tract infection, DIC = disseminated intravascular coagulation, ca = carcinoma, ESKD = End stage kidney disease

Table 3: Indirect causes of maternal deaths by location**.**

	Community/Coroner No. (%)	Hospital/Permission No. (%)	Total No. (%)
Infections	59 (59.6)	40 (40.4)	99 (100.0)
SCD	45 (61.6)	28 (38.4)	73 (100.0)
Anaemia in pregnancy	25 (78.1)	7 (21.9)	32 (100.0)
CLD disease in pregnancy	12 (80.0)	3 (20.0)	15(100.0)
CVS disorders	4 (40.0)	6 (60.0)	10 (100.0)
PTE	7 (87.5)	1 (12.5)	8 (100.0)
Neoplasms	2 (40.0)	3 (60.0)	5 (100.0)
Others	7 (77.8)	2 (22.2)	9 (100.0)

of leading international bodies on maternal health, as well as -governmental organizations and the Ghana

Government to redirect attention on this component of maternal deaths, which hitherto has not been the main focus [9,10,11]. In most countries including Ghana, the focus has been on the direct causes of maternal deaths with specific globally accepted management protocols such as the use of active management of the third stage of labour and magnesium sulphate regimen for prevention/treatment of primary postpartum haemorrhage and eclampsia respectively.

Although a larger proportion (64.1%) of the deaths occurred in the community, a significant proportion also occurred in the health facilities (35.9%). The higher proportions of indirect deaths occurring in the community are in keeping with the fact that in Ghana and other Sub-Saharan African countries, more than 60.0% deliveries are done at home and mostly not supervised by trained personnel.[4] In this current study, maternal deaths were commoner in the 25 – 29 year age group, in keeping with previous autopsy studies of maternal deaths in Ghana[12,13].

The common indirect causes of death in descending order were: infections, SCD, anaemia in pregnancy, CLD, CVS disorders, pulmonary thromboembolism and neoplasms. The spectrum of indirect causes of maternal deaths in this current study is in keeping with previous autopsy[13] and clinical studies in Ghana [3,6,14,15,16,17,18]and across Africa[19]. Further grouping of deaths due to indirect causes suggests that more than 80% of indirect causes are from pre-existing disorders, including HIV.

The common causes of infection related maternal deaths were: HIV/AIDS (24.2%), pneumonia (19.1%), purulent bacterial meningitis (17.2%), malaria (9.1%) and tuberculosis (8.1%). This is in keeping with studies in developing countries, particularly Sub-Saharan Africa, that found infections as the major contributors of indirect maternal deaths, mainly HIV/AIDS[20,21,22].

Pregnancy commonly induces complications of sickle cell disease and thus a common indirect cause of maternal death in both developed and developing countries where the disease is common.[23,24,25] Sickle cell disease was the second common underlying indirect cause of maternal death in this study, accounting for 29.1% of the total deaths. It is known that pregnancy induces a number of physiological changes that affect the haematological indices, and patients with SCD may experience worsening of anaemia and other complications[26]. Despite the medical advances in recent decades, pregnancy is still associated with many clinical and obstetric complication in patients with SCD, resulting in a higher maternal mortality. The significant number of maternal deaths in this current study thus supports these previous publications.[27,28] The spectrum of immediate causes of death in SCD pregnant women in descending order in this study were; anaemia, haemolytic crisis and acute chest syndrome These findings are in keeping with other studies[25,29].

Anaemia complicating pregnancy leading to death has been reported as a major cause of maternal death in Ghana and other Sub-Saharan countries[12,13,25,30]. In this study, a significant proportion (12.7%) of maternal deaths were due to anaemia in pregnancy with congestive cardiac failure (87.6%) being the most common immediate cause of death. This supports studies decades ago that found high prevalence of anaemia among African pregnant women and the associated serious complications such as congestive cardiac failure[30,31,32,33]. Infections before and during pregnancy such as malaria and pneumonia are recognized as contributory factors of anaemia via haemolysis and can precipitate life threatening

complications such as congestive cardiac failure[22,34]. The study found approximately 39.9% of all causes of maternal deaths to be infection related, and this may explain why significant numbers of maternal deaths were due to anaemia.

Viral hepatitis commonly predates chronic liver disease[35,36]. Also studies have shown that chronic liver disease is commonly worsened during pregnancy[37,38]. In this study, 6.0% of all maternal deaths were due to chronic liver diseases and that most of the deaths occurred in the community. The current findings are in keeping with studies that found significant maternal deaths to be associated with chronic liver disease in pregnancy[39,40,41].

Cardiovascular disorders other than pregnancy induced hypertension have been reported in autopsy and clinical studies globally as significant indirect causes of maternal deaths, although most are preventable [3,42,43] In this study, 4.0% of maternal deaths were due to cardiovascular disorders, particularly dilated cardiomyopathy (60.0%) and these mostly occurred in health facilities. This proportion is lower than the 6.0% found in developed countries but comparable with findings in developing countries[3,44].

Pulmonary thromboembolism (PTE) as a cause of maternal death has been reported in the literature[45,46]. In this study, PTE accounted for 3.2% of all indirect causes of maternal deaths. This value is similar to the 3.3% in Panchabhai et al autopsy study in India[47]. This is however higher than some other previous autopsy studies also in India[48,49]. The current finding confirms that pulmonary thromboembolism remains a significant cause of maternal death in developed countries.[50] Furthermore, the great majority (87.5%) of PTE related maternal deaths occurred suddenly in the community. This is partly due to the fact that most cases are asymptomatic and diagnosis is made only at autopsy.[50]Some of these deaths may have been prevented with more timely identification of risk factors and prevention through the use of prophylaxis.

Conclusion

The study found that 15.2% of all maternal deaths were due to indirect causes. These commonly occurred in the community and in the 25 -29 year age group. Infections were the commonest indirect cause of maternal death. The authors conclude that indirect causes of maternal deaths cannot be ignored and that efforts should be focused on their reduction. Research is needed in this area of maternal death including the mechanisms by which these cause death and what programmes could reduce it.

Recommendations

1. Further research is needed in the area of maternal death including the mechanisms by which these deaths are caused., Specific preventive and management programmes to improve pregnancy outcomes from these pre-existing medical conditions need to be implemented.
2. We recommend the development of specific measures for prevention of complications in pregnant women with pre-existing medical conditions such as SCD, coupled with early and active multidisciplinary involvement.
3. There is an urgent need for developing evidence based management protocols and guidelines for the various indirect causes of maternal deaths especially in resource limited settings like Ghana to improve maternal deaths.
4. Finally, adequate and regular counseling and education of clients including the pre-conception, antenatal, intrapartum and postnatal periods are critical in reducing indirect causes of maternal mortality.

Limitation of the study

1. This study did not consider indirect causes of maternal deaths for which death certificates were issued by the clinicians in the wards without autopsy, resulting in significant under-reporting.
2. The autopsy log book for the year 2008 could not be traced resulting in significant missing data which is an inherent problem of retrospective studies. However, the findings of this study are significant as they provide a general overview of the burden of indirect maternal deaths and the major underlying causes in Ghana.

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PATTERN OF BREAST CANCER REFERRAL TO PALLIATIVE CARE AND THE COMPLIMENTARY ROLE OF A PALLIATIVE CARE UNIT IN A RESOURCE-LIMITED COUNTRY

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Abstract

Background:Poor quality of end of life care is an information problem. Information about palliative and end of life care is sparse from developing countries. Only 10 percent of the information in this field of care emanates from developing countries where about 85% of annual deaths due to cancerous diseases occur. We present review of breast cancer patients referred to Palliative unit of our hospital between May 2009 and June 2013. This article demonstrates challenges to palliative care and the complementary role of the palliative unit to palliative care in developing countries

Method: The records of the Palliative unit University of Ilorin Teaching Hospital were reviewed for information about the stage of the disease at referral, performance status of the patients, the support given by the palliative unit and outcome of care.

Result: One hundred and one patients were reviewed for breast cancer by the Palliative unit during the study period. Most of the referrals were from one of a general surgery units in the hospital. The number of referrals per year showed no sustained commitment to referral for palliation.

The palliative unit provided counselling, home visitation and source of psychosocial and financial support. The median survival duration was 3 months. 59 percent of the recorded deaths were at home

Conclusion

This report demonstrated that even though the palliative unit filled a void in the management of breast cancer patients, palliative care is still not widely accepted.

Key Words: palliative care, challenges, breast cancer

INTRODUCTION

Medical management of malignant diseases will consider one of two aims; to cure the early disease or to palliate the late disease. These 2 aims are usually adequately addressed by the system of care in the developed countries.The beneficial role of palliative care such as pain control, treatment of anorexia, insomnia and other symptoms control as recommended by WHO is reported in developed countries and in few developing countries where palliative care is well established[1-4]. Many centers in the developing countries have no palliative care system, specialized palliative care is virtually non-existent[2,3,6,7] and cure appears to be the recognized and readily acceptable measure of success[1].A goal which is rarely achievable due to late presentation[1,4,5]

In many developing centres, once cure is no longer achievable the patient and many care-givers literarily "submit to the will of the disease" because of several reasons[4,5] including of course, "the submission to the will of God". This "fatalistic acceptance"[6] deprives many patients of the active care required towards the end of life.

Breast cancer which is the most common malignancy in women is also a leading cause of death, mutilation and misery. In the developing countries, more than 70% of patients with breast cancer present at a late stage[7]. At this stage the disease brings untold hardship to the afflicted and their relations.

Poor quality of end of life care has been described as an information problem[6]. Information about palliative and end of life care is sparse from developing countries[6, 8]. Only 10 percent of the information in this field of care emanates from developing countries where about 85% of annual deaths due to cancerous diseases are recorded[6]. In our center, there is a budding palliative care unit established in 2009. We present a review of breast cancer patients referred to this center for palliation. This article describes the pattern of referral and the complementary role of palliative care. The article also adds to the information emanating about palliative care for breast cancer patients in developing countries.

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Method and Study Center

Study centre

The pain and palliative unit (PAPU) of our hospital (University of Ilorin Teaching Hospital, Ilorin, Kwara state Nigeria) was established in 2009. At the time of this review, the PAPU wasstill a relatively small unit for a 650 bedded tertiary care center. It was

manned by 4 doctors two of whom are anesthesiologists, 4 nurses, 1 physiotherapist, 1 social worker, 2 spiritual leaders (a Muslim and a Christian) and 2 other volunteer members. Referrals were initially expected at the time of diagnosis of all terminal illnesses, especially HIV/AIDS and all cancers. At the time of this review, the referral for cancer patients was preferred at stages III and IV because of the limited staff strength and the increasing workload.

The records of breast cancer patients referred to the PAPU between May 2009 and June 2014 were reviewed and the Nursing staff of the PAPU were briefly interviewed to shed light on some of the records and clarify the findings. The information sought was the source of referral, the stage at referral, the complications present at the time of referral, performance status of the patients at the time of referral, the treatment and other aids given by the PAPU team and the duration of exposure to palliative care as at the time of this report. Results were presented in descriptive statistics.

Results

The sources of referrals to the PAPU were 3 general surgery units within the hospital, the General outpatient department of the hospital, other adult clinical subspecialties and external sources (private hospitals within the state and neighboring states). Most of the referrals were from one of the general surgery units within the hospital, in this report we refer to this unit as General Surgery unit A (GSA) (Figure 1).

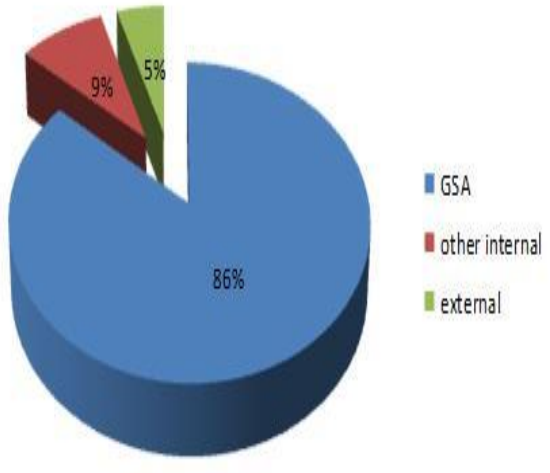

Fig. 1: Sources of referral

One hundred and one patients were reviewed for breast cancer by the PAPU during the study period. Ninety four percent of the patients presented to the PAPU in advanced stage (figure2). The karnofsky performance score was documented in 56 percent. The median performance score was 50 percent for the available records. The number of yearly referrals

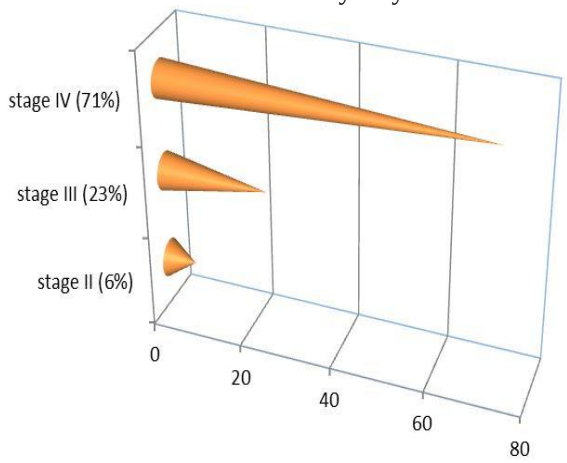

Fig. 2: Stage of presentation to the PAPU

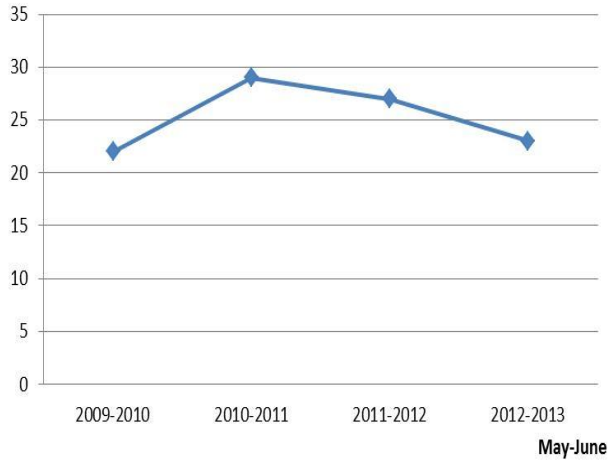

Fig 3: Frequency of referral to the PAPU per year over the four year period

Table 1: Complications present at time of referral to PAPU

Complications	Frequency
Chest Metastasis	24
Fungation	13
Spine Metastasis	11
Brain Metastasis	7
Lymphedema	6
Liver Metastasis	2

revealed a fluctuating trend (Figure3). The most frequent complication present at the time of referral was chest metastasis (Table 1)

Care and aids given by the PAPU were communication and counseling in line with the objectives of orthodox palliative medical care. Some specific aspects of the communication and counseling included establishment of other outcomes different

from cure, tactical provision of information about possible progression, outcomes and realistic goals and expectations. Other supports rendered by our PAPU included pain control, home visitations, telephone contacts and sourcing for financial aids.

Pain control was achieved with combinations of oral or intravenous morphine, oral paracetamol, oral nonsteroidal anti-inflammatory agents and oral amitriptyline. Fifty four patients (53%) had pain at presentation, the median pain score on a numerical rating scale of 0 to 10 was 3. The sites of the pain were the breast, axilla and locations of metastasis (chest, spine, or long bones). Of the 54 patients that presented with pain, total relief or reduction in pain score was achieved in 31 patients, the pain worsened or remained unchanged in 14 patients while the remaining 9 had no repeat documentation of their pain score as at the time of this report

Within the study period, 85(84.2%) of the patients referred to the palliative records had died; the median survival duration was 3 months (Figure 4a and 4b).

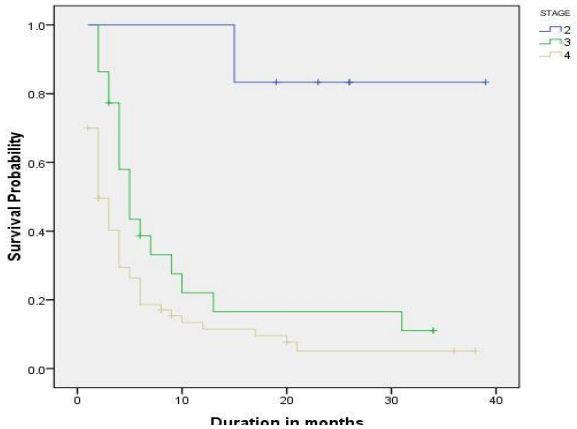

Fig. 4a General survival curve

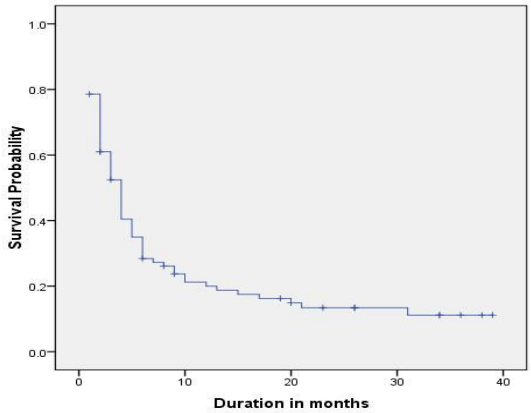

Fig. 4b: Survival curve by stage of presentation

The survival was similar for both stages III and IV diseases. Place of death was recorded for 61 of the 85 patients. 59 percent of the recorded place of death was home.The others died in the surgical wards or at the accident and emergency unit.

Discussion

The incidence of breast cancer is increasing in developing countries yet the stage of presentation still remains late. At the late stages, the disease may constitute a serious problem; it may be mutilating, destroying the self-esteem of the patients. It may disrupt the family system and lead to social isolation and abandonment because of the physical and socioeconomic demands on the family. The patient in Figure 5 was a victim of such circumstances. She was abandoned in the hospital.

Fig. 5 Advanced breast cancer patient; mutilated and abandoned

The PAPU unit in our center complements the medical management of these patients by offering home visitations, communication and counseling consistent with orthodox care and realistic expectations, sourcing for funds and other psychosocial supports. The effort of the PAPU encourages the relations to sustain the care of the patients and protects the family unit.

The late presentations to the PAPU is a reflection of the overall late presentation to the hospital and also late referral for palliative care, it has been shown that it is possible to improve the number of patients presenting to the hospital at early stages with sustained campaign and enlightenment programs[9, 10]

The declining number of referrals to our PAPU demonstrates the flinching commitment to referral of patients for palliative care. A large percentage of the referrals were from one of the three general surgery units. A brief interview of the nursing staff of the PAPU revealed information that shed a little light on what the members of the PAPU perceived as possible reasons for the skewed and fluctuating pattern of referral. Firstly, the PAPU had permission to review patients being managed for terminal diseases by the GSA while awaiting a formal referral or invitation which may be delayed, but was always eventually done. The PAPU did not have the same from the other units. The express permission given by the GSA

limited the logistics of inter-unit referral. Secondly, some primary care physicians insisted that PAPU team will be invited when and only when no other active treatment can be offered to the patient. And lastly, the PAPU nurses were referred to as "idle workers" by some colleagues. These perceptions of the PAPU nurses were not confirmed by interviewing other nurses and physicians in the hospital. Late referral to palliative unit is not new to Nigeria[2]. In other places, previously documented reasons that dissuade active palliative care and lead to poor volume of referral to palliative units include fear of loss of patient to another unit, non-acceptance of the benefit of specialized palliative care; active palliative treatment is considered not cost effective hence undeserving of a share of the limited resources[7, 9, 14]

In our review, the most frequent clinically evident complications at the time of referral to the PAPU were fungation and chest metastasis. In the presence of an active metastatic lesion or complications, the lifespan of the patient is significantly shortened as supported by the median survival of 3months in this report. The lifespan has been estimated, though with wide variations, to be about 24 months in patients with bone metastasis and 10, 8 and 3 months in patients with lung, liver and brain metastasis respectively[15]. In the shortened period of survival following progression of the disease the hardship and pain endured by the patient is unquantifiable, it may be worse than the demise of the patient; this is when palliation becomes of utmost importance. As noted by Merriman[4] this is when the patients should be supported to live until they die. In this report pain relief was achieved in more than 50% of patients who had documentation of pain, this is higher than the pain relief rate of about 13% recently documented in Nigeria for a combination of various types of cancer where breast and prostate accounted for about 21% of patients reviewed[5]

Many clinicians do not pay adequate attention to palliative care and some even opine that offering active treatment may be overly burdensome and are of unproven effect[4,9,14]. These postures which significantly hinder active palliative care in developing countries are compounded because the care of advanced cases is totally undertaken by relatively few specialists in the respective fields[16].Hence the time and patience for devoted palliative care is regrettably lacking[9].

Specialists in many developing centers are already saddled with excess clinical activity hence it is difficult to spare the time required to "sit and chat". This leaves a gap in communication. The gap is filled with conflicting, misleading and anxiety provoking information from the community: friends, relations, neighbors and news media. Fortunately in our center, the PAPU shouldered the burden of sustained counseling. Because the information provided by the PAPU aligns with the specialist's consultation contrary to what is circulated in the community, the effort of our PAPU is additive to the specialist's consultation.

It is reported that more than 50% of terminally ill patients prefer to die at home but only about 30%or less eventually die at home. Home- based palliative care is relatively new to Nigeria[2]. In this study recorded place of death was home for about 60 of the patients. Even though we have no prior records of the number of patients dying at home because they have previously been labeled as lost to follow-up or absconders and we did not enquire why they died at home or in the hospital, we are of the opinion that the relatively higher percentage of deaths occurring at home may be linked to the interaction between the patient/relations and PAPU team because the interaction attempted to help the patients and relations to understand and accept the transition among other plausible reasons.

The intervention of our palliative team also attempted to help patients and relations to set realistic goals or expectations of their treatment and to accept successful palliation as a form of successful treatment that is different from cure. The home visitations provided the patients with medical care at their doorsteps thus relieved them of the financial and other costs of transportation, hospital admissions and terminal nursing services. The home visitation also significantly reduced the number of patients labeled as lost to follow up and assisted in collection of complete records of patient management and transition. The relevance of home-based palliative care has been previously noted in Nigeria[1, 2]

Conclusion

There is a need to generate more information and interest in palliative care from developing countries. Other measures of successful treatment of advanced breast cancer besides cure should be promoted. This review also adds to documentation about palliative care in advanced breast cancer emanating from developing countries and it highlights the complimentary role of a specialized palliative care unit in a developing center.

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TREATMENT OUTCOME OF OPEN TIBIAL SHAFT FRACTURES IN A TEACHING HOSPITAL IN GHANA

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Abstract

***Background*:** Objective of this prospective study is to report results of treatment of open tibia fractures in Korle-Bu Teaching Hospital Accra Ghana.
Patients and Methods: In this prospective study 47 patients were considered over a 6-month period from February 2012 to July 2012, and each patient was however followed up for at least 3 months. Treatment of these fractures was guided by the unit protocol.
Results: Out of the 47 patients, 35 (74%) had a good outcome and 12 (26%) had complications.
Conclusion: The results of treatment of open fracture of tibia in this study are encouraging (with 74% of patients having a good outcome). Considering that three decades ago an open fracture of the tibia in Ghana had the common fate of surgical Amputation, Sepsis and Death. Further improvements in treatment of these fractures with early antibiotics, Debridement and irrigation and modern stabilization methods are recommended.

Key Words: Treatment outcomes; Tibia; Open fracture

Introduction

An open fracture is defined as osseous disruption with interruption of power transmission along the bone, in which a break in the epithelial surface and underlying soft tissue communicates directly with the fracture and its haematoma.

Although the tibia is the most commonly affected site in an open fracture[1,] its treatment still remains controversial[2, 3]. A century and half ago, open tibia fractures were often treated with amputation, with a high probability of patients evolving to sepsis and death. Today, fracture stabilization with an intra-medullary nail or external fixator enables early rehabilitation, minimizes hospitalization time and the number of postoperative complications. Due to the evolution of fixation methods for open tibia fractures, and the studies addressing the use of antibiotics and soft tissue management, the outcome of open tibia fracture has improved a lot. It is well established that open fractures must be treated with antibiotics, wound irrigation, debridement, fracture stabilization, and early coverage of soft tissue.

However, there are some variations regarding those concepts in literature, with the majority of controversial aspects being related to: the real surgical need for open type-I fractures and gunshot fractures[4,5,6]; the best irrigation product and pressure for surgical cleaning[7,8]; the best moment for wound closure and coverage of soft tissue[9,10,11]; time of antibiotics use[12,13]; and the best method for fracture stabilization[3].

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There are many methods for stabilizing open fractures, with external fixators, intramedullary nails and plates being mostly used. The evidence in the literature suggests the locked intramedullary nail as the method of choice for stabilizing these fractures[3]. However, a different reality is present in Ghana and in other developing countries. The high costs of implants, the lack of availability of equipment for emergency situations and the technical difficulties, restrain the use of intramedullary nails. Thus, other methods such as external fixators, plates and plaster immobilization are still most commonly used.

The objective of this study is to determine the treatment outcomes of open tibia fractures in the Korle-Bu Teaching Hospital.

Patients and methods

The study was prospective in design, spanning for about 6- months from February, 2012 to July, 2012 with 47 patients who reported with open tibia fracture. The inclusion criteria were all consenting patients with open fractures of the tibia with or without fibula involvement.

However, excluded in the study were patients who refused to participate, those with underlying bone pathology, those who had debridement before arrival, patients who had their fracture with intra-articular extension and those requiring vascular repair of the effected leg. Also patients loss to follow up, incomplete data, and default of appointment were excluded in the study.

Treatment of patients with open tibia fracture was guided by the unit protocol (Table 1), and each patient was followed up for at least 3 months. A special form was used to evaluate adequate use of the protocol, classification of the open tibia fracture, time interval between injury and arrival at the hospital, time of debridement, use of antibiotics, tetanus prophylaxis, type

of skeletal fracture stabilization done, other steps of surgical intervention and outcome of treatment**.**

The treatment of open fracture of the tibia is a challenge for orthopaedic surgeons all over the world. In Korle Bu we have a treatment protocol in place for these category of patients (Table1).

Table 1: Unit Protocol implemented for all open tibia fracture patients.

Wound swabs are not obtained before starting antibiotics.
Anti- tetanus prophylaxis as well as intravenous cefuroxime is given at the emergency room.
All open tibia fractures are treated as surgical emergencies.
Cefuroxime is continued in 3 divided doses for 72 hours then continued with oral clindamycin for a minimum of two weeks.
Intravenous metronidazole or intravenous penicillin is added if injury occurred in the farm or in the gutter.
Plain films are taken of the affected bones after temporary splint application.
Thorough wound debridement and copious irrigation is emphasized.
The wound classification system of Gustilo and Anderson is used.
Soft tissue coverage is dependent on Gustilo and Anderson classification.
The most common methods of fracture stabilization employed is external fixator, above knee Plaster of Paris cast or intramedullary nailing
Outcome of treatment is analyzed in respect to speed of fracture union and presence of complications as wound infection and osteomyelitis.
Fracture union is evaluated by clinical and radiological examinations at six weeks, three months, and subsequently at six months' intervals. The fracture is considered united if there is no pain, tenderness or abnormal movement at the fracture site and bridging callus is visible on radiograph. Delayed union is diagnosed when the fracture unites between four and six months.

Table 2: Classification of Open Fractures

GRADE	QUALIFICATIONS
I	Clean skin opening of < 1cm, usually from inside to outside. Minimal muscle contusion. Simple transverse or short oblique fracture.
II	Laceration >1cm, with moderate soft tissue damage and contamination. Minimal to moderate crushing component. Simple transverse or short oblique fracture with minimal fragmentation.
IIIA	Extensive soft tissue laceration usually >10cm long, high contamination. Severe soft tissue crushing and usually multifragmented fractures. Adequate soft tissue coverage of bone possible
IIIB	Extensive soft tissue injury usually >10cm long, with extensive periosteal stripping and bone exposure. Moderate to severe multifragmentation of fractures, segmental bone loss. Inadequate soft tissue cover requiring soft tissue flap closure.
IIIC	Any open fracture with a vascular injury requiring repair.

Patients with tibia fractures reported to Korle-Bu Teaching Hospital were categorized based on the Gustilo and Anderson classification of open fractures[14](Table 2)

Results

The study participants of 47 patients with open tibia fractures treated at the Korle-Bu Teaching Hospital were successfully followed up for 3 months.

Gender distribution: The study participants were 40 (85%) males and 7 (14.9%) females giving a male to female ratio of 5.7:1.

In terms of age distribution, the results showed between 4years to 70 years with the mean age being 34.6years as presented in Figure 1. Most of the patients who reported with open fracture of the tibia were in the age group of 31-40 years 20(42.6%), followed by those within the ages of 21-30 years 10 (21.3%). It is thus clear that these two age groups (31-40years & 21-30years) are more active and therefore more prone to fractures of the tibia. The results also shows that the extreme age groups that is patients less than 20 years and those more than 50 years are less affected with the condition of open fracture of the tibia.

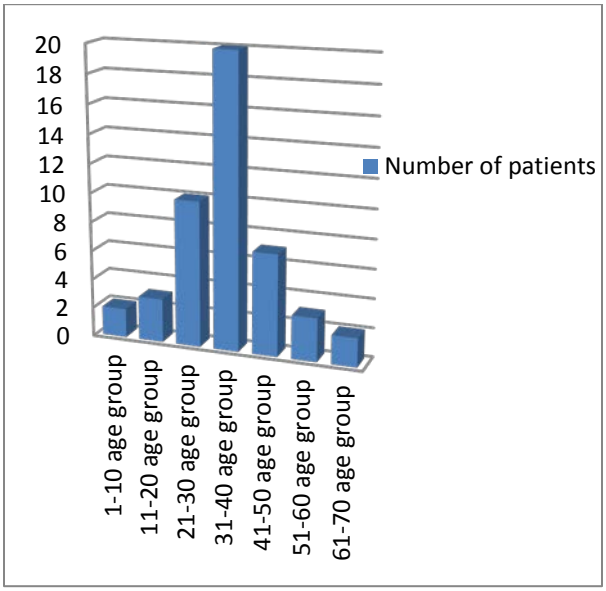

Figure 1: Age distribution of patients with open tibia fractures

The causes of open fracture of the tibia for the patients who reported to the Korle-Bu Teaching Hospital were motor vehicular accidents (MVA) 41 (87.4%), falls from heights 3 (6.3%), assault 2 (4.2%) and fall of heavy object (block) on the leg 1 (2.1 %).

Treatment outcome: The study revealed that, out of the 47 patients who were treated and followed up, 35 (74.47%) had good treatment outcome while 12 (25.5 %) developed complications.

The complications that were identified were as follows: Delayed union 5(41.7%), wound infection 3(25%) and mal-union made of 2(16.7%).

However 1(8.3%) developed chronic osteomyelitis and 1(8.3%) died at the end.

1. Related to Fracture grading

The outcome based on the fracture grading for the patients is presented in Table 3.

Out of the 47 fractures 5(11%) were type I fractures, 17 (36%) type II fractures, 10 (21%) type IIIA fractures, 15 (32%) type IIIB fractures. The overall complication rate in open tibia fractures was 26% (12). Based on the classification we found different types of complications (Table 3) among the study population. Of the type I fractures, 1 (2.12%) died at home two days after discharge from the hospital. The cause of death was unknown because no autopsy was done. Of the type II fractures, 1 (2.12%) developed soft-tissue infection and 1 (2.12%) developed delayed union. While for the type IIIA fractures, 1 (2.21%) developed soft-tissue infection and 2 (4.25%) developed delayed union. In the type IIIB fractures, 1 (2.12%) developed soft-tissue infection, 1 (2.12%) developed osteomyelitis, 2 (4.25%) developed delayed union and that of mal-union was 2(4.3%).

2. Related to Time of presentation:

Early reporting with fractures enables the surgeons to take prompt actions thereby reducing complications. Of the 47 patients who were part of the study, 27 (57.4%) reported within 6 hours of the injury, 15(31.9%) reported between 6 hours and 24 hours, while 5 (10.6%) presented after 24 hours.

Outcome related to presentation time shows that there is no clear difference of prevalence of complication between patients presenting within six hours after injury 6 (22.3%) and those presenting between 6 and 24 hours 4 (27%). Even after 24 hours of presentation the complication rate was not higher 2 (40%) (Table 4).

3. Related to wound debridement:

Wound debridement and irrigation as one of the treatment modality was done in 35 (74.5%) of the patients between 6 hours to 24 hours with the exception of 1 (2.1%) patient who had it within 6 hours. About 11 (23.4%) of the patients had their debridement done after 24 hours of reporting. All 47 patients received intravenous antibiotics and anti- tetanus prophylaxis according to the unit protocol in the emergency room. It is generally accepted that emergent care with debridement, irrigation and antibiotics will minimize morbidity (2,3, 4). In our series 35 (74.5%) patients who had debridement between 6 hours -24 hours, about 6 (18%) developed complications and those treated after 24 hours, 6 out of 11 constituting about 55% also developed complications (Table 5).

Table 3: Fracture grade, treatment outcome and specified Complication

Grade	Number of Pat.	Good Outcome	Complic.	Delayed Union	Mal-Unions	Wound Infection	Osteo-Myelitis	Death
I	5 (11%)	4(80%)	1(20%)	0	0	0	0	1
II	17 (36%)	15 (88%)	2 (12%)	1	0	1	0	0
IIIA	10 (21%)	7 (70%)	3(30%)	2	0	1	0	0
IIIB	15 (32%)	9 (60%)	6(40%)	2	2	1	1	0
IIIC	0 (0%)	0(0%)	0(0%)	0	0	0	0	0
Total	47(100%)	35(74%)	12 (26%)	5	2	3	1	1

Table 4: Time of presentation and treatment outcomes

Time of Present.	Number of Pts.	Good Outcome	Complication
< 6 h.	27 (57.4%)	21 (77.7%)	6 (22.3%)
6 – 24 h.	15 (31.9%)	11 (73 %)	4(27%)
>24 h.	5 (10.6%)	3 (60%)	2 (40%)
Total	47 (100%)	35(74%)	12 (26%)

Table 5: Time of debridement and treatment outcomes

Time of Debridement	Number of Patients	Good Outcomes	Complications.
< 6 h.	1 (2.1%)	1 (100%)	-
6 – 24 h.	35 (74.5%)	29 (82%)	6 (18%)
> 24 h.	11 (23.4%)	5 (45%)	6 (55%)
Total	47 (100%)	35 (74%)	12 (26%)

Table 6: Type of stabilization and treatment outcomes

Stabilization Type	Number Patients	Good Outcome	Complications
P.O.P.	14 (29.8%)	9 (64%)	5 (36%)
External Fixator.	32 (68.1%)	25 (78%)	7 (22%)
IM Nailing	1 (2.1%)	1 (100%)	-
Total	47 (100%)	35 (74%)	12 (26%)

Table 7: Type of soft tissue management, treatment outcome with specified complications.

Soft Tissue Cover	Number of Pat.	Good Outcome	Complic.	Delayed Union	Mal-Unions	Wound Infection	Osteo-Myelitis	Death
Primary closure	10 (21.3%)	6 (60%)	4 (40%)	1		2		1
Delayed prim. closure	17 (36.17%)	15 (88.24%)	2 (11.76%)	1				
Skin grafting	11 (23.40%)	9 (81.81%)	2 (18.18%)	1	2			
Flap cover	4 (8.51%)	2 (50%)	2 (50%)	1			1	
Secondary healing	5 (10.64%)	3 (60%)	2 (40%)	1		1		
Total	47	35	12	5	2	3	1	1

4. Related to Stabilization method:

Stabilization of open fractures has a number of beneficial effects in reducing complications[5].

The methods employed in our study as primary device were mostly external fixators 32 (68.1%), P.O.P 14 (29.8%) and intra medullary (IM) nailing 1 (2.1%).

The used protocol liberalized the choice of fracture stabilization method based on the group, fracture configuration and the most suitably available material at the time of treatment. We found great ease in the use of external fixation and plaster of Paris as a first choice because they were always available and cheap. We recorded a higher incidence of complications in the P.O.P-group than in the external fixation group (22% compared to 36 %) (Table 6)

5.Related to soft tissue management:

Soft tissue management choices depend on the grade of the wound (see table2). About 17 (36%) patients had delayed primary closure. Primary closure was performed in 10 (21.27%) patients, 11 (23%) patients had skin grafting, while 4 (8.51%) cases had flap coverage. 5(10.64%) patients wound healed by secondary intention. Plastic surgeons were involved when skin grafting becomes the choice of tissue cover for extensive traumatic ulcers.

Type of soft tissue cover and treatment outcome are shown in Table 7. In the group treated by primary closure and healing occurring by secondary intention recorded 40% complications. Those treated with the delayed closure (2 of 17) in this study had better results when compared with those whom delayed split thickness skin graft (2 of 11) method was used. Flap coverage, which were carried out on type IIIB resulted in 50% (2 of 4) complication rate. There was correlation between the presence of complication and type of tissue cover. Delayed union was observed in all types of tissue cover. This was followed by wound infection in primary closure and mal-union in skin grafting.

Discussion

The results of the study showed that 85% of the patients with open tibia fractures are males, within the age range of 20years to 40years. With the main cause of the fractures being vehicular, a situation which is similar to those independently reported by Alabi[15] and Onabowale *et al* [16] who indicated that about 63.8% of patients reporting with fracture are between the ages of 20years-40years.

Although the operative treatment of our patients was beyond 6 hours the study revealed that about 74% of the patients had a good treatment outcome, with 26% developing complications. These findings also agree with other studies that shows that notwithstanding the time of presentation, treatment outcome is generally good,[17,18] thereby disagreeing with the studies that support the "six-hour rule" of operative treatment of open tibia fractures[19,20]. The good outcome of our series could be as a result of early antibiotic therapy, adequate debridement and irrigation of the wound.

Increased rate of complication with increasing Gustilo type was found in this study. Out of the twelve patients who developed complications, 50% (6) of the complications were found in type IIIB. These findings are in congruent with the work done by Khatod, and Botte, on Outcome in Open Tibia Fractures: Relationship between Delay in Treatment and infection[21].

All types of wound infections were found in type IIIB in our series. This also supports the Gustilo grading system of open fractures as a significant prognostic indicator for infection as a complication. Delayed primary closure correlates with a lower complication grade. A number of studies have demonstrated excellent outcomes with closure performed within three days after injury[22,23].

Based on the use of Plaster of Paris (POP) the incidence of complications was much higher than in the use of external fixator. This finding is also supported by Edwards et al. who reported in their prospective study

of 202 type-III open tibia fractures treated with external fixation and concluded that, the method was successful for the treatment of severe open tibia fractures[24].

Conclusion

Open tibia fracture is a challenge in Ghana, as it is in the whole world. In Ghana, the young and economically active males are the most at risk. These fractures tend to occur mainly among the low income earners. Motor vehicular accident is the main cause of the injuries. Despite improvements in technology and surgical techniques, rates of complications are still a challenge, but a lot of improvement has been seen in Ghana within the last three decades with this study registering 74% good outcome in patients.

Recommendations

1. Early administration (< 6hours) of antibiotics after open tibia fracture, coupled with early and meticulous irrigation and debridement, could decrease rates of infection.
2. The use of all modern stabilization implants for open tibia fractures such as external fixators and intra medullary nails should be advocated.
3. The limitation to this study is the relatively small number of patients as the sample. A multicentre prospective study with the incorporation of qualitative research method is proposed to look at a larger sample of patients and duration to validate the findings.

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ANXIETY AND DEPRESSION AMONG BREAST CANCER PATIENTS IN A TERTIARY HOSPITAL IN GHANA

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Abstract

Background: Breast cancer is the second most common cancer globally and the most frequent cancer among women. It is associated with significant psychological morbidity including anxiety and depression. The extent of this burden has however not been documented in the Ghanaian setting. This study aimed at determining the prevalence of anxiety and depression amongst patients with breast cancer at the Korle Bu Teaching Hospital (KBTH).

Design and Subjects: A cross-sectional study was carried out among 120 breast cancer patients using a structured questionnaire to obtain socio-demographic characteristics of patients. The hospital anxiety and depression scale (HADS) was used to assess for depression and anxiety in these patients.

Results: The overall prevalence of depression was 84.2%, while that for anxiety was 92.5%. Forty-four percent of the study participants had both anxiety and depression. There was no significant difference in depression (p=0.796) and anxiety (p=0.999) prevalence between post-menopausal (82.9% and 92.1% respectively) and pre-menopausal (86.4% and 93.2% respectively) patients. A significant difference in prevalence of depression alone (p=0.033) and depression in combination with anxiety (0.025) was found between those living with their partners and those living without their partners. Average monthly income was found to be significantly associated with anxiety alone (p=0.014) as well as anxiety and depression combination (p=0.032) but not with depression alone (p=0.101).

Conclusion: The prevalence of anxiety and depression are quite high among breast cancer patients at the Korle Bu Teaching Hospital. Anxiety was significantly associated with the average monthly income while depression was associated with the marital status of patients. The high prevalence of both anxiety and depression among breast cancer patients makes it imperative for psychotherapy to be incorporated as an integral part of the management of breast cancer patients for the entire duration of the illness but more especially during the period immediately following diagnosis

Key Words: Breast cancer, anxiety, depression, oncology unit, Ghana

Introduction

In spite of current improvements in reducing recurrence and providing cure, cancer is still associated with pain, hopelessness, fear and death. Often linked with its diagnosis and treatment are psychological stresses which may be due to the actual symptoms of the disease or to the patient's or his/her family's perception of the disease. Patients have common fears, which have been characterized by six Ds:

i) death
ii) dependency on family, spouse and physician;
iii) disfigurement - sometimes resulting in loss or changes in sexual functioning
iv) disability
v) disruption of interpersonal relationships; and
vi) discomfort or pain in later stages of illness.[1]

Depression is a mood disorder that causes a persistent feeling of sadness and loss of interest.[2] According to the "Diagnostic and Statistical Manual of Mental Disorders, 4th Edition" (DSM-IV), it may be classified into mild, moderate and severe depending on the signs/symptoms set one exhibits.[3] Anxiety, on the other hand, is an emotion characterized by feelings of tension, worried thoughts and physical changes.[4]

Depression often co-exists with pain and anxiety,[5] with anxiety and depression usually occurring in cancer patients with several biological and psychosocial stressors.[6] These two conditions may arise at different stages from suspicious findings, cancer diagnosis through treatment to survival or the need for palliative treatment.[6]

Depression in cancer patients may be multi-factorial, resulting from the following: situational stress related to the cancer diagnosis and treatment, medications (steroids, interferon, or other chemotherapeutic agents), a biologically determined depression (endogenous or major depression) not related to a precipitating event, or recurrence of a bipolar mood disorder. The first two are the most common.[1]

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Though the exact etiology of depression in cancer is unknown, several factors have been suggested. These include the emotional impact of a cancer diagnosis, side effects of treatment, the disability associated with progression of cancer and the disruption of key relationship(s).[7]

The common causes of anxiety in patients with cancer may be grouped as follows: (*a) Situational, which includes diagnosis or illness related crisis, (b) Disease related, such as poorly controlled pain and abnormal metabolic states, (c) Treatment related, such as anxiety-producing drugs and withdrawal states and (d) Exacerbation of pre-existing anxiety disorder such as phobias and generalized anxiety disorders.*[8]

Breast cancer is the second most common cancer globally and the most frequent cancer among women.[9] It is associated with significant psychological morbidity, including anxiety and depression. However, the extent of this burden has not been documented in Ghana where most patients with breast cancer present with advanced disease. This, coupled with religious and other beliefs as well as misconceptions about breast cancer which may have psychological impact, makes this study even more relevant. This study is aimed at determining the prevalence of anxiety and depression amongst patients with breast cancer at the Korle Bu Teaching Hospital.

Subjects and Methods

A descriptive cross-sectional study was carried out at the Oncology Unit of the Surgical Department of the Korle Bu Teaching Hospital. All breast cancer patients presenting at the Surgical Department either as outpatients or who were admitted between May and July 2015 were invited to participate in the study. Patients who were terminally or critically ill as well as those who did not consent to the study were excluded. A total of 120 breast cancer patients participated in the study.

A structured questionnaire was used to obtain socio-demographic characteristics of patients. The hospital anxiety and depression scale (HADS) was used to screen for depression and anxiety in these patients. The HADS is a self-report questionnaire developed to detect adverse anxiety and depressive states.[10] It has 14 questions, 7 related to anxiety and 7 to depression. Scoring for each question is from 0-3 and the total scores range from 0-21. Scores of 0-7 are interpreted as normal, 8-10 borderline or mild and 11-21 abnormal (moderate to severe). Data was captured and analyzed using SPSS version 20. Descriptive statistics (mean, standard deviation and proportions) were computed. Chi-square tests were performed to test for any association(s) between variables and the outcomes of interest (anxiety and depression).

Written informed consent was obtained from each participating individual. Information obtained during the study was kept under lock and key and was used solely for the purpose of research. Data was doubled-keyed to check for consistency.

Results

Between May and July of 2015, a total of 146 patients with confirmed breast cancer reported for management of their condition at the Oncology Unit of the Department of Surgery. Twenty-two (22) of them were either critically or terminally ill or both and were therefore excluded from the study. Of the remaining 124, 4 did not consent to being part of the study and were also excluded. A total of 120 breast cancer patients took part in this study. The ages of participants ranged from 30 to 84 years with a mean of 50.3 ± 10.9 years. Their socio-demographic characteristics are as shown in Table 1. Most of them were married (56.7%) and had attained at least primary education (85%). Over 70% of them earned less than five hundred cedis (about $131) monthly with more than 40% earning less than one hundred cedis (about $26) monthly. Of the 120 women, 76 (63.3%) were post-menopausal.

Table 1: Socio-demographic characteristics of patients

Variables	(%) N=120
Age as at last birthday (years)	
30-34	10
35-39	9.2
40-44	11.7
45-49	15
50-54	16.7
55-59	22.5
60-64	5.8
≥65	9.2
Marital status	
Never married	11.7
Currently married	56.7
Divorced/separated	19.2
Widowed	12.5
Education (Highest completed)	
None	15
Primary	15.8
*JHS/Middle School	25.8
**SHS/Vocational/Technical	15
Tertiary	28.4
Average monthly income (in Ghana Cedis)	44.2
< 100	27.5
100-499	20
500-999	8.3
≥1000	

*Junior High School, **Senior High School

A third (33.3%) of the participants reported a history of anxiety/depression prior to being diagnosed with breast cancer. Overall, the prevalence of depression was 84.2% (39.2% being mild and 45% being moderate-to-severe), while that for anxiety was 92.5% (34.2% being mild

and 58.3% being moderate-to-severe). Forty-four percent of them had both anxiety and depression. There was no significant difference in depression (p=0.796) and anxiety (p=0.999) prevalence between post-menopausal (82.9% and 92.1% respectively) and pre-menopausal (86.4% and 93.2% respectively) patients.

Table 2: Disease-related characteristics of breast cancer patients

Variable	(%) N=120
Self-reported prior history of anxiety/depression	
Yes	33.3
No	67.7
Duration following diagnosis of breast cancer (months)	
<1	8.3
1-6	35.0
7-12	20.8
13-60	32.5
>60	3.3
Depression status	
Normal	15.8
Borderline (mild)	39.2
Abnormal (moderate-to-severe)	45.0
Anxiety status	
Normal	7.5
Borderline (mild)	34.2
Abnormal (moderate-to-severe)	58.3
Both anxiety and depression	44.2

Depression and anxiety levels did not differ significantly in the various durations following diagnosis with breast cancer (Table 3), however the highest prevalence for both depression and anxiety occurred in those who had been diagnosed with breast cancer for less than a month (90% and 100% respectively) while the least prevalence was found among those who had been diagnosed for more than 5 years (50% and 75% respectively).

There was no significant association between marital status and prevalence of anxiety alone (p=0.529). However, a significant difference in prevalence of depression alone (p=0.033) and depression in combination with anxiety (0.025) was found between those living with their partners and those living without their partners. Average monthly income was found to be significantly associated with anxiety alone (p=0.014) as well as anxiety and depression combination (p=0.032) but not with depression alone (p=0.101). The highest prevalence of anxiety (98.1%) was among those with the least average monthly income, while those with the highest average income had the least prevalence (70%).

Table 3: Association between prevalence of anxiety/depression and selected variables

Selected variables	Prevalence in percentage		
	Anxiety	Depression	Anxiety and depression
Duration since diagnosis (months)			
<1	100	90	40
1-6	92.9	83.3	45.2
7-12	88	84	40
13-60	94.9	87.2	48.7
>60	75	50	25
p-value	**0.499**	**0.576**	**0.737**
Average monthly income (Cedis)			
<100	98.1	86.8	58.5
100-499	93.9	90.9	33.3
500-999	87.5	79.2	37.5
≥1000	70	60	20
p-value	**0.014**	**0.101**	**0.032**
Marital status			
Living with partner	91.2	77.9	35.3
Living without partner	94.2	92.3	55.8
p-value	**0.529**	**0.033**	**0.025**

Discussion

In this study, we found the prevalence of depression and anxiety amongst patients with breast cancer to be 84.2% and 92.5% respectively with 44.2% of these patients having both anxiety and depression. This is much higher compared to the 33.3% self-reported prevalence of anxiety/depression in these same individuals prior to their being diagnosed with breast cancer.

This high prevalence of depression among breast cancer patients is comparable to what was found by Kovacs et al, 2011 (75.8%),[11] but much higher than the findings of similar studies in other settings.[12,13,14,15] The prevalence of anxiety in this study was also much higher than was found in other studies.[11,12,13,14,15] This rather high prevalence of depression and anxiety amongst our study population could be the result of many factors, including situational stress relating to the diagnosis and treatment of the cancer. One very plausible explanation could also be the late presentation of breast cancer cases in Ghana.[16]

In Ghana, more than 50 % of patients present with locally advanced or metastatic disease.[16]

Although breast cancer is usually not painful, advanced disease could become painful, and there may be pain from metastatic disease as well.[16] The more advanced the disease, the more pain the patient is likely to have. Depression and anxiety are known to have positive correlation with the affective and sensory components of pain respectively;[13] this may account for the very high prevalence of both disorders in the study population. Advanced disease is also associated with other symptoms such as large swollen breasts that cannot be hidden as well as bleeding and offensive discharge.[17] These symptoms/signs can also heighten the levels of depression and anxiety among patients. Other symptoms of advanced disease like breathlessness, cough and headaches may also be contributing factors.

In the current study, the highest prevalence of anxiety and depression (100% and 90% respectively) was recorded among individuals who had been newly diagnosed with breast cancer (< 1 month following diagnosis). These results are consistent with previous research findings that suggest that anxiety and depression are more prevalent within the newly diagnosed cancer population.[13, 18]

Anxiety was found to be associated with the average monthly income of the patients (p=0.014). Those with the least average monthly income had the highest prevalence (98.1%) of anxiety. Depression was also found to be associated with the marital status of the patients. The highest prevalence of depression (92.3%) was among patients living without their partners while those living with their partners had relatively lower prevalence of depression (77.9%). These findings were consistent with those of Hassan et al in 2015.[12] Breast cancer diagnosis and treatment can be quite expensive and the fear of not being able to meet the financial obligations associated with the management of their conditions could be responsible for the high anxiety prevalence. Disruption of interpersonal relationship is a known trigger for depression among breast cancer patients[1] and this may be a reason for the higher depression prevalence amongst patients living alone (without partners).

Conclusion

The prevalence of anxiety and depression are quite high among breast cancer patients at the Korle Bu teaching hospital. Anxiety was significantly associated with the average monthly income while depression was associated with the marital status of patients. The prevalence of depression and anxiety have very strong deteriorative effect on the quality of life of the patient, puts a burden on the patients' social relations and, at the same time, interferes with their active coping attitude and increases the chances of the recurrence.[19]

It is therefore imperative that psychotherapy be incorporated as an integral part of the management of breast cancer patients for the entire duration but more especially during the period immediately following diagnosis. As part of holistic management, spouses of patients should be educated on their partner's condition and encouraged to provide the needed emotional support. The National Health Insurance Authority (NHIA), should consider expanding the current coverage of the scheme to include full treatment for breast cancer. This will remove the financial barrier to seeking treatment and help reduce anxiety caused by unavailability of funds.

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CASE REPORT

ECTOPIC PREGNANCY AFTER BILATERAL TUBAL LIGATION

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Summary

Tubal ligation is a permanent voluntary form of contraception in which a woman's fallopian tubes are surgically cut or blocked off to prevent pregnancy. The procedure is a common method for achieving permanent sterilization and can be done at a Caesarean section or at a mini-laparotomy either immediately postpartum or as an interval procedure.

Case Report: To report the case of a 35year old woman (G3P2) who was successfully managed for ectopic pregnancy after a bilateral tubal ligation, and review the literature on this rare complication and its management.

Conclusion: This case has demonstrated that even though ectopic pregnancy after bilateral tubal ligation is uncommon, sterilization does not invariably confer permanent infertility in all cases.

Key Words: Ectopic, Pregnancy, Tubal, Ligation, Permanent, Contraception, Complication, Ghana

Introduction

Tubal ligation is a permanent voluntary form of contraception in which a woman's fallopian tubes are surgically cut or blocked off to prevent pregnancy. It is among the leading forms of birth control in the USA, preferred mainly because the sexually active potentially fertile users try to avoid the limitations of other contraceptive methods. According to Beers et al, this method is used by over 10 million women in the United States of America (USA) where over 15% of women of reproductive age, are typically over 30years, married, and with two or three children[1].

In many developing countries with rapid population growth concerns, tubal ligation by the open technique is a common method for achieving permanent sterilization. In these cases, the procedure is done at a Caesarean section or as a mini-laparotomy either immediately postpartum or as an interval procedure[2].

An ectopic gestation is a complication of pregnancy in which the embryo gets implanted outside the uterine cavity[3]. It is a common gynaecological emergency, that can be life-threatening and a major event in a woman's reproductive life[4].

Ectopic pregnancy is a high-risk condition that occurs in 1.9 percent of reported pregnancies and has been reported as the leading cause of pregnancy-related death in the first trimester[5]. In many developing countries, ectopic pregnancy remains a major public health challenge as it is a major cause of maternal morbidity and mortality[6].

Most ectopic pregnancies occur in the Fallopian tubes, termed tubal pregnancies, but implantation may also occur in the cervix, ovaries and abdomen.

There are a number of risk factors for ectopic pregnancies, even though in up to 50% of cases, there have been no risk factors identified. Known risk factors include previous pelvic inflammatory disease (PID), assisted reproductive technology (ART), use of intrauterine contraceptive device (IUD), previous ectopic, tubal surgery, intrauterine surgery and smoking[7].

The incidence of failed abdominal bilateral tubal ligation (BTL) is quite low. The reasons for this failure are usually faulty surgical technique, formation of fistulous tract between the severed ends or spontaneous re-anastomosis of the severed tubal ends. The failure rate is higher in the patients undergoing tubal ligation at the time of Caesarean section[5]. If it occurs, this pregnancy is usually extra uterine or ectopic in location, with most common site being the interrupted fallopian tubes. It has also been reported in ovaries or intra-abdominal locations[2].

The patient with ectopic pregnancy after BTL can have serious and fatal consequences in untreated cases or where the treatment is delayed. Because the sterilization confers a good sense of security, the patient typically does not suspect pregnancy and so may overlook the signs and symptoms, thus reporting late[5].

Compared with a vasectomy, BTL is 20 times more likely to have major complications, 10 to 37 times more likely to fail, and also costs three times as much. Moreover, the procedure-related mortality, although rare, is 12 times higher with sterilization of

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the woman than of the man. Despite these advantages, 300,000 more BTLs are usually done than vasectomies. Hendrix et al found from their study that vasectomy was the safest, most efficacious, and least expensive method of sterilization. They subsequently propose that physicians should recommend vasectomy when providing counseling on sterilization, despite the popularity of BTL[10].

Case Report

The patient is a 35year old woman (P3+0) who had her first delivery vaginally, followed by two Caesarean sections. At her last deliver, which was her second Caesarean section 4years earlier, she had a Bilateral Tubal Ligation for permanent contraception. She reported at a health facility in Accra on 10/09/2014 at 2:49pm with complaints of having missed her period, feeling pregnant, with nausea, heaviness in both breasts and dysuria over three days. Her last menstrual period (LMP) was on the 14/07/2014. She has had regular 28day menstrual cycles during which she bled for 4days.

She is a known hypertensive diagnosed two years earlier and currently being managed on oral Nifedipine 30mg daily and Bendrofluazide 5mg daily.

On examination the young woman looked stable, fully conscious, alert and well oriented. She was not febrile, pale or dehydrated. Her respiratory system findings were normal. Her pulse rate was 95beats per minute, Blood pressure 141/85mmHg.

Her abdomen appeared full, moved normally with respiration, and had a Pfannenstiel incision scar. There was mild supra-pubic tenderness with no associated guarding or rebound tenderness; neither was there any masses palpable nor fluid demonstrable.

A routine pelvic ultrasound scan showed a slightly bulky anteverted uterus with multiple tiny intramural myomata giving a heterogenous echogenicity. The endometrium appeared thickened, measuring 88mm, both adnexae appeared normal with minimal fluid noted in the pouch of Douglas. Her differential diagnoses were Urinary Tract Infection and a suspected extra-uterine gestation in a woman with previous BTL

A full blood count, urinalysis, urine culture with sensitivity, and a baseline quantitative serum beta Human Chorionic Gonadotrophin (HCG) and a repeat HCG after 48hours were requested. She was started on oral Cefuroxime and Paracetamol, counseled and scheduled for review after 72hours with the laboratory results.

She was subsequently reviewed 72hours later with a persistence of her initial symptoms. Her blood counts and urine test results were normal. Her baseline beta HCG measured 72,200iu/l and the 48hour repeat reported 72,600iu/l.

A repeat pelvic ultrasound scan revealed an empty uterus with a gestational sac and a live fetus in the right adnexa with fetal cardiac activity and a crown ramp length (CRL) of 2.06cm corresponding to 8weeks and 4days gestation.

The diagnosis of ectopic gestation was thus confirmed and patient appropriately counseled and prepared for an emergency laparotomy. Findings at surgery were: a slightly bulky uterus, bilaterally disjointed tubes, and an intact gestational sac containing one live fetus with gross movements implanted on the posterior aspect of the right broad ligament and partially attached to the right ovary.

The right broad ligament was removed with the gestational sac, haemostasis secured, haemo-peritoneum of about 250mls suctioned, peritoneum cleaned and abdomen closed in layers.

The patient made uneventful post-operative recovery and was discharged home on the third post-operative day in a very satisfactory condition. She was reviewed after two weeks and six weeks, and then discharged.

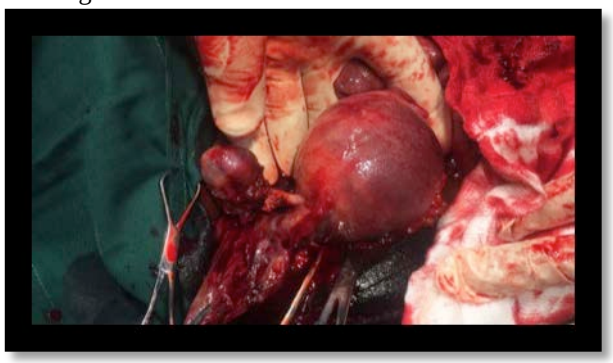

Fig. 1: Right postero-lateral view of uterus showing location of gestation

Fig. 1b: Gestational sac containing fetus after removal

Discussion

Tubal ligation is a common surgical method of contraception. The procedure permanently occludes the Fallopian tubes and may involve the tubes being cut and tied, cauterized, blocked with a silicone band (Falope ring), or clipped to ensure spermatozoa are unable to reach and fertilise an oocyte.

The possibility for this method to fail is as low as 7 pregnancies per 1,000 procedures. Failure following BTL can happen if the cut ends of the tubes re-

anastomose; if the tube was not completely cut or blocked off; if the plastic clip or rubber band has loosened or come off; or if the woman was already pregnant at the time of the procedure[1]. The Pomeroy technique of tubal ligation and resection is the most commonly used, and involves creating and tying off a loop of the fallopian tube. The tied off section is then surgically removed. The ligatures are designed to dissolve; eventually leaving two separated sealed ends. There are variations of the Pomeroy technique and the risk of failure has been related to the duration the suture material takes to dissolve to free the two ends of the tube[11]. In Ghana, most clinicians use either the chromic cutgut or vicryl sutures in tubal ligations largely based on what is available. There is evidence to support the increased likelihood of failure if the ligature remained longer, holding the severed ends of the tubes together, as this allows for easy fistulous recanalization. Also, it has been shown that BTLs done at Caesarean sections are associated with higher failure rates[2].

The patient in this case had BTL done through the modified Pomeroy fashion using a delayed absorbable suture three years earlier, during her second Caesarean section. There was therefore appreciable risk in this patient for the BTL to fail. Knowing she has had a tubal ligation, the woman was certain she had protection from any unwanted pregnancy, hence reported two months after missing her periods.

Ectopic pregnancy after BTL can have serious and fatal consequences if untreated or where the treatment is delayed. As the sterilization confers a sense of security, the patient does not suspect pregnancy and may overlook the signs and symptoms. Most often, the patient has had her periods at the due date, even though the flow is scanty due to the shedding of decidua cast from the uterus. This leads to a delay in seeking treatment. In cases of unruptured tubal pregnancies, the patient may present with sharp agonizing pain located in the pelvic region or the iliac fossa. If tubal rupture has occurred the patient can present to the emergency room in a state of unexplained hypovolemic shock. The history of tubal ligation and the apparently normal monthly period can mislead even the most experienced clinician[12].Early diagnosis requires a high index of suspicion by the clinician with the understanding that patient history, physical examination, and a single quantitative beta-HCG level cannot reliably rule out an ectopic pregnancy.

Despite this woman's previous BTL, the suspicion of ectopic informed the evaluation of baseline, and the repeat serum hormones to confirm the diagnosis. In agreement with the recommendation by Della-Giustina et al[12] that ultrasound findings, in conjunction with quantitative serum beta-HCG levels should guide the diagnosis of ectopic, this patient had the needed evaluation approach.

This patient's baseline hormone levels reached the pregnancy threshold but the 48hour repeat did not attain the near doubled level expected in majority of intrauterine viable gestations, and the sonographic findings of the extra-uterine gestation confirmed the diagnosis.

Following BTL, ectopic pregnancy has been reportedly found in the ovaries and other intra abdominal locations[5], but none documented to have been seen on the posterior aspect of the broad ligament as seen in this case.

The location of this extra-uterine gestation on the posterior aspect of the right broad ligament may likely be the result of a recanalized proximal tubal stump that provided access to the spermatozoa to reach an ovum released from the right ovary most likely on to the posterior surface of the right broad ligament.

Management of ectopic gestation depends on the presentation. Most patients present with features of shock and would require urgent resuscitation combined with urgent laparotomy to arrest potentially life-threatening internal haemorrhage. Those who are haemodynamically stable and meet the set criteria may benefit from expectant treatment like the use of medical or laparoscopic management[5],[2].

The patient in this case had fluid demonstrated in the pouch of Douglas, and coupled with the two previous caesarean surgeries, appropriately had an emergency laparotomy.

Conclusion

This case has demonstrated that even though ectopic pregnancy after bilateral tubal ligation is uncommon, sterilization does not confer permanent infertility in all cases. These women should be adequately counseled on the rare possibility of failure. Clinicians should not disregard the possibility of ectopic gestation in women who have undergone bilateral tubal ligation.

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EXERCISE INDUCED PARALYSIS IN TWO YOUNG GHANAIAN MEN

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Summary

We present two cases of young Ghanaian males who presented to the Korle Bu Teaching Hospital between August and September 2013 with a history of exercise induced quadriparesis and diagnosed to have hypokalaemic periodic paralysis. Both patients had had recurrent paralysis for years without a diagnosis. The condition is part of a heterogeneous group of chanellopathies that affect sodium, potassium, and calcium channels in membrane cells. It has autosomal dominant inheritance with male preponderance, common in Caucasians and Asians and rare in blacks

Key Words: hypokalaemia, periodic paralysis, quadriparesis

Introduction

Hypokalemic paralysis is a form of metabolic myopathy, which represents a heterogeneous group of disorders associated with hypokalaemia, acute flaccid paralysis which may be potentially fatal when the weakness involves the respiratory muscles or there is life-threatening cardiac arrhythmia. The first known description of periodic paralysis was given by Musgrave in 1727[1]. Since then, hypokalaemic paralysis has been reported from different parts of the world predominantly in South East Asia[2]. Hypokalaemic periodic paralysis (HPP) can be a primary disorder, which may be familial with autosomal-dominant inheritance or sporadic, or it may be secondary with causes like renal tubular acidosis (RTA), thyrotoxic periodic paralysis (TPP), primary hyperaldosteronism, Gitelman syndrome, barium poisoning, and diarrhoea[3]. Familial periodic paralysis (FPP) is the commonest cause of HPP in Caucasians, and TPP is the leading cause in Asian population[4,5]. Although the clinical manifestation may be similar in both types, the severity and the long-term management may be different and, therefore, it is imperative for physicians to find out the cause of hypokalaemic paralysis. Failure to make a distinction between these two types may result in mismanagement, which can be fatal.

Case Reports

Case 1

A 26 year old male university student was referred to emergency department in July 2013 with a history of inability to move all his four limbs upon waking up early in the morning 2 days prior to presentation. It begun in the evening as ascending weakness of both lower limbs 3 hours after a basketball game. By the following morning he could not get out of bed. This was his fourth experience of such a presentation; the previous presentations were in 2003, 2006, and 2009 which he recovered spontaneously without a deficit within 48-72 hours. There was no history of diarrhoea or vomiting with the current or previous episodes of weakness.

He had received empirical treatment comprising antibiotics and steroids with a diagnosis of recurrent Guillaine Barre syndrome. He had neither family history of a similar illness nor a chronic medical condition Central nervous system (CNS) examination revealed decreased muscle tone including loss of neck control but normal muscle bulk and muscle power of MRC grade 2/5. Deep Tendon Reflexes were reduced in all areas with a normal sensory examination and he had no evidence of respiratory distress or abnormal cardiac rhythm. Serum electrolytes showed potassium of 1.8 mmol/L

Case 2

A 21 year old senior high school graduate presented with 3 days history of progressive muscle weakness which had worsened to quadriparesis on day of presentation. He had had several episodes of such weakness over the years which frequently occurred after vigorous exertion, the current presentation having occurred after sexual intercourse. He would regain full muscle strength spontaneously, within 6 hours without going to the hospital. In the current situation, the weakness had persisted beyond the usual 6 hours necessitating him to seek medical attention. He had no family history of a similar illness, no chronic medical condition and had had neither diarrhoea nor vomiting with the current or previous episodes. On physical examination he was not in respiratory distress and did not have any abnormal cardiac rhythm Central Nervous System Examination revealed a normal muscle bulk, decreased tone, and muscle power of MRC grade 2/5. The rest of the examination was unremarkable.

Serum electrolytes showed potassium of 1.9mmol/l

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Case 1 Electrolyte chart:

	Day 1	Day 3	OPD (2wks)
Na^+	137mmol/l	137mmol/l	134mmol/l
K^+	1.8mmol/l	4.5mmol/l	4.0mmol/l
Cl^-	98mmol/l	103mmol/l	100mmol/l
Bicarbonate	26mmol/l	29mmol/l	26mmol/l
Urea	7.5mmol/l	4.7mmol/l	4.0mmol/l
Creatinine	98umol/	88umol/l	74umol/l

Case 2 Electrolyte chart:

	Day 1	Day 3	OPD (2 wks)
Na^+	**142mmol/l**	142mmol/l	137mmo/l
K^+	**1.9mmol/l**	4.3mmol/l	4.5mmol/l
Cl^-	106mmol/l	103mmol/l	96mmol/l
Urea	5.2mmol/l	3.8mmol/l	3.1mmol/l
Creatinine	63umol/l	66umol/l	60umol/l

Both patients were diagnosed to have hypokalaemic periodic paralysis based on the typical history and the low serum potassium on admission to the emergency room without objective clinical loss of potassium. Case I received parenteral potassium chloride because of the clinical severity (Loss of neck control) and case 2 received oral potassium supplementation. Both cases were walking by the 3rd day of admission regardless of the different approaches to treatment. The repeated serum electrolytes were also normalized. Other laboratory results including FBC, urine analysis, ECG, chest X ray, Liver and thyroid function tests were normal.

Thyroid function tests for the two patients are below:

Case 1 Thyroid Function tests

Parameter	Results	Reference Range
S-TSH (Thyrotropin)	1.12 uIU/mL	0.34-5.6
S-FT3 (Direct)	7.2 pmol/L	3.7-10.4
S-FT4 (Thyroxine)	8.6 pmol/L	7.5-21.1

Case 2 Thyroid Function tests

Parameter	Results	Reference Range
S-TSH (Thyrotropin)	1.08 uIU/mL	0.34-5.6
S-FT3 (Direct)	5.3 pmol/L	3.7-10.4
S-FT4 (Thyroxine)	8.4 pmol/L	7.5-21.1

Discussion

Acute hypokalaemic paralysis, a clinical syndrome characterized by acute systemic weakness and low serum potassium, is a rare but treatable cause of acute weakness. Therefore, it is imperative for physicians, particularly those working in acute care settings, to be aware of this condition and to take prompt action when encountered. If recognized and treated appropriately, patients recover without any clinical sequellae[3].There have been no reported cases of this condition in Ghana in the recent past and this may be due to the rarity of the condition or misdiagnosing it for other causes of acute flaccid paralysis. The patient in case 1 for instance, was not diagnosed for 10 years despite several hospital admissions for acute paralytic attacks. Most cases of hypokalaemic paralysis are due to familial or primary hypokalaemic periodic paralysis; sporadic cases are associated with numerous other conditions including barium poisoning, hyperthyroidism, renal disorders, certain endocrinopathies and gastrointestinal potassium losses. The age of onset, race, family history, medications, and underlying disease states can help in identifying the cause of hypokalaemic paralysis[3,6,7]. None of our patients had a known family history of periodic paralysis and neither of them had any form of thyroid disease. Clinical symptoms of hyperthyroidism have been found to be mostly subtle in patients with hypokalaemic periodic paralysis despite obvious biochemical derangement[3]. In addition they had no renal or gastrointestinal disease.

Because our patients had no concurrent illness and had had no procedures, they were unlikely to have the familial forms of hypokalaemic paralysis. Familial hypokalaemic periodic paralysis is however an autosomal dominant condition with symptoms usually beginning before the age of 25 years with a male preponderance[8] . Our patients were both males, 26 and 21 years of age and had no family history. It is likely that they may have the primary (sporadic) form of hypokalaemic periodic paralysis. This could not be affirmed because of our inability to do genetic testing in our setting for ultimate defective ion channel. Attacks may be precipitated by a carbohydrate-rich meal (secondary to insulin secretion) or physical exertion associated with increased muscle consumption of glucose and intracellular potassium influx[2,7,9]. Of the several precipitating factors, increased physical activity has been observed to be the most common trigger factor[2,10]. Because of the precipitation of weakness by a high carbohydrate meal, increased plasma glucose may be a presentation finding which may result in the inadvertent use of insulin in such patients. It is therefore worth emphasizing that, patients presenting with flaccid paralysis or extreme weakness in the setting of a high blood sugar need to have their potassium levels evaluated and corrected before administering insulin, especially if the patient is not known to have diabetes mellitus or with a family history of periodic paralysis. If this precaution is not taken, the high blood sugar in the presence of increased insulin level will worsen the hypokalaemia by driving the little potassium left into the intracellular space leading to cardiac conduction abnormalities.

The diagnosis of hypokalaemic paralysis is based on a combination of history, physical examination, laboratory and ancillary studies. Laboratory investigations to be done include serum levels of

sodium, potassium, calcium, magnesium, urea and creatinine, serum Creatinine Phosphokinase (CPK), thyroid function tests, urine pH, arterial blood gas analysis, and 12 lead electrocardiogram (ECG). Laboratory studies should be consistent with low serum potassium levels. The ECG may show U waves, prolonged QT interval or even ventricular arrhythmia. Transtubular potassium concentration gradient and potassium-creatinine ratio during paralytic attack is very important to distinguish potassium loss from a renal disease. For example a urinary potassium concentration >20 mmol/L, or a urinary potassium/creatinine ratio of >2.5 indicates urinary loss of potassium. Also, a transtubular potassium concentration gradient (TTKG) >3.0 suggests hypokalaemia of renal origin[11]

The weakness in hypokalaemic paralysis can range from mild isolated transient involvement of specific muscle groups to diffuse generalized weakness leading to quadriparesis. Our patients presented with quadriparesis and serum potassium level below 2.0 mmol/l. Both patients usually got the attacks after a rest following physical exertion and never during the activity. The first case never thought the physical activities had a connection with his attacks unlike the second patient who noticed the relationship between activity and his attacks.

Acute cases can last from hours to several days and can be a onetime event or recurrent periodic episodes[1]. The patient in case 1 had his attacks usually lasting more than 24 hours and this resulted in 3 different occasions of hospitalization. The second case usually had his attacks lasting in less than a day but usually frequent. The longest period of attack resulted in the presentation in this report

Thyrotoxic periodic paralysis (TPP) is another differential when evaluating hypokalaemic paralysis[3,12]. TPP is common in the Asian sub-continent, age of onset of symptoms and inheritance pattern are similar to the familial type[12].

In a large study from Taiwan, which included 97 patients, 68% patients had demonstrable secondary causes of which thyrotoxicosis was the most frequent (40.2%) cause[2].

There are various theories regarding the mechanism of the hypokalaemia in an elevated thyroid state, including the direct effect of high circulating hormone titers on Na+-K+-ATPase pump, which lead to increased cellular potassium uptake and hypokalaemia. The exact mechanism however remains unclear. It is therefore imperative to do serum free T4, T3, and TSH levels to exclude TPP in patients presenting with hypokalaemic paralysis. This was done in our patients however they had normal thyroid function.

Potassium supplementation is warranted in acute cases of hypokalaemic paralysis. Oral replacement with potassium chloride is usually preferred over intravenous supplementation[12,13]. Intravenous potassium should be used in cases with cardiac arrhythmia or respiratory compromise secondary to pharyngeal weakness or involvement of respiratory muscles[1,13] A recommended initial dose of 0.5 to 1 mmol/kg would raise serum potassium concentrations by 1 to 1.5 mmol/L[1]. Because the hypokalaemia and subsequent changes in potassium concentration induced by treatment may result in cardiac arrhythmias, it is important to monitor the electrocardiogram (ECG) before, during, and after treatment and to have repeated assessment of blood potassium concentration[4].

Prophylactic management with carbonic anhydrase inhibitors (CAIs) such as acetazolamide can be considered in cases with frequent, recurrent attacks[11,13,14]. In patients with limited response to CAIs, potassium-sparing diuretics such as triamterene and spironolactone can be considered[3]. The efficacy of topiramate, an anticonvulsant with CAI-like activity, has been described in a case report[1] and it is not well characterised

It will be noticed that we treated our initial case with parenteral potassium chloride on day one due to the profound weakness that was threatening respiratory function. The second patient had oral potassium supplementation.

Patients with history of hypokalaemic paralysis need special care when they are being worked up for surgical procedures to prevent secondary complications such as Pre- or postoperative paralysis[15]. The following are recommended:

- Close control of serum potassium concentration
- Low carbohydrate intake
- Avoidance of large glucose and salt loads
- Maintenance of body temperature and acid-base balance
- Careful use of neuromuscular blocking agents with continuous monitoring of neuromuscular function

Conclusion

Hypokalaemic paralysis is a serious but reversible condition if recognized in time and treated promptly. It is supposed to be uncommon in sub-Saharan Africa but we have presented here two cases of such with rather interesting presentation very common to most emergency room settings. Even though we had limitations in doing genetic testing, hypokalaemic paralysis remains a clinical diagnosis and we propose Hypokalaemic paralysis should be considered as a differential diagnosis in patients presenting with acute flaccid paralysis in the absence of an acute illness in emergency rooms in Ghana. Emergent management should include adequate and timely potassium replacement, diagnostic evaluation, and close monitoring.

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AstraZeneca

NEW

FORXIGA™ removes excess glucose and creates multiple benefits for your patients with type 2 diabetes[1,2,3]

- Inhibits renal glucose reabsorption, promotes excess urinary glucose excretion and lowers hyperglycaemia[3,4]
- Lowers blood glucose independently of insulin action[4]
- 4 years of clinically-proven efficacy and safety data[4]
- Once-daily dosing[5]

As the most prescribed SGLT2 inhibitor worldwide,[7] FORXIGA™ does more than just reduce HbA_{1C}

***FORXIGA™ is not indicated for the management of weight loss or high blood pressure. Weight change was a secondary endpoint in trials.[3]**

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1. Bailey CJ, Day C. SGLT2 Inhibitors: Glucuretic treatment for type 2 diabetes. *Br J Diab & Vasc Disease* 2010;10(4):193-199. 2. 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. 3. 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. 4. Del Prato S, Nauck M, Durán-Garcia S, *et al.* Long-term glycaemic response and tolerability of dapagliflozin versus a sulphonylurea as add-on therapy to metformin in patients with type 2 diabetes: 4-year data. *Diab Obes & Metab* 2015;doi:10.1111/dom.12459:1-10. 5. Forxiga™ package insert.UK. 2014. 6. Bailey CJ, Gross JL, Hennicken D, *et al.* Dapagliflozin add-on to metformin in type 2 diabetes inadequately controlled with metformin: a randomized, double-blind, placebo-controlled 102-week trial. *BMC Medicine* 2013;11:43. 7. IMS Health database, MIDAS, August 2015.

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Excess glucose – remove it