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EDITORIAL

THE FIGHT AGAINST CANCERS

From records of the Kumasi Cancer Registry of 2015, the leading cancers seen in the country are liver and prostate cancers in males, breast and cervical cancers in females and non-Hodgkin's lymphomas and leukemias in children. The trend probably is the same as of today. The worry is that most adults with cancers present to health facilities rather late.

The reasons why such patients present late are not far-fetched and include:

- Lack of education on recognizing early symptoms of cancers
- Self-medication
- Belief in ascribing non-specific symptoms and especially new growths and other lesions on the body to certain traditional diagnoses with its attendant application of inappropriate local herbal and drug treatment.
- Beliefs in linking such non-specific symptoms to witchcraft and supernatural powers
- Poverty

How do we as service providers and training/research institutions fit into the fight against cancers in the country?

The fight against cancers cannot be won without preventive measures. It is an undeniable fact that cervical cancer is recognized as a sexually transmitted disease whose "long incubation phase" enables us to offer preventive and therapeutic measures. Vaccination against the HPV virus, life-style modification and national screening programmes need to be intensified. The treatment of pre-invasive forms of the disease must be addressed. In this regard, we need to train and equip more nurses and other field workers in the use of simple but effective technologies in identifying the pre-invasive forms of the disease and offer appropriate treatment modalities. The scaling up of visual inspection with acetic acid/iodine and the use of thermocoagulation, among others in treating pre-malignant lesions of the cervix cannot be overemphasized. We also need to encourage and help equip private practitioners and facilities in this fight against cervical cancer.

The incidence of breast cancer is increasing in the developing world due to increase life expectancy, increase urbanization and adoption of western lifestyles. Although some risk reduction might be achieved with prevention, these strategies cannot eliminate the majority of breast cancers that develop in low- and middle-income countries where breast cancer is diagnosed in very late stages. Therefore, early detection in order to improve breast cancer outcome and survival remains the cornerstone of breast cancer control.

The only breast cancer screening method that has proved to be effective is mammography screening. Efforts must be made by government and our health partners to ensure the availability of functioning equipment for mammography in the country. Programmes that will ensure that women avail themselves of the opportunity of being regularly screened must also be put in place. Low-cost screening approaches, such as clinical breast examination must be aggressively advocated and implemented in the country.

Men must be encouraged to have screening for prostatic cancer by undergoing periodic digital rectal examination coupled with ultrasound and PSA testing.

The most significant risk factor for liver cancer is chronic infection with hepatitis b virus (HBV) and hepatitis c virus (HCV). Other factors include chronic heavy alcohol usage, smoking and the ingestion of aflatoxins. Avoiding such risk factors will go a long way to reduce liver cancers. Vaccination against HBV will also be protective. However, there is no vaccine for HCV currently.

Unlike cancer in adults, the vast majority of childhood cancers do not have a known cause. Many studies have sought to identify the causes of childhood cancer, but very few cancers in children are caused by environmental or lifestyle factors. Cancer prevention efforts in children should focus on behaviours that will prevent the child from developing preventable cancer as an adult.

Some chronic infections are risk factors for childhood cancer. For example, HIV, Epstein-Barr virus and malaria increase the risk of some childhood cancers. Other infections can also increase the child's risk of developing cancer as an adult. Current data suggest that approximately 10% of all children with cancer have a predisposition because of genetic factors. Early diagnosis consists of 3 components: awareness by families and accessing care, clinical evaluation/diagnosis and access to treatment.

When identified early, cancer is more likely to respond to effective treatment and result in a greater probability of survival, less suffering, and often less expensive and less intensive treatment. A correct diagnosis is essential to treat children with cancer because each cancer requires a specific treatment regimen that may include surgery, radiotherapy, and chemotherapy. Cure is possible for more than 80% of childhood cancers, in most cases with inexpensive generic medications.

The training of doctors at the membership level in general oncology and fellows in sub-specialty areas is key.

We need to increase the numbers of specialists trained in histopathology to help with the rapid

diagnoses of cancer patients. One has to acknowledge that the training of specialists in sub-specialty areas takes time as only few residents can be taken at a time. The lack of medical oncologists to man the few oncology centres in the country is another issue the country has to address.

We also need to scale up the training of radiation oncologists, medical physicists and specialized nurses in chemotherapy to address the deficit in this area.

The training of specialised laboratory personnel, the development of laboratory quality assurance programmes and standardised procedures and reporting all need to be scaled up.

Other challenges that militate against ensuring optimum services to our cancer patients

- Lack of trained medical professionals and opportunities for training that negatively impact the quality of patient care.
- Insufficient and inadequate equipment and infrastructure for providing quality oncology services.
- Lack of harmonized cancer treatment guidelines and protocols as well as standard operating procedures (SOPs)
- Absence of comprehensive cancer care centres and dedicated units for patients (and relatives) undergoing cancer treatment and palliative care

Palliative care relieves symptoms caused by cancer and improves the quality of life of patients and their families. Not all patients with cancer can be cured, but relief of suffering is possible for everyone. Palliative care should be appropriately considered as a core component of comprehensive care starting when illness is diagnosed and continued regardless of whether or not the patient receives treatment with curative intent.

Palliative care programmes can be delivered through community- and home-based care to provide pain relief and psychosocial support to patients and their families. Adequate access to oral morphine and other pain reliefs should be provided for the treatment of moderate to severe cancer pain, which affects more than 80% of cancer patients in the terminal phase.

Finally, the treatment of cancer patients is very expensive and few patients can afford the entire cost of treatment. It would be a great relief if the cost of cancer therapy can be entirely absorbed onto the National Health Insurance Scheme. Private insurers are also greatly encouraged to fully absorb the treatment of cancers in the country.

Only with such collective efforts can we win the fight against cancers in the country.

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COMMENTARY

GHANA PRODUCES FIRST GYNAECOLOGIC ONCOLOGISTS: IMPLICATIONS FOR THE NATION AND HOPE FOR THE AVERAGE WOMAN?

Ghana produces first gynaecologic oncologists: implications for the nation and hope for the average woman?

The Ghana College of Physicians and Surgeons has recently produced the first two Fellows by examination in Gynaecologic Oncology by a novel training programme [1]. I congratulate Dr. Kwabena Amo-Antwi and Dr. Adu Appiah-Kubi as well as their trainers. This is a landmark achievement not only for themselves but for the whole country. It shows that Ghana can be on the path to solving her own problems.

Postgraduate training in obstetrics and gynaecology has come a long way. Before the Ghana College of Physicians and Surgeons, the West African College of Surgeons trained and produced Specialist obstetrician gynaecologists for Ghana [2]. Once upon a time, these doctors had to travel to Nigeria to write the examination to be certified as Specialists/Fellows. One would pass out as a fellow or never make it out as a specialist. Many never came out as specialists. The few who came out were 'generalists' (mainly based in Accra and Kumasi) and attended to everything in obstetrics and gynaecology from Maternal-Fetal Medicine, Reproductive Health and Family Planning, urogynaecology to gynaecologic oncology *[3, 4].

While we need many 'generalists', it has become increasingly clear that one person cannot do everything in obstetrics and gynaecology at the highest/world class level. The Ghana College of Physicians and Surgeons came in and started producing a 'middle level of specialists' called Members of the College who could later continue training to become Fellows. This brought a lot of debate (that is not for this piece). After the membership, these specialists could go into subspecialties like Maternal-Fetal Medicine, Reproductive Health and Family Planning, Urogynaecology and Gynaecologic Oncology. After a long journey, Ghana has two gynaecologic oncologists by examination. They are both currently in Kumasi.

As we congratulate the new subspecialists and celebrate this feat, hoping that they will have a similar impact like the general obstetrician-gynaecologists trained in Ghana [5], we have to look at a few things:

- A. What human capacity do we need to address the burden of gynaecologic cancers in Ghana? Surely not gynaecologic oncologists alone?
 - How many gynaecologic oncologists does Ghana need?
 - Where should these gynaecologic oncologists be to reach out to all women in Ghana but not just a few?
 - What other cadre of staff and numbers (radiation oncologists, medical oncologists, oncology nurses, pharmacists etc) does Ghana need to reach out to

everyone in need of gynaecologic oncology services?

[Currently Ghana has only three centres where radiotherapy can be given for cervical cancer - Komfo Anokye Teaching Hospital (Kumasi), Korle Bu Teaching Hospital (Accra), and the Sweden Ghana Medical Centre (Accra)].

- B. How do we produce these cadre of staff sustainably across the country?
- C. Many gynaecologic cancers (especially cervical cancer, which is the commonest in Ghana) are preventable. How do we develop and implement a national programme to prevent these cancers so that we do not overburden the few gynaecologic oncologists in the country to be performing complex surgeries which could have been prevented by simple procedures like HPV vaccination, screening and treatment of precancerous lesions of the cervix, which can be done by nurses in CHPS compounds [6, 7]?

A new era in gynaecologic oncology has arrived in Ghana. It comes with responsibilities for the new gynaecologic oncologists and all of us. Whether we succeed as a nation or not depends on how we plan and the effort we put in. Time will tell.

Dr. Kofi Effah is a gynaecologist and head of the Cervical Cancer Prevention and Training Centre in Catholic Hospital, Battor in the North Tongu District of the Volta Region of Ghana.

References

1. Erem AS, Appiah-Kubi A, Konney TO, Amo-Antwi K, Bell SG, Johnson TRB, Johnston C, Tawiah Odoi A and Lawrence ER (2020) Gynecologic Oncology Sub-Specialty Training in Ghana: A Model for Sustainable Impact on Gynecologic Cancer Care in Sub-Saharan Africa. *Front. Public Health* 8:603391. doi: 10.3389/fpubh.2020.603391
2. Klufio CA, Kwawukume EY, Danso KA, Sciarra JJ, Johnson T. Ghana postgraduate obstetrics/gynecology collaborative residency training program: success story and model for Africa. *Am J Obstet Gynecol.* 2003;189 (3):692---696.
3. Anderson FWJ, Mutchnick I, Kwawukume EY, et al. Who will be there when women deliver? *Obstet Gynecol.* 2007;110(5):1012---1016.
4. Clinton Y, Anderson FW, Kwawukume EY. Factors related to retention of postgraduate trainees in obstetrics-gynecology at the Korle-Bu Teaching

- Hospital in Ghana. *Acad Med.* 2010;85(10):1564---1570.
5. Anderson FW, Obed SA, Boothman EL, Opare-Ado H. The public health impact of training physicians to become obstetricians and gynecologists in Ghana. *Am J Public Health.* 2014;104(Suppl.1):S15965. doi: 10.2105/AJPH.2013.301581
 6. World Health Organization. (2019). WHO guidelines for the use of thermal ablation for cervical pre-cancer lesions. World Health Organization. <https://apps.who.int/iris/handle/10665/329299>.
 7. Pinder LF, Parham GP, Basu P, et al: Thermal ablation versus cryotherapy or loop excision to treat women positive for cervical precancer on visual inspection with acetic acid test: Pilot phase of a randomised controlled trial. *Lancet Oncol* 2020; 21:175-184
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ORIGINAL ARTICLES

CHANGES IN SERUM ELECTROLYTES IN BLOOD TRANSFUSED AND NON-TRANSFUSED POST-OPERATIVE PATIENTS AT A NATIONAL REFERRAL HOSPITAL IN GHANA

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Abstract

Background: Red blood cell transfusion among patients is an essential part of medical care, and can be life-saving. This study therefore determined changes in serum electrolyte in blood transfused and non-transfused post-operative patients at the Korle-Bu Teaching Hospital (KBTH) in Ghana.

Methodology: This was a hospital-based longitudinal study involving 160 female patients aged 18- 70 years admitted to the KBTH and screened pre-operatively. In all 92 general surgical and gynaecological adult patients who met the inclusion criteria were studied post-post operatively. Data abstraction form was used for data collection on demographic, weight and serum electrolytes. Categorical data were analysed using chi-square. Independent t-test was used to compare the means for the two groups, while the paired t-test was used to compare the means for the immediate post-operative and 24 hours post-operative period, using SPSS version 23.0 software.

Results: In the transfused patients, serum levels of sodium ($p= 0.297$), Chloride ($p= 0.143$), and calcium ($p= 0.368$) increased, while potassium ($p= 0.383$) and magnesium ($p= 0.147$) levels decreased after transfusion; although not statistically significant. However, there was a significant decrease in serum levels of sodium ($p= 0.040$), potassium ($p= 0.001$), and magnesium ($p= 0.026$) in non-transfused patients 24 hours post operatively. Hypomagnesemia was observed among the transfused patients in this study (pre-transfusion, 0.66 ± 0.05 vs. post transfusion, 0.57 ± 0.04 , $p= 0.147$)

Conclusion: Blood transfusion corrected serum electrolyte levels in patients after surgery. Serum electrolytes monitoring is clinically useful in post-operative patients in this large referral hospital.

Key Words: serum electrolytes, blood transfusion, adult surgical patients, post-operative period, Sub-Saharan Africa.

Background

Blood transfusion and conservation techniques are increasingly becoming an essential part of the holistic management of the surgical patients. The national requirement for blood in Ghana is estimated to be 1% of the total population of 25 million, amounting to about 250,000 units, based on the 2010 National Population and Housing Census¹.

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Conflict of Interest: None Declared

Red blood cell transfusion is an essential part of medical care, can be life-saving among patients². Medically appropriate use of blood transfusions means using red blood cells only for the prevention of mortality in patients who cannot be saved with other methods other than with blood transfusion². Globally, it is estimated that 85 million red blood cell units are transfused yearly³. Red blood cell (RBC) transfusion is commonly required in critically ill and post-operative patients. Due to the frequency of use of this intervention, it is essential for health providers at the intensive care and post-operative units and wards of health facilities to be abreast with current developments in this evolving field of transfusion medicine and the clinical consequences for patients⁴.

When deciding to transfuse, it is essential to consider that despite the advances made in blood transfusion practices, complications still exist. Potential

risks of RBC transfusions include infection, metabolic and cardiovascular complications, hypothermia, iron overload, and graft-versus-host disease⁵. Massive transfusion in adults, is the replacement of more than a litre of blood volume in 24 hours or greater than 50% of blood volume in four hours (adult blood volume is approximately 70 mL/kg)⁵.

Overall, the metabolic complications or consequences of blood transfusion include citrate toxicity, hyperkalemia, and hypothermia. These complications are most commonly observed during large-volume infusions⁶. In addition, during storage, RBCs leak potassium into the plasma or additive solution. This relatively little amounts of potassium load rarely causes problems in small volume transfusions. This is mainly due to post-transfusion rapid dilution and redistribution into cells of the body. On the other hand, rapid infusion of RBCs (> 1 litre) into patients with cardiac, hepatic, or renal dysfunction absolutely requires close monitoring and observation^{7,8}.

The safety of transfusing whole blood and red blood cells (RBCs) after longer durations of refrigerated storage has been identified as “the most critical issue facing transfusion medicine”⁹. A large observational study of post-operative cardiac surgery patients found an increased risk of postoperative complications and reduced survival in those who received RBCs stored for more than 14 days¹⁰. Clinical consequences have been reported in some-epidemiologic studies of transfusions of RBCs stored for longer durations^{11,12}.

It has been reported that complications such as hyperkalaemia, hyponatraemia and citrate toxicity may follow blood transfusion of stored blood¹³. When blood is stored in the blood banks or refrigerators on the wards, there is slow but constant leakage of potassium from the red blood cells into the surrounding plasma milieu along a concentration gradient due to the failure of the sodium potassium ATPase pump¹³. The plasma level of potassium may increase by 0.5-1 mmol/L per day of refrigerated or stored blood. Thus the longer the duration of storage the higher the level of extracellular potassium levels. Upon transfusion, the extracellular potassium is also infused which creates a transient increase in plasma potassium in the recipient.

Massive blood transfusion (especially with blood stored for longer periods) may thus cause hyperkalaemia and hyponatraemia in the patient¹⁴. Plasma potassium level is linked to plasma levels of electrolytes such as sodium, magnesium, calcium and others, and thus derangement in potassium level affects the levels of these electrolytes during massive transfusion.

The need for blood transfusion for both surgical and non-surgical patients in hospitals is steadily increasing whereas the availability of allogeneic blood is lagging far behind¹. Some of the major operations conducted in this large tertiary hospital (KBTH) require large volume transfusions. However, little has been published on the effect of large volume transfusion on electrolyte changes

of post-operative patients in Sub-Saharan Africa, especially in Ghana.

The aim of this study was to investigate the effect of large volume transfusion on electrolyte changes of post-operative patients in a national referral centre in Ghana. The goal is to potentially provide a guide to electrolyte management in the post-operative period in surgical patients in this large referral hospital in Ghana.

Methodology

Study Design and Study Site

This is a hospital-based longitudinal study comparing transfused and non-transfused female patients, conducted at the main Surgical Theatre and the Gynaecological Theatre of the Korle-Bu Teaching Hospital (KBTH), over a three months period in 2017. Korle-Bu Teaching Hospital is a tertiary referral centre located in the National capital of Ghana, Accra. With 2000 bed capacity and twelve different departments. The general surgical out-patient clinic attends to a high number of patients, (over 15,512 out-patients, constituting 43% of the total hospital out-patients in 2013). The most common surgical diagnoses for admission are hernia, appendicitis and breast cancer, while myomectomies and Total abdominal Hysterectomy are the most common Gynaecological operations¹⁵. In addition, the Department of Anaesthesia of KBTH delivers over 12000 anaesthetics annually.

Study Population and sampling

We recruited adult females aged 18-70 years at the general surgical and gynaecological departments booked for laparotomy (including myomectomy and total abdominal hysterectomy) admitted to the KBTH. Female patients were selected due to the type of surgical interventions. Patients admitted for emergency surgeries, those with known chronic kidney and chronic liver disease were excluded. In this study, a transfused patient was one who received at least a litre of whole blood or one blood volume loss in 24 hours, and a general surgical patient is one who had laparotomy.

The study compared two populations, transfused and non-transfused surgical (general and gynaecological). Hyponatremia is one of the most common electrolyte disorder in transfused patients, and been reported to occur in about 30–40% of hospitalized patients [16]. Using the difference in proportions sample size determination, based on 40% rate of hyponatremia in transfused patients, and assuming a hyponatremia rate of 10% in non-transfused, at 95% confidence interval and power of 95%, a final sample of 46 transfused and 46 non-transfused patients were recruited in each category for the study (i.e. total sample size of 92). A total of 160 female patients aged 18- 70 years admitted to the KBTH were screened pre-operatively and 92 patients who met the inclusion criteria were studied post- operatively.

Patients were recruited by simple random sampling technique from the main surgical and gynaecological

wards of the hospital, after informed consent. A maximum number of six (3 general surgical and 3 gynaecological) subjects were selected daily by balloting and comparable number of non-transfused patients were selected accordingly. These numbers gave enough time for the abstraction of information and increased the time period over which patients were selected aimed at increasing variability in patients' characteristics. The study tried to limit the influences of intra-operative events (type of surgery, type of anaesthesia used etc) by taking the baseline serum electrolyte for both groups in the immediate post-operative period.

Data Collection Methods

An abstraction form was used for record of data collected and solicited information on the demographic characteristics and weight of patients. Determination of serum electrolytes was done among transfused patients, pre-transfusion and 24 hour post-transfusion, while in the non-transfused patients, serum electrolytes were determined immediate post-operatively and 24 hour post-operatively. The rationale was to enable comparability in serum electrolytes at these periods post-operatively for transfused and non-transfused patients.

All transfused patients received whole blood. To control for or avoid the influence of other fluids given to the patients and how much did each patient get of what type of fluid intra-operatively, the baseline serum electrolytes were measured immediate post-operatively and was then compared with the measurements 24-hour post-operatively.

Samples for serum electrolyte determination were taken under strict aseptic conditions. Three (3) millilitres of blood was obtained each time from the brachial vein using a vacutainous needle into gel separator tubes. Shaking or agitation of the tubes was avoided to prevent haemolysis of the sample. Samples obtained were kept in an ice-chest and within two (2) hours of collection, were sent to the laboratory for separation and analysis of serum concentrations of sodium, potassium, chloride, calcium and magnesium.

Measurements

All electrolyte determinations were done at Korle-Bu Polyclinic Laboratory, of the KBTH. Blood samples were centrifuged and serum separated into cryotubes (at -20 degree). Analysis of electrolytes were done using an automated Mindray chemistry analyzer. Serum electrolyte levels were determined using atomic absorption methods and analysed within 24 hours of sample collection. Each unit of blood was transfused slowly to patients over a four hour period. Among the transfused patients, no pre-medications were administered.

The mean weight in transfused patients was 73.8 ± 22.1 kg and that of non-transfused patients (71.5 ± 17.9 kg). The weight of patients ranged from 47- 134kg

In this study, massive transfusion in adults is the replacement of more than a litre of blood volume in 24 hours or greater than 50% of blood volume in four hours in a patient; hyperkalaemia was defined as a serum potassium level greater than 5.0 mmol/L; hypokalaemia was defined as less than 3.5 mmol/L; hyponatraemia was defined as below 135mmol/L; and hypomagnesaemia and was defined as less than 1.7 mg/dL (0.7 mmol/L).

Data Handling and Analysis

Strict confidentiality was maintained during and after the study. To anonymise and protect the data, respondents were represented with codes and data was kept in locked cabinets and computer files on personal laptop computer which was password protected.

Data were captured using Microsoft Excel 2013 Database and analysed using SPSS statistical software version 23.0. Categorical variables were summarized as frequencies and percentages, and continuous variables were summarized as means and standard deviations. Chi square was used to test for associations between categorical variables. Independent t-test was used to determine significant differences in serum electrolyte levels in transfused and non-transfused patients. Paired t-test was used to test significant differences in serum electrolytes at the initial time period and at 24 hours within each group. Significance level was set at 95% (p-value < 0.05).

Ethical Issues

Ethical approval was obtained from the Ethical and Protocol Review Committee of the College of Health Sciences, University of Ghana (protocol approval number: CHS. Et/M.8-P3.1/2016-2017) as well as the Institutional Review Board of the Korle-Bu Teaching Hospital (protocol approval number: KBTH-IRB/00017/2017). All adult patients admitted for surgery to the surgical and gynaecological theatres in KBTH were informed about the study and consent sought for data abstraction for the study on the wards. Patients provided written informed consent duly administered and witnessed before data abstraction from patients' medical records.

Results

Demographic and clinical characteristics of patients

In all, 92 participants (patients) were involved in the study (46 were patients who received blood transfusion within 24 hours after surgery, and 46 were patients who did not receive blood transfusion after surgery). The mean age of the transfused patients was 42.9 ± 15.1 year and that of non-transfused patients (41.4 ± 9.2 years). Age of patients ranged from 22- 70 years in transfused patients and 22- 62years in the non-transfused.

in transfused patients and 39- 120kg in non-transfused patients.

The most common surgical operation was Laparotomy, 21 (46.7%), followed by Hysterectomy 6 (13.3%) in the transfused patients, while Total Abdominal Hysterectomy, 19 (41.3%) and Myomectomy, 18 (39.1%) were the common surgical operation in the non-transfused patients.

Serum Electrolyte changes in the Transfused patients

Table 1 shows the pre-transfusion and 24 hour post transfusion mean serum levels of the sodium,

potassium, chloride, calcium and magnesium. Compared to pre-transfusion levels, the 24 hour post transfusion serum levels of sodium, chloride and calcium increased by 2.88 ± 2.66 mmol/L, 5.77 ± 3.87 mmol/L and 0.04 ± 0.04 mmol/L respectively. While the 24 hour post transfusion serum levels of potassium and magnesium decreased compared to pre-transfusion levels by 0.18 ± 0.20 mmol/L and 0.08 ± 0.06 mmol/L respectively. These differences were however, not statistically significant as shown in table 1.

Table 1: Serum Electrolyte changes before and after transfusion in post-operative patients at the Korle-Bu Teaching Hospital (N= 46)

Serum Electrolyte (mmol/L)	Mean	Standard Error	Paired t-test	P-value	Confidence Interval
Serum Sodium (Na⁺)					
Na ⁺ level pre-transfusion	138.64	2.46	-1.056	0.297	133.685 - 143.597
Na ⁺ level 24 hours post-transfusion	141.44	0.77			139.886 - 143.004
Difference (means)	-2.80	2.66			-8.156 - 2.547
Serum Potassium (K⁺)					
K ⁺ level pre-transfusion	3.88	0.16	0.880	0.383	3.547 - 4.211
K ⁺ level 24 hours post-transfusion	3.70	0.12			3.452 - 3.943
Difference (means)	0.18	0.20			-0.234 - 0.598
Serum Chloride (Cl⁻)					
Cl ⁻ level pre-transfusion	104.17	4.18	-1.490	0.143	95.760 - 112.583
Cl ⁻ level 24 hours post-transfusion	109.94	0.96			108.013 - 111.875
Difference (means)	-5.77	3.87			-13.576 - 2.032
Serum Calcium (Ca²⁺)					
Ca ²⁺ level pre-transfusion	1.57	0.02	-0.910	0.368	1.540 - 1.607
Ca ²⁺ level 24 hours post-transfusion	1.61	0.03			1.545 - 1.675
Difference (means)	-0.04	0.04			-0.117 - 0.044
Serum Magnesium (Mg²⁺)					
Mg ²⁺ level pre-transfusion	0.66	0.05	1.475	0.147	0.547 - 0.763
Mg ²⁺ level 24 hours post-transfusion	0.57	0.04			0.485 - 0.657
Difference (means)	0.08	0.06			-0.031 - 0.199

Electrolyte changes in the Non- Transfused patients

Among the non-transfused, mean levels of all the serum electrolytes decreased when measured at the 24 hour post operatively compared to the baseline values i.e. the immediate post-operative period. These

decreases in levels were statistically significant for sodium, potassium, and magnesium.

As depicted in Table 2, the mean level of Na decreased from 140.27 mmol/L baseline to 137.72 mmol/L (24 hours post-operation), ($P < 0.040$), serum level of Chloride decreased minimally from 107.99

mmol/L to 107.43 mmol/L, ($P < 0.600$) and mean serum level of Calcium decreased from 1.68 mmol/L to 1.64 mmol/L ($P < 0.133$)

Similarly, mean level of serum potassium decreased from 3.88 mmol/L to 3.57 mmol/L ($P < 0.001$) and mean serum level of Magnesium decreased 0.82 mmol/L to 0.71 mmol/L ($P < 0.026$).

Table 2: Serum Electrolyte changes in the immediate and 24 hours post-operative period in non-transfused surgical patients at the Korle-Bu Teaching Hospital (N= 46)

Serum Electrolyte (mmol/L)	Mean	Standard Error	Paired t-test	P-value	Confidence Interval
Serum Sodium (Na⁺)					
Na ⁺ immediate post-operation	140.27	1.07	2.117	0.040	138.117 - 142.422
Na ⁺ level 24 hours post-operation	137.72	1.22			135.263 - 140.176
Difference (means)	2.55	1.21			0.124 - 4.979
Serum Potassium (K⁺)					
K ⁺ immediate post-operation	3.88	0.08	3.783	0.001	3.727 - 4.038
K ⁺ level 24 hours post-operation	3.57	0.07			3.429 - 3.700
Difference (means)	0.32	.08			0.148 - 0.486
Serum Chloride (Cl⁻)					
Cl ⁻ immediate post-operation	107.99	0.95	0.528	0.600	106.076 - 109.901
Cl ⁻ level 24 hours post-operation	107.43	1.06			105.291 - 109.578
Difference (means)	0.55	1.05			-1.561 - 2.669
Serum Calcium (Ca²⁺)					
Ca ²⁺ immediate post-operation	1.68	0.02	1.529	0.133	1.643 - 1.725
Ca ²⁺ 24 hours post-operation	1.64	0.02			1.600 - 1.686
Difference (means)	0.04	0.03			-0.013 - 0.094
Serum Magnesium (Mg²⁺)					
Mg ²⁺ immediate post-operation	0.82	0.06	2.294	0.026	0.693 - 0.955
Mg ²⁺ 24 hours post-operation	0.71	0.05			0.604 - 0.808
Difference (means)	0.12	0.05			0.014 - 0.221

Baseline (immediate post-operative period) serum electrolyte levels in blood transfused and non-transfused patients

Table 3 demonstrates that the baseline serum levels of all the five measured electrolytes (sodium, potassium, chloride, calcium and magnesium) were relatively higher in the non-transfused compared to those who later got transfused. The baseline serum calcium levels was (1.68 mmol/L) in the non-transfused compared to (1.57 mmol/L) in the transfused patients, ($P < 0.001$).

Similarly, the baseline serum magnesium levels was (0.82 mmol/L) in the non-transfused compared to (0.17mmol/L) in the transfused ($P < 0.048$).

The 24-hour post transfusion and 24-hour post-operative serum electrolyte levels in transfused and non-transfused patients

The levels of all measured serum electrolytes with the exception of magnesium were higher in the transfused group compared to the non-transfused. The

serum level of sodium was 141.44 mmol/L in the transfused patients compared to 137.72 mmol/L in the non-transfused, ($P < 0.012$), serum levels of Potassium was 3.69 mmol/L in transfused patients compared to 3.56 mmol/L in the non-transfused, ($P < 0.345$). The levels of Chloride and calcium were both higher in the

transfused patients compared to the non-transfused, though not significant. The serum level of magnesium was however, significantly lower in the transfused patients (0.66 mmol/L), compared to the non-transfused patients, (0.82 mmol/L ($P < 0.045$)) as shown in Table 4.

Table 3: Baseline (immediate post-operative period) serum electrolyte levels in blood transfused and non-transfused patients in the Korle-Bu Teaching Hospital

Serum Electrolyte (mmol/L)	Mean	Standard Error	Two-sample t-test	P-value	Confidence Interval
Serum Sodium (Na⁺)					
Transfused	138.64	2.46	-0.607	0.545	133.685 - 143.597
Non-transfused	140.27	1.07			138.117 - 142.422
Combined (N= 92)	139.45	1.34			136.800 - 142.110
Difference (means)	-1.63	2.68			-6.958 - 3.701
Serum Potassium (K⁺)					
Transfused	3.87	0.16	-0.018	0.986	3.547 - 4.211
Non-transfused	3.88	0.08			3.727 - 4.038
Combined (N= 92)	3.88	0.09			3.701 - 4.060
Difference (means)	-0.01	0.18			-0.365 - 0.359
Serum Chloride (Cl⁻)					
Transfused	104.17	4.18	-0.891	0.375	95.760 - 112.583
Non-transfused	107.99	0.95			106.076 - 109.901
Combined (N= 92)	106.08	2.14			101.831 - 110.329
Difference (means)	-3.82	4.28			-12.325 - 4.692
Serum Calcium (Ca²⁺)					
Transfused	1.57	0.02	-4.237	0.001	1.539 - 1.607
Non-transfused	1.68	0.02			1.643 - 1.725
Combined (N= 92)	1.63	0.01			1.600 - 1.657
Difference (means)	-0.11	0.03			-0.163 - -0.059
Serum Magnesium (Mg²⁺)					
Transfused	0.65	0.05	-2.003	0.048	0.547 - 0.763
Non-transfused	0.82	0.06			0.693 - 0.955
Combined (N= 92)	0.74	0.04			0.65 - 0.825
Difference (means)	-0.17	0.08			-0.336 - -0.001

Table 4: The 24-hour post transfusion and 24-hour post-operative serum electrolyte levels in transfused and non-transfused patients

Serum Electrolyte (mmol/L)	Mean	Standard Error	Two-sample t-test	P-value	Confidence Interval
Serum Sodium (Na⁺)					
Transfused	141.44	0.77	2.579	0.012	139.887 - 143.004
Non-transfused	137.72	1.22			135.263 - 140.176
Combined (N= 92)	139.58	0.74			138.104 - 141.061
Difference (means)	3.726	1.44			0.856 - 6.596
Serum Potassium (K⁺)					
Transfused	3.69	0.12	0.949	0.345	3.452 - 3.943
Non-transfused	3.56	0.07			3.429 - 3.701
Combined (N= 92)	3.63	0.06			3.493 - 3.769
Difference (means)	0.13	0.14			-0.144 - 0.409
Serum Chloride (Cl⁻)					
Transfused	109.94	0.96	1.7519	0.083	108.013 - 111.875
Non-transfused	107.43	1.06			105.291 - 109.578
Combined (N= 92)	108.69	0.72			107.251 - 110.128
Difference (means)	2.51	1.43			-0.336 - 5.355
Serum Calcium (Ca²⁺)					
Transfused	1.61	0.03	-0.879	0.382	1.544 - 1.675
Non-transfused	1.64	0.02			1.601 - 1.686
Combined (N= 92)	1.63	0.01			1.588 - 1.665
Difference (means)	-0.03	0.04			-0.111 - 0.043
Serum Magnesium (Mg²⁺)					
Transfused	0.63	0.05	-2.003	0.045	0.547 - 0.763
Non-transfused	0.82	0.06			0.693 - 0.9548
Combined (N= 92)	0.74	0.04			0.654 - 0.824
Difference (means)	-0.19	0.08			-0.336 - -0.001

Discussion

There were more females in the study which is expected as it corresponds to pattern of utilisation of health services in general and in the Korle-Bu Teaching Hospital. Females in general tend to utilise health services more¹⁵. In addition, the two main study sites were the general surgical and gynaecological theatres. Those patients who required transfusion post operatively were slightly older than those who did not require transfusion. This result was expected, as older patients may tend to require correction for blood losses due to presence of some chronic conditions and dietary factors⁸.

In general, serum levels of sodium, chloride and calcium increased after transfusion, while potassium and magnesium levels decreased after transfusion. It is known that hyponatremia is the most common electrolyte disorder and the prevalence of this complication following blood transfusion is estimated to be in the range of 30–40% of hospitalized patients¹⁷. However, hyponatremia usually develops when certain factors or underlying condition impairs the kidney's ability to excrete water. This clinical risk has been shown to be more pronounced in the postoperative period when non-osmotic stimuli such as nausea, pain, stress, and volume depletion lead to higher

Adenosinetriphosphate (ADH) levels when compared to preoperative values¹⁸.

The changes in serum potassium levels in this study is supported by a previous study conducted by Murthy which indicated that in blood transfusion, the relatively small potassium which leaks from the red blood cells into the plasma or additive solution rarely causes any clinical problems. The study observed that an extensive literature particularly in paediatrics which have reported deaths from hyperkalemia. Minor changes in the other serum electrolytes have also not been shown to cause any clinical problems. This is because of post-transfusion rapid dilution and redistribution into cells⁸. This post-transfusion rapid dilution and redistribution into cells may be the potential explanation for the results of the current study which measured post-transfusion potassium 24 hours after the transfusion. Murphy, and Carvalho however cautioned that rapid infusion of large volumes of RBCs into patients with cardiac, hepatic, or renal dysfunction mandates close monitoring^{7,8}.

Physiologically, the extracellular potassium concentration is determined by multiple factors (catecholamines, the renin–angiotensin–aldosterone system, glucose and insulin metabolism, as well as direct release from exercising or injured muscle). Catecholamine-associated intracellular potassium shifting is amply demonstrated when hyperkalaemia induced by hypothermia occurs⁸.

One key observation is on the 24 hours post-transfusion level of magnesium (0.63 mmol/L) observed among the transfused patients in this study. This indicates hypomagnesemia by definition (i.e. values less than 0.7 mmol/L defined as hypomagnesemia). This was not the case among the non-transfused patients. Hypomagnesemia is associated with a two to three-fold increased mortality in critically ill and postoperative patients^{19,20}. It has been observed that, the occurrence of hypomagnesemia in patients is frequently associated with derangement in other electrolytes such as hypokalemia and hypocalcaemia^{20,21}. This association of hypomagnesemia with hypokalemia was however, not observed in the current study.

This observation indeed calls for the need to determine the levels of these electrolytes in the post-operative patient to limit the risk of mortality associated with hypomagnesemia in critically ill and postoperative patients.

In general, among the non-transfused patients, the levels of all the serum electrolytes sodium, potassium, chloride, calcium and magnesium decreased from the immediate post-operation to the 24 hours post-operative period. Overall these decreases in levels were statistically significant for sodium, potassium, and magnesium but were generally not below the normal levels. These changes in the serum electrolytes are potentially due to the physiological redistribution into the cells as noted by Murthy⁸.

There was a relative increase in the levels of the serum electrolytes upon blood transfusion among the

transfused patients particularly regarding potassium level. This is in agreement with a study by Opoku-Okrah and colleagues¹³. When blood is stored in the blood banks or refrigerators on the wards, there is slow but constant leakage of potassium from the red blood cells into the surrounding plasma milieu along a concentration gradient due to the failure of the sodium potassium ATPase pump¹³. Thus the potassium concentration of RBCs in stored blood is higher than the normal human plasma potassium level. Upon transfusion, the extracellular potassium is also infused which creates a transient increase in plasma potassium in the recipient. This increase may be transient and the level would normalize through the normal physiological process of redistribution into cells.

Massive blood transfusion (especially with blood stored for longer periods) may thus cause hyperkalaemia and hyponatraemia in the patient¹⁴. These were however, not observed in the current study probably due firstly to the time period when the electrolytes were measured (only once after the transfusion); some studies conducted these at more regular intervals (at four-hourly intervals)¹³. Secondly, this may probably be due to the duration of storage (i.e. demand for blood in this large teaching hospital is very high and does not allow for prolonged storage of blood at the national blood transfusion service centre or the blood bank of the teaching hospital¹. A third reason is probably due to the volumes transfused (all transfused patients in this study received a litre or more (i.e. fits the definition of massive blood transfusion), the largest volume transfused for a patient in this study was four units). Emergencies and other types of surgeries may require much larger volumes for transfusion.

It should also be noted that this current study used patients booked for elective surgery, a relatively more stable group of patients. Assessment of emergencies and critically ill patients may lead to different findings.

Study limitations: The study tried to limit the influences of intra-operative events (type of surgery, type of anaesthesia used etc) by taking the baseline serum electrolyte for both groups in the immediate post-operative period. However, the measurement of the serum electrolytes in the transfused group was done only after 24 hours. Other studies conducted this immediately after transfusion (i.e. within minutes to few hours to observe the immediate haemodynamic and serum electrolyte changes) [13, 22]. In addition, the study did not consider the type and amount of fluids given during the post-operative period.

Conclusion

There was no significant changes in the levels of serum electrolytes among transfused patients, 24 hours after transfusion. It is however, worthy to note that, baseline serum electrolyte levels were lower in patients who were eventually transfused compared to non-transfused patients. Twenty-four hours post transfusion, serum sodium level was significantly elevated and

serum magnesium level was significantly decreased among transfused compared to non-transfused patients. These observations, could serve as a guide to the management haemodynamic and electrolyte changes in the many patients who undergo surgery in this large referral hospital in Ghana.

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References

1. Accra area centre of the Ghana National Blood Transfusion Service. Blood collection data. 2014; Service Data
2. Gahrehabghian A, Ahmadi L, Taymour H, Rahbari M . *WHO guideline: the clinical use of blood in medicine, obstetric, pediatric*. 1st ed Tehran: Research center of blood institute; 2003.
3. Carson JL, Grossman BJ, Kleinman S, Tinmouth AT, Marques MB . Red blood cell transfusion: a clinical practice guideline from the AABB*. *Ann Intern Med*. 2012, 157(1):49–58.
4. Lelubre C and Vincent J-L. Red blood cell transfusion in the critically ill Patient. *Annals of Intensive Care* 2011, 1:43. <http://www.annalsofintensivecare.com/content/1/1/43>
5. Roseff SD, Luban NL, Manno CS. Guidelines for assessing appropriateness of pediatric transfusion. *Transfusion*. 2002, 42:1398–413. [PubMed: 12421212]
6. Hendrickson JE, Hillyer CD. Non-infectious serious hazards of transfusion. *Anesth Analg*. 2009, 108:759–69. [PubMed: 19224780]
7. Carvalho B, Quiney NF. ‘Near-miss’ hyperkalaemic cardiac arrest associated with rapid blood transfusion. *Anaesthesia*. 1999, 54:1094–6. [PubMed: 10540099]
8. Murthy BV. Hyperkalaemia and rapid blood transfusion. *Anaesthesia* 2000, 55:398. [PubMed: 10781143]
9. Ness PM. Does transfusion of stored red blood cells cause clinically important adverse effects? A critical question in search of an answer and a plan. *Transfusion*. 2011, 51(4):666–667. [PubMed: 21496035]
10. Koch CG, Li L, Sessler DI, Figueroa P, Hoeltge GA, Mihajlevic T, Blackstone EH. Duration of red-cell storage and complications after cardiac surgery. *N Engl J Med*. 2008, 358(12):1229–1239. [PubMed: 18354101]
11. Pettila V, Westbrook AJ, Nichol AD, Bailey MJ, Wood EM, Syres G, Phillips LE, Street A, French C, Murray L, Orford N, Santamaria JD, Bellomo R, Cooper . Age of red blood cells and mortality in the critically ill. *Crit Care*. 2011, 15(2):R116. [PMCID: PMC3219399][PubMed: 21496231]
12. Sanders J, Patel S, Cooper J. Red blood cell storage is associated with length of stay and renal complications after cardiac surgery. *Transfusion*. 2011, 51(11):2286–2294. [PubMed: 21564106]
13. Opoku-Okrah C, Acquah BKS, Dogbe EE. Changes in potassium and sodium concentrations in stored blood. *Pan African Medical Journal*, 2015, 20:236–239
14. Vraets A, Lin Y, Callum JL. Transfusion-Associated Hyperkalaemia. *Transfusion Medicine Reviews*, 2011, 25(3):184–196
15. Korle-Bu Teaching Hospital Annual Report, 2014. Retrieved September 2017:
16. <http://kbth.gov.gh/assets/downloads/pdf/korle-bu-Annual-report-2014.pdf>
17. Sedlacek M, Schoolwerth AC, and Remillard BD. Electrolyte Disturbances in the Intensive Care Unit. *Seminars in Dialysis*, 2006, 19(6): 496–501
18. Upadhyay A, Jaber BL, Madias NE. Incidence and prevalence of hyponatremia. *Am J Med* 2006, 119:S30–S35.
19. Moritz ML, Ayus JC. The pathophysiology and treatment of hyponatremic encephalopathy: an update. *Nephrol Dial Transplant*. 2003, 18:2486–2491
20. Safavi MHA. Admission Hypomagnesemia - Impact on Mortality or Morbidity in critically ill patients. *Middle East J Anesth*. 2007, 19(3):645–60.
21. Djagbletey R, Boni F, Phillips B, Adu-Gyamfi Y, Aniteye E, Owusu C, Owusu-Darkwa E, Yawson AE . Prevalence and predictive factors of preoperative hypomagnesaemia among adult surgical patients in a large tertiary hospital in Ghana. *BMC Anesthesiology* 2015, 15:132
22. Whang R, Oei TO, Aikawa JK, Watanabe A, Vannatta J, Fryer A. Predictors of Clinical Hypomagnesemia. *Arch Intern Med*. 1984, 144(9):1794–6.
23. Saugel B, Klein M, Hapfelmeier A, Phillip V, Schultheiss V, Meidert AS, Messer M, Schmid RM and Huber W. Effects of red blood cell transfusion on hemodynamic parameters: a prospective study in intensive care unit patients. *Scand. J. of Trauma, Resuscitation and Emergency Med.*, 2013, 1:21. DOI: 10.1186/1757-7241-21-21

EFFECTIVENESS OF CONTINUING MEDICAL EDUCATION IN GHANA: A PRELIMINARY STUDY

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Abstract

Introduction: The purpose of this study was to evaluate the impact of a Continuing Medical Education (CME) activity on the level of knowledge of Ghanaian physicians. CME is well studied in resource-rich countries, but little is known about the efficacy of CME in Lower- and Middle-income countries.

Methods: This cross-sectional study used anonymous semi-structured questionnaires in a self-assessment method of evaluation. Participants of the CME conference organized by the Ghana College of Physicians and Surgeons, dubbed Medical Knowledge Fiesta, were asked to evaluate the utility of the educational content at the conference, and then at three- and six-months post-conference. Data was reported anonymously using aggregation and analysed using descriptive statistics.

Results: The data indicates a 53% knowledge diffusion rate at three months and 63% at six months post CME.

Sixty-six percent and 77% of participants implemented new knowledge within three months and six months post CME, respectively. At three months post CME, 65% of participants indicated CME changed their practice, and this increased to 82% at six months. Changes reported include 57% of participants asking different and/or additional questions during patient assessments three months post CME which increased to 74% at the sixth month survey. Thirty-three percent of participants scheduled more follow up appointments three months post CME which increased to 44% six months post CME.

Conclusion: In this study, CME improved physician knowledge in Ghana. Within six months following the CME, 82% of respondents reported a change in their medical practice.

Key Words: Education, Medical, Continuing, Ghana.

Introduction

Ghana, with a population 28.2 million¹, has approximately 2,600 doctors practicing medicine within its borders.² Limited internet and international journal access coupled with fiscal challenges traveling to international medical meetings means local continuing medical education (CME) is critical to improving physician knowledge. Ghana has a gross domestic product (GDP) of approximately USD42.69 billion.³ In 2014, total healthcare expenditure, both public and private, comprised about 3.6% of GDP compared to 5.6% of GDP for developing sub-Saharan African countries, and approximately 4.5% of GDP in all other Low- and Middle-Income Countries (LMICs).³ Public

sector health care expenditure for Ghana was 59.8% of GDP compared to 42.6% for developing countries in sub-Saharan African and 37.1% for LMICs in general.³ Ghana achieved independence from Britain in 1957 and formal training of medical doctors in Ghana to serve the national need began in 1962. Since then, there has been expansion in medical training facilities. The last decade saw an unprecedented commitment by the Ghana College of Physicians & Surgeons (GCPS) to establish postgraduate training of specialists and subspecialists in various medical disciplines. In 1999, Ghana began their Family Medicine Residency Program.⁴ The National Ambulance Service began in 2004 and was expanded in 2008⁵ with the training program in Emergency Medicine being launched in 2010. Further, as Ghanaians begin to live longer, the GCPS began work on a Geriatrics training program. Additionally, medical schools and expanded residency programs work in tandem with continuing medical education (CME).

Ghana is one of the few nations in sub-Saharan Africa that has formal CME requirements to maintain a medical license. The Ghana Medical and Dental Council requires physicians to earn 15 points (credits) annually

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from a minimum of three educational activities. Moreover, a recertification in ethics is required every three years.⁶ Unlike many other countries, Ghana's CME credit system is not based on the duration of an educational activity, but on the educational format of the activity. For example, in the United States, performance improvement CME (PI CME) is a 20-credit activity per project and internet searching and learning is a 0.5 credit activity per internet search.

Other formats of CME, such as conferences, workshops and online learning are duration based and typically one hour is equivalent to one credit. However,

Ghana, as seen in table 1, places more credit and thus more emphasis on multidisciplinary meetings (5 credits) and less emphasis on online enduring materials (1 credit). Ghana also limits the number of credits a physician can earn from the various format categories. Again, in table 1 we see that Ghanaian physicians can earn two CME credits per peer reviewed article with a maximum of four articles a year for a total of eight credits of the 15 required credits. Despite a formal CME system, few published reports on the effectiveness and/or outcomes of Ghanaian CME exist.

Table 1: Medical and Dental Council – Ghana. 2016 CME requirements⁶

Continuing Professional Development	(up to 3 credits)
Law and Ethics Management and Administration Cost and Management Accounting E-Learning Good record keeping Medical Education Entrepreneurship Updating clinical skills and information IT including computer assisted clinical programs	
CME Requirements per annum	
Multidisciplinary - one event covering up to at least 3 disciplines of medicine	5 credits/event
Subject based events with hand-on learning	5 credits/event
Subject based events (oral only)	3 credits/event
Online/distance learning courses certificates (Maximum of 4 credits/year)	1 credit/event
Published research (peer reviewed) (Maximum of 4 credits per year)	2 credits/paper
Non peer reviewed papers (One credit per year)	1 credit/paper
Resource Person at accredited event (Learning from teaching: In addition to programme credit)	1 credit/paper
Clinical meetings (certified by HOD) (Maximum of 4 Credits/year)	1 credit/event
Professional Association/groupings/ scientific meetings and conference	3 credits/event

CME is abundant in the United States and other resource-rich nations with many no cost offerings available online and in local healthcare facilities. Further, numerous studies and systematic reviews regarding the effectiveness of CME, particularly in the United States, are well published and commonplace compared to other countries. As the effectiveness of education is highly dependent on context, it is a challenge to ascribe the findings of previous research of the CME field to CME outside of the US. However, previous studies do provide some framework to assist in studying non-US CME.

In 1996, Umble & Cervero published a systematic review of CME noting the emphasis of researchers on identifying causal connections between CME and

various impact variables as well as a focus on improving evaluation methods to improve causal inferences. Their review not only demonstrated the effectiveness of CME but illustrated how CME research attempted to address some of the complex social constructs that influence the degree to which CME can be effective.⁷ Looking further at the work of Robertson et. al., the effectiveness of CME and its impact on clinical outcomes must take into account the context of physician practice. They concluded that continuing education needs to be viewed less as an individual physician learning activity and more as a social activity comprising numerous social interactions.⁸

For purposes of this study, knowledge diffusion was a key social interaction that aided in determining the

effectiveness of the CME activity. By ‘knowledge diffusion’ we mean “the process by which an innovation is communicated through certain channels over time among members of a social system.”⁹ With such a significant shortage of physicians in Ghana, CME must be designed with knowledge diffusion in mind so that information can reach those clinicians who are not able to attend larger medical meetings.

Cervero and Gaines (2015) continue to highlight the importance of social context and CME by observing that different educational approaches have different outcomes in different contexts, and that social, political, economic and other variables impact the effectiveness of CME. Their synthesis of systematic reviews includes reports of findings calling for research on the effectiveness of CME in terms of contextual influencers like learner motivation. They continued their analysis to observe research demonstrate that more positive outcomes were associated with education that incorporated a higher percentage of the intended learners, some interactivity, focused on simpler behaviour changes, and more serious clinical issues.¹⁰

It is with a focus on the contextual clinical realities of Ghana that the CME activity was developed and studied. Given that the clinical environment is very different in LMICs compared to resource-rich environments, repackaging existing CME for LMICs ignores cultural, language and resource differences making it less effective. Since August 2011, the GCPs in collaboration with the Ghana Physicians and Surgeons Foundation of North America and Africa Partners Medical has hosted an annual 4-day CME activity in Ghana, dubbed Medical Knowledge Fiesta. The CME faculty has comprised of Ghanaian, American, Canadian and British medical experts. While the CME activity has been well attended (250-500 participants each year), no attempt has been made to evaluate its impact on knowledge gain and change in practice. A number of Ghanaian and international collaborators have also been working together to offer

CME throughout Ghana; however, there is little published evidence on the effectiveness of CME in improving physician practice in Ghana.

The aim of this study was to evaluate the impact of a CME activity on the level of knowledge and practice of Ghanaian physicians. It is envisioned that beyond information obtained from on-site and follow-up evaluations, this study will collate information to improve the effectiveness of CME offerings designed by and for physicians in Ghana.

Methods

Setting

Participants included in this study were Ghanaian doctors who practice medicine in Ghana and who attended the Medical Knowledge Fiesta held from 14th to 17th September, 2015 under the theme Improving Quality and Safety of Patient Care at the Ghana College of Physicians and Surgeons, Ridge, Accra. This conference is one of the largest CME meetings in Ghana and therefore attracts a lot of doctors in Ghana. All conference attendees were eligible for the study and attendees who did not give their consent were excluded.

CME structure and content

Table 2 outlines the content of the meeting which includes plenary sessions, program tracks and workshops. There were seven plenary sessions, eight workshops and ten program tracks. Teaching methods included didactic lectures, small group discussions and hands-on skill training. Content covered a range of clinical topics including one of Ghana’s first papers in Interventional Radiology. Workshops included a few non-clinical topics such as succession planning, scientific writing and a workshop on how to relocate to Ghana to practice medicine. In line with the meeting’s theme, much of the content focused on quality improvement and patient safety.

Table 2: 2015 Medical Knowledge Fiesta content areas (Accra, Ghana)

Program Tracks	Workshops
OB/GYN	Cardiology
Family Medicine	Radiology
Internal Medicine	Scientific Writing
Public Health	Adult Basic Life Support
Paediatrics	Palliative Care
Anaesthesiology & Emergency Medicine	Relocating Home
Surgery	Succession Planning
Laboratory Medicine	Mental Health
Eye & ENT	
Psychiatry	

Data Collection

Using a modified Information Assessment Method (IAM) survey design, each program track and workshop session was evaluated. IAM was developed by Roland Grad and Pierre Pluye of McGill University in Montreal

Canada. It “systematically documents reflection on health information delivered or retrieved from electronic knowledge resources. IAM enhances reflective learning, evaluation of knowledge resources, and two-way knowledge exchange between information users and

information providers".¹¹ IAM was selected over session evaluation approach because the instrument is highly client-centred more so than content-centred. It helps to facilitate using the content as opposed to just knowing the content. Questions included multiple choice questions, with some questions accepting a single response and other questions accepting multiple responses. Question formats also included yes/no, open-ended, and four-point scale questions. Eighty session evaluations were collected during the CME conference.

The three- and six-month follow-up surveys were distributed electronically through Qualtrics. The follow-up surveys included questions about implementation and sharing of information in respondents' practice environments. (In LMICs, implementation of new clinical knowledge is as important as sharing that knowledge with one's colleagues. Not all the physicians in a hospital or a practice, particularly in remote areas, can attend CME conferences where knowledge is disseminated. Thus, many clinicians in LMICs may rely on their peers who are able to attend CME conferences to share what they learned. To the researcher's knowledge, there has not been a study on knowledge diffusion post CME in a LMIC. Effective knowledge diffusion requires a certain level of valuation by the learners to determine if the knowledge disseminated at a CME conference is worth diffusing within their clinical social systems. Therefore, the follow-up surveys included a four-point scale question asking participants to what extent they shared what they learned to identify if diffusion took place.

This research protocol was reviewed by the University of Wisconsin–Milwaukee Institutional Review Board and granted Exempt Status under Category 1 as governed by 45 CFR 46.101(b). (IRB#16.041) The study protocol was reviewed and approved by the Ethical and Protocol Review Committee of the University of Ghana Medical School. All attendees were informed that participation in the

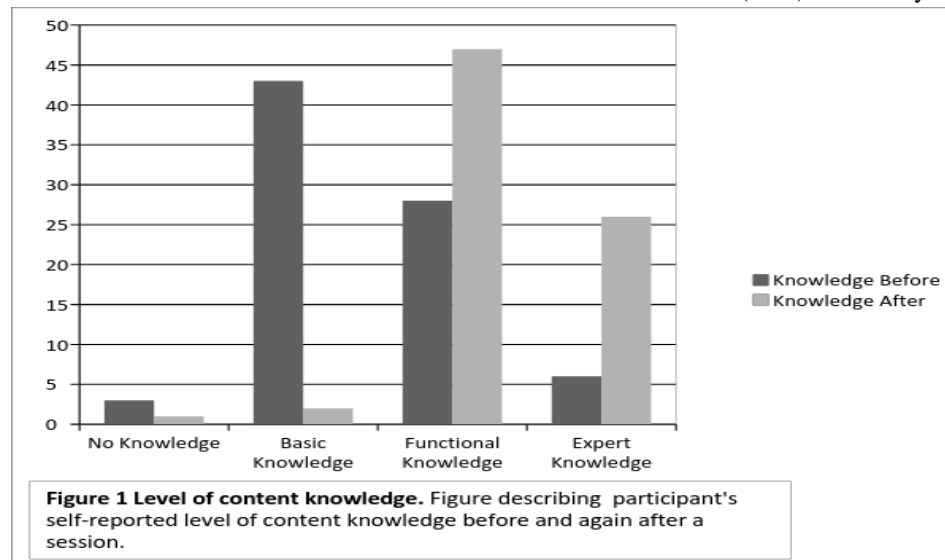
study was completely voluntary. Conference faculty and staff were excluded from the study.

Results

Two hundred and fifty physicians attended the 2015 Medical Knowledge Fiesta CME. Eighty completed session evaluations were collected at the time of the conference. One hundred and eighty (72%) of the 250 attendees were sent the follow-up surveys. Sixty-eight participants (37.7%) responded to the three-month follow-up survey and 37 (20.5%) participants responded to the six-month follow-up survey. The Medical and Dental Council in Ghana requires physicians to earn 15 credits from at least three separate CME activities a year.⁶ The follow-up survey data indicates that most participants or 63% (n=43) attended 3-5 conferences/seminars per year when asked on the three-month follow up survey. On average, study participants had previously attended the Medical Knowledge Fiesta once or twice prior to the 2015 meeting.

Survey at the time of the CME event

During the workshops and session tracks, most participants, 43, claimed to have basic knowledge of session content before the start of the session (n=43) with 28 claiming to have functional knowledge of the session content before the start of the session (n=28). After the sessions, participants reported an increase in session content knowledge with (n=47) reporting functional knowledge and (n=26) reporting expert knowledge (figure 1). Participants were asked a question allowing for multiple answers as to how their practice would improve (no change, diagnostic approach, therapeutic approach, disease prevention or prognostic approach). Fifty-one of 122 responses (42%) reported they plan to change their therapeutic approach in their clinical practice. When asked about the impact of the content on the participant or the participant's practice, 52 of 101 (51%) stated they had learned something new.



Using the modified IAM model of evaluation at the end of each session, participants were asked if they plan to use the content/information on a specific patient. Forty-five percent (n=31) stated yes and 29% (n=20) stated possibly. If participants stated yes, a follow up question was asked as to how they intended to use the information. Forty-four percent (n=17) stated they will manage patients differently. Thirty three percent (n=14) stated that will use the information to better understand a particular issue related to the patient. Considering the same patient, participants were asked if they expect any health benefits as a result of applying the knowledge learned in the session. Ninety-three percent (n=40) stated yes. Again, a follow up question was asked to identify possible health benefits for the patient. Forty-four percent (n=33) indicated the information will help to improve this patient's health status, functioning or resilience (i.e., ability to adapt to significant life stressors). Twenty-nine percent (n=22) stated the information will help to prevent a disease or worsening of disease for this patient. Twenty-seven percent (n=20) stated that the information will help to avoid unnecessary or inappropriate treatment, diagnostic procedures, preventative interventions or a referral, for this patient.

The session evaluation asked to what extent participants became more interested in the subject. This question speaks to motivation. The World Health Organization in their 1990 report on Systems of Continuing Education for district workers emphasizes the importance of continuing education in the health professions not only to increase knowledge but to serve as a motivating factor amongst scarce human resources.¹² Sixty-seven percent (n=49) of participants reported being more interested in the session content to a great extent. Participants were also asked about motivation and intent to change in practice. These questions focused on their determination to change

practice and 94% (n=65) stated that they were determined to try to change at least to a moderate extent.

CME follow up surveys

Three and six months following the 2015 Medical Knowledge Fiesta, electronic surveys using Qualtrics were disseminated to 180 meeting attendees. E-mail addresses gathered from the conference registration were used and a link to the Qualtrics survey was included in the email along with instructions. The link aided in keeping responses anonymous. Given some of the power grid issues and unreliability of internet connectivity in Ghana, the survey link was mailed three times to each respondent at the three-month and again at the six-month time periods.

Sixty-eight participants responded to the three-month follow-up survey and 37 participants responded to the six-month follow-up survey. Attendees were asked to what extent they had implemented what they learned during the 2015 Medical Knowledge Fiesta. Three months post CME, 45 of 57 (79%) respondents stated, at least to a moderate extent, they have tried to implement what they learned. This was down slightly six-month post CME to 24 of 32 (75%) respondents. While this question addressed attempts at implementation of knowledge, we asked about use of knowledge signifying successful implementation. Three months post CME, 44 of 58 (76%) participants reported using what they learned at least to a moderate extent compared with 28 of 33 (85%) at six months post CME. (Table 3) We also asked about the extent to which participants did things differently because of what they learned. Thirty seven of 57 (65%) of participants at three months post CME stated at least to a moderate extent, they did things differently because of what they learned which increased to 23 of 33 (70%) at six months post CME.

Table 3: Descriptive Statistics on content implementation into medical practice.

		N	Mean	Std. Dev	Std. Error	95% Confidence Interval for Mean		Min	Max
						Lower Bound	Upper Bound		
Tried to implement	3 months	62	2.94	.827	.105	2.73	3.15	1	4
	6 months	32	3.00	.803	.142	2.71	3.29	1	4
	Total	94	2.96	.815	.084	2.79	3.12	1	4
Used what you learned	3 months	63	2.97	.803	.101	2.77	3.17	1	4
	6 months	33	3.09	.723	.126	2.83	3.35	1	4
	Total	96	3.01	.775	.079	2.85	3.17	1	4

When asked a multiple response question about possible changes to their practice, 57% reported that they asked their patients different and/or additional questions during assessments three months post CME activity. This increased to 70% at six months post CME. (Table 4) Additional research is needed to learn why participants continued changing practice up to six months post CME

A question focused on knowledge diffusion was asked on the follow up surveys. This becomes valuable in LMICs where those who practice medicine particularly in rural districts cannot always travel to CME conferences and may have limited access to relevant medical education via the internet, journals or other sources. The question was asked to what extent participants had shared the information with others.

Thirty of 56 (53%) reported sharing the information with others at the three-month post CME mark. This increased to 21 of 32 (66%) at six months post CME. This data, along with comments to some of the open-ended questions, suggests that the information provided at the CME activity was perceived as credible and valuable to the point that it was worth sharing with others.

Table 4. Self-Reported Changes in Practice

	3-Month	6-Month
I ask patients different and/or additional questions during assessments	57%	70%
I order more tests	14%	23%
I refer more patients to a specialist	33%	17%
I manage more of the care myself	35%	33%
I schedule more follow-up appointments	33%	43%
Other (specify):	14%	3%
I kick started the process to restore my medical license in Ghana		
I do more staff education		
I do more health education		
It hasn't changed much		
N/A		
None of the above		
Public health education to my community as well nearby communities		

One limitation of the study is the small sample size. The unreliable power grid throughout Ghana means that some who attended the CME activity may not have received the follow-up surveys, despite multiple attempts. Considering several communication and technological challenges with electronic surveys in LMICs, we are impressed with the rate of response. We understand some attendees did not have the opportunity to participate. Ghana's healthcare system has a fragmented electronic health record system in certain facilities and is not nationwide. The variability in which medical records are maintained complicates accessing certain clinical data points. Therefore, we did not access point-of-care practice data to determine change in practice. We relied on change in practice based on self-report, which could be subject to bias. Additionally, many CME activities do not gather data on knowledge diffusion thus there is little to no data available to compare the knowledge diffusion rate of this study to.

Discussion

Current literature in the area of CME in sub-Saharan Africa touches on access to knowledge such as

reported limited CME access in Malawi.¹³ There is evidence of an initiative from *World Anaesthesia Journal* where journal editions were converted to hypertext and Adobe PDF formats and sent free of charge to targeted anaesthetists in developing countries.¹⁴ The use of mobile tablet technology to increase access to CME has been reported in Tanzania.¹⁵ A paper on continuing professional development in Botswana¹⁶ outlines an educational needs assessment for future education while another paper concluded that there was the need for more CME in Nigeria.¹⁷ A study by Mock et. al, regarding a one-week (40 hour) CME trauma course in Ghana included follow-up with participants one year after the training. The Mock study showed improved clinical knowledge.¹⁸ In 2014, Achonduh et. al, published research in the *Malaria Journal* where researchers conducted an in-depth analysis of the management of uncomplicated malaria in Cameroon. Researchers then created training interventions and measured its impact on patient care.¹⁹ The researchers assessed the change in clinicians' practice in the management of uncomplicated malaria. They concluded that up to 92% of participants agreed to adopt a new practice of perform an RDT malaria test before prescribing antimalarials to a patient.¹⁹

In this study, using a modified IAM session evaluation tool along with the follow up surveys allowed researchers to identify changes in the level of learner's medical knowledge, the learner's ability to identify specific patients whose care could be improved by the knowledge gained and the learner's self-reported attempt to implement what they learned. The fact that 66% of six months follow-up survey respondents shared what they learned with others suggests that learners thought the CME content contextually relevant to their practice environment. Our findings confirm the continued need for CME in LMICs. The level of contextualization, "the degree to which an intervention is matched to the circumstances of its application,"²⁰ is critical for effective CME in LMICs. Of note, 88% of the speakers for the 2015 Medical Knowledge Fiesta were Ghanaians who practice medicine in Ghana. Therefore, the speakers were well versed in the culture, language, laws and clinical practice environments of the learners.

The WHO 1990 report on continuing education emphasises that motivation it is a critical component of learning. Participants were asked how much more interested they were in the subject and how willing they were determined to try to practice what they had learned.¹² Therefore, knowledge transfer, motivation, implementation and knowledge diffusion were assessed in this study on the effectiveness of CME in terms of medical knowledge and skills of Ghanaian physicians.

Implications for future research

The Medical Knowledge Fiesta is an annual event. It will be important to study this CME activity in future

to compare data longitudinally. More research as to how and why participants chose to share what they learned with others is important as there is little data in the area for LMICs. CME research provides few studies focusing on the learning team as opposed to individual physicians. Additionally, participants continued to change their practice even six months after the CME activity. It would be ideal to study a learner cohort exposed to specific CME content and track the patient outcome data longitudinally. This model could be replicated for other CME content as well. This would be an important outcome from the conference for Ghana and research into the effectiveness of CME in developing practice guidelines in LMICs.

Conclusions

This study demonstrates the effectiveness of CME in improving medical knowledge of physicians in Ghana. Eighty-eight percent of the speakers for the CME activity were local Ghanaians who are not only experts in medicine, but were aware of the cultural, language, applicable laws and clinical guidelines of Ghana. Ghanaian physicians increased their medical knowledge and maintained that knowledge over an appreciable period. Given the limited resources available in Ghana, the knowledge diffusion rate of 63% six months after the CME activity indicates the physicians' high perceived value in CME content and their willingness to share the knowledge with others in their clinical settings.

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References

1. *WB Population, total*. Washington, DC. United States: The World Bank, 2017
2. AHWO. General country information. Brazzaville, Republic of Congo: *Africa Health Workforce Observatory*, 2017.
3. *WB Health expenditure, total (% of GDP)*. Washington, DC. United States of America: The World Bank, 2017.
4. Lawson HJ, Essuman AE. Country Profile on Family Medicine and Primary Health Care in Ghana. *Afr J Prim Health Care Fam Med*. 2016, Nov;8(1):e1-e6.

5. MOH. National Ambulance Service (NAS). Policy Briefing Paper 00. Accra, Ghana: *Ministry of Health*, 2008
6. *Medical & Dental Council Ghana*. Continuing professional development renewal of registration medical & dental practitioners. Accra, Ghana: 2015:1-5.
7. Umble KE, Cervero RM. Impact studies in continuing education for health professionals. *Evaluation & the Health Professions*. 1996;19(2):148-174.
8. Robertson MK, Umble KE, Cervero RM. Impact studies in continuing education for health professions: update. *JCEHP* 2003; 23(3):146-156.
9. Graham ID, Logan J, Harrison MB, Straus SE, Tetroe J, Caswell W, Robinson N Lost in knowledge translation: time for a map? *J Contin Educ Health Prof*. 2006 Winter;26(1):13-24.
10. Cervero RM, Gaines JK. The impact of CME on physician performance and patient health outcomes: an updated synthesis of systematic reviews. *J Contin Educ Health Prof*. 2015; 35(2):131-138.
11. *ITPCRG*. The Information Assessment Method. Montreal, Quebec: Information Technology Primary Care Research Group, McGill University, 2017
12. WHO. Systems of continuing education: priority to district health personnel. World Health Organization technical report series. Geneva, Switzerland: *World Health Organization*, 1990
13. Muula AS, Misiri H, Chimalizeni Y, Mpando D, Phiri C, Nyaka A. (2004) Access to continued professional education among health workers in Blantyre, Malawi. *Afr Health Sci*. 2004 Dec;4(3):182-184.
14. Robinson G, Dobson M, Sewell, J. MED29/434: Using C&IT for continuing medical education in Africa - a pilot project in Zimbabwe. *Journal of Medical Internet Research*. 1999;1(Suppl 1):e67.
15. Nilseng J, Gustafsson LL, Nungu A, Bastholm-Rahmner P, Mazali D, Pehrson B, Eriksen J. A cross-sectional pilot study assessing needs and attitudes to implementation of Information and Communication Technology for rational use of medicines among healthcare staff in rural Tanzania. *BMC Med Inform Decis Mak*. 2014 Aug 27;14:78.
16. Kasvosve I, Ledikwe JH, Phumaphi O, Mpofu M, Nyangah R, Motswaledi MS, Martin R, Semo BW. Continuing professional development training needs of medical laboratory personnel in Botswana. *Hum Resour Health*. 2014 Aug 18;12:46.
17. Owoeye OA, Aina OF, Morakinyo O. Postpartum depression in a maternity hospital in Nigeria. *East Afr Med J*. 2004 Dec;81(12):616-619.
18. Mock CN, Quansah R, Addae-Mensah L, Donkor P. The development of continuing education for trauma care in an African nation. *Injury*. 2005 Jun;36(6):725-732.

18. Achonduh OA, Mbacham WF, Mangham-Jefferies L, Cundill B, Chandler C, Pamen-Ngako J, Lele AK, Ndong IC, Ndivi SN, Ambebila JN, Orang-Ojong BB, Metoh TN, Akindeh-Nji M, Wiseman V. Designing and implementing interventions to change clinicians' practice in the management of uncomplicated malaria: lessons from Cameroon. *Malar J*. 2014 May 29;13:204.
19. ICEBeRG. Designing theoretically-informed implementation interventions. Tyne, United Kingdom. Quansah R, Addae-Mensah L, Donkor P. The development of continuing education for trauma care in an African nation. *Injury*. 2005 Jun;36(6):725-732.
20. Achonduh OA, Mbacham WF, Mangham-Jefferies L, Cundill B, Chandler C, Pamen-Ngako J, Lele AK, Ndong IC, Ndivi SN, Ambebila JN, Orang-Ojong BB, Metoh TN, Akindeh-Nji M, Wiseman V. Designing and implementing interventions to change clinicians' practice in the management of uncomplicated malaria: lessons from Cameroon. *Malar J*. 2014 May 29;13:204.
21. ICEBeRG. Designing theoretically-informed implementation interventions. Tyne, United Kingdom. Improved Clinical Effectiveness through Behavioural Research Group. *Implement Sci*. 2006 Feb 23;1:4.



FACTORS INFLUENCING SELF-MEDICATION AMONG STUDENTS OF UNIVERSITY OF GHANA, LEGON

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Abstract

Objectives: To determine the factors influencing self-medication among students of the University of Ghana (UG), Legon

Methods: We conducted a descriptive cross-sectional study among UG students and collected primary data from 396 students using a structured questionnaire through a systematic sampling technique. Data on the demographic characteristics, health seeking behaviour and knowledge on the implications of drugs were analysed using Stata 14.1 and chi-square test was used to determine the association between the dependent variable (self-medication) and the independent variables (factors influencing self-medication) under study.

Results: The prevalence of self-medication among the students was 48.0% [95% CI 43.1-53.0]. The reasons associated with this were: the believe that the condition didn't merit a physician visit (42.1% p=0.000), familiarity with treatment options (36.8% p=0.000),

lack of time (14.7% p=0.000), lack of primary physician (6.8% p=0.000) and the lack of a valid insurance (1.9% p=0.070). Regardless the free medical services available to the students at the University's health facilities, 128(67.4%) students would practice self-medication. Long hours of waiting (39.3%), quick relief from sickness (28.0%), distance to the hospital (18.0%) and the negative attitude of physicians (18.0%) were some of the reasons given. However, 22(11.6%) [95% CI 07.7-17.0] have suffered some form of Adverse effect from self-medication.

Conclusion: Self-medication is prevalent among students due to time constraints and unpleasant attitude of health care providers. The University Hospital in collaboration with Ghana Health Service should organize public lectures on self-medication and address students' challenges.

Key Words: Self-medication, University of Ghana, students, medical services.

Background

Self-medication is the act of obtaining and consuming drug(s) without the advice of a physician for the treatment of self-diagnosed symptoms or illness¹. Self-medication has drawn global concerns over the years due to the increasing rate of Over-the-Counter drugs' ill-use. The true prevalence of self-medication is not certain as most surveys conducted are self-reported; the prevalence in developed countries are 3% –19% while developing countries are 9% – 100%^{2,3,4}. Most developing countries have the highest frequencies due to poor regulatory systems^{5,6} coupled with the act being considered a normal practice⁷. Virtually everyone, including doctors, nurses, pharmacists, neighbours, families and friends as well as the media (print and electronic), contribute to this health issue⁸⁻¹⁰. In the presence of conscious improvement in individuals' education, knowledge and socioeconomic status, the

practice of self-medication minimizes the pressure on medical facilities and helps indigenes from remote areas access medical services¹¹. The need to seek professional health care then arises when the condition fails to respond to the drug or when the condition persists. But self-medication also has negative consequences on the health and wellbeing of people. It results in wastage of resources, increased resistance of microbes to drugs and Adverse Drug Reaction (ADR)¹²⁻¹⁴. Awareness of these implications may encourage people to seek hospital intervention for proper medical examination, diagnosis, and treatment of their illnesses. According to WHO, "a response to a drug which is noxious and unintended, and which occurs at doses normally used in man for the prophylaxis, diagnosis, or therapy of disease, or for the modifications of physiological function" is an Adverse Drug Reaction. Simply, an appreciably unpleasant or harmful reaction of a drug that occurs during usual clinical use and dosage.

Self-medication is common among the youth (students)^{8,12,15-17} especially among medical, nursing and pharmacy students^{10,18-22}. Some factors associated with self-medication include; individual life style, accessibility and availability of drugs, the drive to treat certain illnesses through self-care, the lack of healthcare facility, exposure to advertisement and education^{9,15,21}.

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Some other factors include; socioeconomic status (e.g. educational level, access to medical information, awareness of health), and cost of consultation. Furthermore, students also use prescription-only drugs such as antibiotics and antimalarials in self-care^{2,15,23}. Some students hold the perception that antibiotics are suitable for viral infections^{8,9}. High level of education ironically increases the practice of self-care of which tertiary students are culprits of the practice^{15,21,24,26}. In Ghana, the practice is also common among health care practitioners²⁷. The magnitude and factors associated with self-medication among students in tertiary institutions has not been extensively studied in Ghana. A study has however been done among university students with focus on antibiotic use²⁸. The practice when not properly checked, creates a greater probability of inappropriate, incorrect diagnosis, undue treatment therapy, pathogen resistance, adverse drug effects and increased morbidity. Thitherward, with the practice being a health management behavior among students, an improved knowledge, awareness and understanding about self-medication may have a positive impact in reducing the negative implications associated with the ill-use. University of Ghana offers free medical services to its student population and refunds monies on drugs purchased by prescription-only. Therefore, we conducted the study to determine the factors influencing self-medication among students of the University of Ghana.

Methodology

Study Design and Study Site

We conducted a descriptive cross-sectional study to assess self-medication practices among students through the use of a structured questionnaire between May and July, 2017. The University of Ghana is located in Accra, the Capital of Ghana and has its main campus at Legon. The school has a growing number of international students from over 70 countries. There are 16 Halls of residence located at different sections of the campus. Most of the halls are within catchment areas of four pharmacy shops that provide pharmaceutical services.

Study Variable

The dependent variable was self-medication and the independent variables included; gender, educational level, college of students, sources of drugs, type of drugs and knowledge on free medical services for students. Self-medication was defined as the act of obtaining and consuming drug(s) without the advice of a physician for the treatment of self-diagnosed symptoms or illness.

Sample size and sampling procedure

The sample size was calculated based on the Cochran formula; $N = (Z^2 * (p) (1-p)) / d^2$ at 95% confidence interval and 5% margin of error. We

assumed a prevalence of 62.9% based on a similar study²⁹. The calculated sample size was 359. Systematic random technique was used to select 25 rooms in each of the 16 halls of residence. These halls have varied population sizes and rooms, as such the total number of rooms in each hall of residence was divided by 25 and every nth of that was used to select a room for the study. An individual from each room was then selected via balloting in cases where they were two or more.

Data collection technique and Analysis

We trained data collectors and pre-tested the questionnaire at the University of Cape Coast. The trained data collectors obtained information through a self-administered questionnaire that had three main sub-headings; socio-demographic characteristics, factors influencing health seeking behavior and students' knowledge on the implication of drugs. The respondents were encouraged to fill the questionnaire independently. The average time spent per respondent on the questionnaire was 25 minutes. Thereafter, the questionnaire was in each case cross-examined to ensure they are properly, completely filled and valid.

Initial data collected using the questionnaire was coded sequentially with a unique identification number and entered into Statistical Package for Social Sciences (SPSS) version 23.

The data was imported into STATA 14 statistical software. The data was clean to ensure accuracy and completeness. Then, analyzed at a 95% confidence interval. Chi-square test was used to establish any association between self-medication and the variables under study.

Ethical Consideration

Ethical clearance was obtained from the Ghana Health Service Ethics Review Committee (GHS-ERC: 48/02/17). Permission was sought from the Dean of students and Hall Tutors before approaching the students. Informed Consent was obtained from students before their participation in the study. Participation was entirely voluntary and participants were free to withdraw at any time. Full participation was however encouraged to ensure that the questionnaires were adequately filled to avoid incomplete data. Anonymity was ensured as the participants were told not to write their names and ID numbers on the questionnaires. Participation was strictly confidential as the participants were left to fill the questionnaire themselves.

Results

Baseline characteristics of participants:

Three hundred and ninety-six (396) students participated. The demographic characteristics of the respondents are shown in Table 1.

The mean age of Students was 22.6 ± 0.2 years. One hundred and ninety respondents representing 48.0%

[95% CI 43.1-53.0] would as a first line of action practice self-medicate (190/396).

The demographic characteristics were subjected to a chi-square test to determine the association with the practice of self-medication as shown in Table 2.

Health seeking behavior

Among the self-treated respondents 42.1% ($p=0.000$) believed their conditions did not merit a physician visit while 36.8% ($p=0.000$) noted they were familiar with treatment options. Other explanations included: the lack of time (14.7% $p=0.000$); lack of primary physician (6.8% $p=0.000$) and invalid health insurance (1.9% $p=0.070$). Four respondents (4/190) representing 2.1% $p=0.036$ stated other reasons (insecurity, distrust in the health system and shyness) (Table 3)

Due to the multiple nature of the responses, there were 239 responses among the 190 self-treated students

in regards to the source of medications used. Out of which, 70.7% (169/239) respondents mostly obtained their drugs from the pharmacy, 8.9% (21/239) had roommates giving them the drugs, 7.5% (18/239) took left over medicines from their home and 5.0% (12/239) obtained drugs from relatives. A proportion of 4.6% (11/239) obtained it from shopping centres while 2.5% (6/239) obtained it as a result of left-over medications given to them during previous visits at the University hospital and 0.8% (2/239) obtained it from other sources (online and market) (Figure 1).

Among the 190 self-treated students, there was a 99.0% (188/190) response rate but due to the multiple nature of responses a total of 318 responses were recorded for the type of medication used. The most frequent drugs used for self-medication were antibiotics 37.1% (118/318), antimalarials 17.9% (57/318) and analgesics 13.2% (42/318) (Figure 2).

Table 1: Demographic characteristics of respondents and their first line of action when ill.

Variables	Self-medicate	Consult doctor	Ignore feeling	Rest/Pray
	Frequency (%)			
Sex				
Male	86 (21.7)	38 (9.6)	58 (14.6)	14 (3.5)
Female	104 (26.3)	25 (6.3)	54 (13.6)	17 (4.3)
Nationality				
Ghanaians	168 (42.4)	60 (15.2)	107 (27.0)	30 (7.6)
Foreign nationals	22 (5.6)	3 (0.8)	5 (1.3)	1 (0.3)
Marital Status				
Single	185 (46.7)	58 (14.6)	106 (26.8)	31 (7.8)
Married	5 (1.3)	4 (1.0)	5 (1.3)	0
Widowed	0	1 (0.3)	1 (0.3)	0
Educational Level				
100	27 (6.8)	8 (2.0)	17 (4.3)	4 (1.0)
200	28 (7.1)	12 (3.0)	16 (4.0)	4 (1.0)
300	38 (9.6)	10 (2.5)	15 (3.8)	6 (1.5)
400	50 (12.6)	19 (4.8)	41 (10.4)	5 (1.3)
500	5 (1.3)	0	0	1 (0.3)
600	32 (8.1)	10 (2.5)	17 (4.3)	7 (1.8)
Others (PhD)	10 (2.5)	4 (1.0)	6 (1.5)	4 (1.0)
College				
Basic & Applied Sciences	52 (13.2)	22 (5.6)	31 (7.9)	13 (3.3)
Education	2 (0.5)	4 (1.0)	3 (0.8)	0
Health Sciences	27 (6.8)	8 (2.0)	9 (2.3)	4 (1.0)
Humanities	109 (27.6)	29 (7.3)	68 (17.2)	14 (3.5)

Table 2: Association of demographic predictors of self-medication.

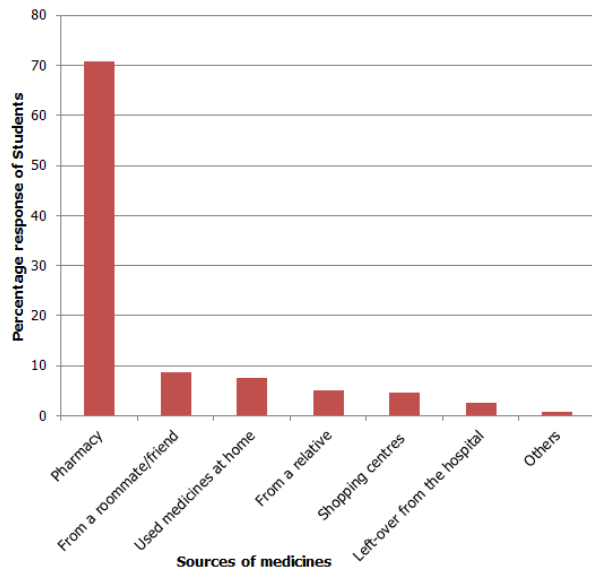
Variables	First line of action when ill N (%)		X ²	p-value
	Self-medicate	Self-medicate		
	Yes	No		
Sex			2.62	0.106
Male	86 (46.26)	110 (53.40)		
Female	104 (54.74)	96 (46.60)		
Nationality			7.12	0.008*
Ghanaians	168 (88.42)	197 (95.63)		
Foreign nationals	22(11.58)	9 (4.37)		
Marital Status			2.76	0.251
Single	185 (97.37)	195 (94.66)		
Married	5(2.63)	9 (4.37)		
Widowed	0 (0.00)	2 (0.97)		
Educational Level			0.05	0.825
Undergraduate	143 (75.26)	157(76.21)		
Post-graduate	47(24.74)	49(23.79)		
College			4.64	0.200
Basic & Applied Sciences	52 (27.37)	66(32.20)		
Education	2(1.05)	7(3.41)		
Health Sciences	27(14.21)	21(10.24)		
Humanities	109(57.37)	111(54.15)		

P-value* < 0.05

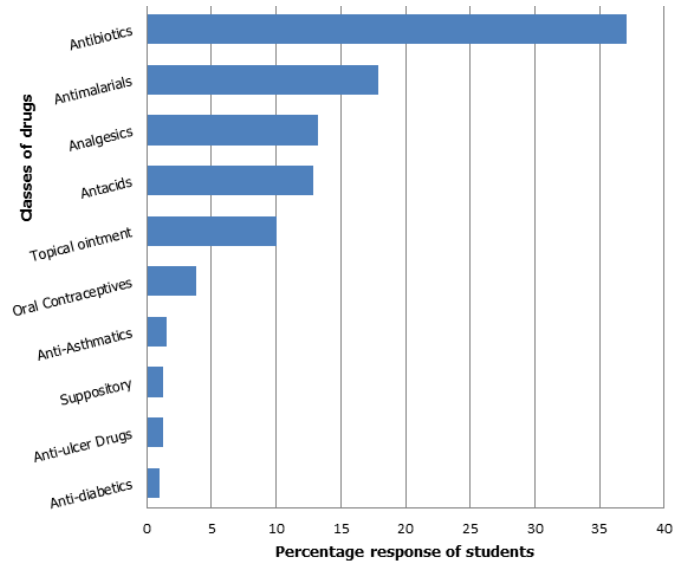
Table 3: Reasons' respondents gave for practicing self-medication

Reason	Self-medicate		X ²	p-value
	Yes	No		
Lack of time			32.6677	<0.01
Yes	28 (14.74)	0(0.00)		
No	162 (85.26)	206(100.00)		
Lack of Primary Physician			14.5731	<0.01
Yes	13(6.84)	0(0.00)		
No	177(93.16)	206(100.00)		
Invalid Insurance			3.2775	0.070
Yes	3(1.58)	0(0.00)		
No	187(98.42)	206(100.00)		
Familiar with treatment option			92.1912	<0.01
Yes	70(36.84)	0(0.00)		
No	120(63.16)	206(100.0)		
Condition do not merit physician visit			108.6955	<0.01
Yes	80(42.11)	0(0.00)		
No	110(57.89)	206(100.00)		
Others (insecurity, distrust in the health system and shyness)			4.3811	0.036
Yes	4(2.11)	0(0.00)		
No	186(97.89)	206(100.00)		

P-value* < 0.05



** Multiple responses
Figure 1: Sources of medicines used by students



** Multiple responses
Figure 2: Classes of medicines used by students

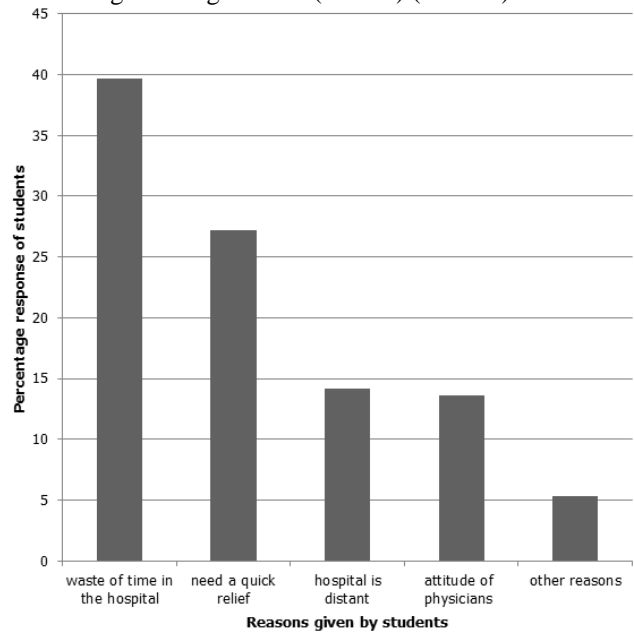
Students’ Knowledge on the implications of self-medication

Among respondents who practice self-medication, one hundred and fifty-seven (157) agreed having knowledge on the free medical services in the University hospital. One hundred and twenty-seven (127) respondents, representing 81.9% (127/157) stated they would self-medicate regardless of their knowledge on the free medical services. Respondents had multiple reasons for practicing self-medication, these included; waste of time in the hospital 39.3% (66/168), the need for a quick relief 28.0% (47/168), the hospital being distant 18.0% (23/168), attitude of physicians 18.0% (23/168) and other reasons (familiarity of treatment options and shyness) 5.4% (9/168) (Figure 3).

Among the self-treated respondents, eighty-five respondents representing 45.5% (85/187) indicated that they had had knowledge on ADR. From that, a total of 22 respondents representing 11.6% [95% CI 7.7%-17.0%] self-treated students had suffered from Adverse Drug Reaction presumably confirmed by a physician/ pharmacist; as 10 out of 22 had knowledge on ADR through a physician or pharmacist. The drugs implicated in these adverse reactions included; Antimalarials 9 (40.9%); Antibiotics 8 (36.4%) and Oral contraceptives 5 (22.7%). (Figure 4) shows a pie chart of the drug classes that cause ADR among respondents that practice self-mediation by sex.

Among the 190 self-treated respondents, there was a response rate of 94.2% (179/190) regarding

knowledge on implications of self-medication. Respondents knew at least one implication of drugs; Adverse Drug Effect 43.6% (78/179), drug resistance 43.6% (78/179), severity of condition 31.3% (56/179) and wastage of drugs 15.6% (28/179) (Table 4).



** Multiple responses
Figure 3: Reasons for self-medication amidst knowledge of free medical services.

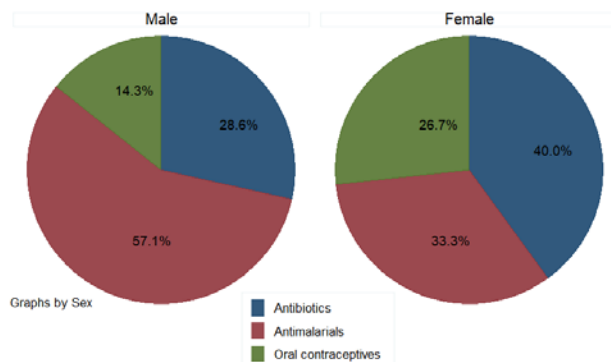


Figure 4: Drug classes that cause ADR among respondents

Discussion

The study found that self-medication was common among students of University of Ghana, Legon. It has been reported however that the incidence of self-medication is dependent on how the questions are constructed in the questionnaire³⁰ where questioning current practice yielded high rates^{8,31-34}. Our results do not align with such claims as participants were encouraged to report the practice of self-medication only based on their experience upon entry into the university.

Our study showed no real association between the practice of self-medication and the demographic characteristics^{4,6,11}. However, the nationality of respondents and the practice of self-medication was statistically significant; this might be because, foreign nationals are not familiar with the health system. Thus, the practice was prevalent among foreign nationals than among Ghanaians. The study showed 48.0% of students practiced self-medication as a first line of action when ill. This is similar to reported rates of 47.9% at Jiangsu University (JSU) and 47.8% at Shantou University (STU) in China². The practice of self-medication occurs more frequently amongst females (54.8%) than in males (45.2%) but this difference was not statistically significant thus, consistent with previous studies conducted among students in Nigerian and Nepal^{11,16}.

Forty percent of the respondents that self-medicate as a first line of action believed their conditions did not merit a physician visit, similar to findings among medical students¹⁶. While 36.8% respondents were familiar with treatment options, 14.7% noted it was due to the mere lack of time, 6.8% explained it was due to the lack of primary physician, 2.1% and 1.9% had other reasons and noted it was due to the lack of a valid health insurance respectively. The main reasons for self-medication were similar to findings among Slovenia students⁸. Similarly, findings from this study were in

Table 4: Knowledge of self-treated respondents on the implication of drugs**

Knowledge of respondents	Frequency (%)
Adverse drug effects	78 (43.6)
Drug resistance	78 (43.6)
Severity of conditions	56 (31.3)
Wastage of drugs	28 (15.6)

line with those reported among students of Universities in other countries^{31,36,37}.

Studies conducted among students in Nigeria^{8,11} indicated that most students obtained their drugs from the pharmacy. Reminiscently, this study revealed a greater proportion of medicines were obtained from the pharmacy (70.7%), similar to a study in India¹⁷. Also, 8.9% respondents had roommates/friends giving them the drugs possibly due to the hospitable nature of Ghanaians, 7.5% took left over medicines from their homes, 5.0% obtained it from relatives and 4.6% obtained it from shopping centers. Only 2.5% and 0.8% obtained it as a result of left-overs from medications given at the University hospital and from other sources (online and market) respectively^{7,10,38}. The websites where drugs are purchased from and the mode of delivery were however not mentioned.

There was wide range of drug classes used by students in this study. The most frequent drug used for self-medication was antibiotics (37.1%) similar to what was reported among University of Lahore students³⁹. This was followed by antimalarials (17.9%); which may be attributed to the high prevalence of malaria cases in Ghana and the readily accessible means of procurement. The use of antibiotics and antimalarials without the guidance of a medical practitioner may result in the likelihood of inappropriate, incorrect, or undue health care, incomprehensible diagnosis, microbial resistance and accrued morbidity⁹. The nature of the study did not permit us to investigate the names of the individual drugs used by students.

The University of Ghana offers free medical services to its students. However, among the self-treated respondents, one hundred and fifty-seven (157) had knowledge of the free medical services in the hospital out of which 80.9% would self-medicate be what may. Most of the reasons respondents gave were, the long hours of waiting time (39.6%) which corresponds to the

findings of a study conducted among University students in South-Western Nigeria¹². About Twenty-seven percent of students noted they needed a quick relief while 14.2% indicated the average 2.5 km distance to the hospital was limiting.

Approximately 13.6 percent also indicated that, the negative attitude of physicians deters them. Medical services should be convenient to anyone that seeks medical attention; one should not avoid health care because of the unfriendly nature of health practitioners. High self-care practices is as a result of the knowledge gap of self-medicating and possible implications⁴⁰. This was evident as respondents had little knowledge on the implication of drugs, aside their side effects. Forty-four percent of respondents knew about drug resistance, 44% Adverse Drug Effect and 31% had knowledge on the severity of condition (deterioration or worsening of medical condition) as an implication of drugs. An estimated 12% among the self-treated respondents suffered an Adverse Drug Reaction as a result of self-medication. This was however perceived ADR experienced as the study could not ascertain the accuracy of their claims. The drugs that were implicated are; antimalarials, antibiotics and oral contraceptives. Pharmacists should relentlessly counsel, build awareness about medical products, provide sufficient detailed information on probable effects of products on health, recommend reasonable dosage and perform follow-ups.

Limitations: To control self-reporting bias regarding social desirability and recall biases, two measures were taken. Social desirability bias was reduced by assuring respondents of their anonymity and providing confidentiality especially where balloting had to be done to select a respondent from a room. Recall bias was controlled by facilitating recall through the provision of a manual that included the definition of self-medication, Adverse Drug Reaction and classes of drugs. This harmonized their perceived meanings of definitions and their actual meanings. For instance, some students didn't know pain killers were also known as analgesics or pain relievers. This curbed any undue advantage respondents from the sciences might have over those from other fields of study.

Another limitation worth mentioning has to do with the ADR experienced by respondents. The study could not unilaterally confirm/deny the claims of respondents as we could not ascertain whether their experiences were as a result of some disease progression that presented itself as ADR and/or as such was proven by a licensed physician or pharmacist. Even though, almost fifty percent of respondents noted they knew about ADR

through a physician or pharmacist. As a result, the ADR as experienced by respondents were treated as perceived ADR rather than one that was clinically proven.

Conclusion

Self-medication was prevalent among students of University of Ghana, Legon regardless of the free medical services at the hospital. Long waiting time, urgent need of relief from sickness, distance to the hospital, unpleasant attitude of some physicians were some of the reasons for the practice. Proportionally, the practice was most common among the female population; this however was not statistically significant. The most commonly used class of drugs is antibiotics, anti-malarials and analgesics obtained from pharmacies and roommates/ friends. Students showed some level of knowledge on the implication of drugs aside side effects of drugs. The proportion of students that had experience an Adverse Drug Reaction whilst self-medicating was quite high.

Recommendation

The University Hospital should collaborate with the Ghana Health Service to organize symposiums which address the concerns of the students. Even though the pharmaceutical industry is a private business, the University Hospital should liaise with pharmacies on the campus to bridge the gap in the delivery of health care to ensure that prescribers have adequate knowledge on the history of students before any prescription is made.

Acknowledgment

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References

- 1 Montastruc JL, Bagheri H, Geraud T, *et al.* [Pharmacovigilance of self-medication]. *Therapie*. 1997.
- 2 Zhu X, Pan H, Yang Z, *et al.* Self-medication practices with antibiotics among Chinese university students. *Public Health* 2015;**130**:78–83. doi:10.1016/j.puhe.2015.04.005
- 3 Okeke IN, Laxminarayan R, Perencevich EN, Weisenberg S MD. Non-prescription antimicrobial use worldwide: a systematic review. *Lancet Infect Dis* 2011;**11**:692e701.
- 4 Morgan DJ, Okeke IN, Laxminarayan R, *et al.* Non-prescription antimicrobial use worldwide: a

- systematic review. *Lancet Infect Dis* 2011;**11**:692–701. doi:10.1016/S1473-3099(11)70054-8
- 5 Kronvall G, Karlsson I, Chuc N, *et al.* Antibiotic medication and bacterial resistance to antibiotics: a survey of children in a Vietnamese community. *Trop Med Int Heal* 2003;**5**:711–21. doi:10.1046/j.1365-3156.2000.00630.x
 - 6 Togoobaatar G, Ikeda N, Ali M, *et al.* Survey of non-prescribed use of antibiotics for children in an urban community in Mongolia. *Bull World Health Organ* 2010;**88**:930–6. doi:10.2471/BLT.10.079004
 - 7 Levson G, Monjeza U. People ' S Knowledge , Attitude and Practice S About Self Medication and Its Implications in Ilala Municipality , Dar Es Salaam People ' S Knowledge , Attitude and Practice S About Self Medication and Its Implications in Ilala Municipal , Dar Es Salaam. 2013.
 - 8 Klemenc-Ketis Z, Hladnik Z, Kersnik J. A cross sectional study of sex differences in self-medication practices among university students in Slovenia. *Coll Antropol* 2011;**35**:329–34.
 - 9 Sherazi BA, Mahmood KT, Amin F, *et al.* Prevalence and measure of self medication: A review. *J Pharm Sci Res* 2012;**4**:1774–8.
 - 10 Mehta RK, Sharma S. Knowledge , Attitude and Practice of Self-Medication among Medical Students. 2015;**4**:89–96. doi:10.9790/1959-04118996
 - 11 Afolabi AO. Self-medication, drug dependency and self-managed health care- A review. *Public Heal Behav Heal Intech* 2012.
 - 12 Osemene KP, Lamikanra A. A study of the prevalence of self-medication practice among university students in southwestern Nigeria. *Trop J Pharm Res* 2012;**11**:683–9. doi:10.4314/tjpr.v11i4.21
 - 13 Montastruc JL, Bondon-Guitton E, Abadie D, *et al.* Pharmacovigilance, risks and adverse effects of self-medication. *Th?rapie* Published Online First: 2016. doi:10.1016/j.therap.2016.02.012
 - 14 Alhomoud F, Aljamea Z, Almahasnah R, *et al.* Self-medication and self-prescription with antibiotics in the Middle East—do they really happen? A systematic review of the prevalence, possible reasons, and outcomes. *Int J Infect Dis* 2017;**57**:3–12. doi:10.1016/j.ijid.2017.01.014
 - 15 Auta A. Medicine Knowledge and Self-medication Practice Among Students. *African J Pharm Res Dev* 2012;**4**:6–11. www.ajopred.com
 - 16 Vo KM. Self-Medication Practices of Undergraduate College Students : Non-Medical Prescriptive Stimulant Use. 2013.
 - 17 Lv B, Zhou Z, Xu G, *et al.* Knowledge, attitudes and practices concerning self-medication with antibiotics among university students in western China. *Trop Med Int Health* 2014;**19**. doi:10.1111/tmi.12322
 - 18 Kumar N, Kanchan T, Unnikrishnan B, *et al.* Perceptions and Practices of Self-Medication among Medical Students in Coastal South India. *PLoS One* 2013;**8**. doi:10.1371/journal.pone.0072247
 - 19 Stephen S, Scaria T, Sunny TT, *et al.* Self Medication Practices Among Undergraduate Nursing Students in South India : a Cross Sectional. *Int J Clin Pharmacol Ther* 2013;**386**:159–62. doi:10.5414/CP202451
 - 20 Gyawali S. Knowledge, Attitude and Practice of Self-Medication Among Basic Science Undergraduate Medical Students in a Medical School in Western Nepal. *J Clin Diagnostic Res* Published Online First: 2015. doi:10.7860/JCDR/2015/16553.6988
 - 21 Kasulkar AA, Gupta M. Self Medication Practices among Medical Students of a Private Institute. *Indian J Pharm Sci* 2015;**77**:178–82.
 - 22 Alkhatatbeh MJ, Alefan Q, Alqudah MAY. High prevalence of self-medication practices among medical and pharmacy students: A study from Jordan. *Int J Clin Pharmacol Ther* 2016;**54**. doi:10.5414/CP202451
 - 23 Hu J, Wang Z. Knowledge, attitudes and perceptions regarding antibiotic use and self-medication: A cross-sectional study among Australian Chinese migrants. *Healthc Infect* 2015;**20**. doi:10.1071/HI14034
 - 24 Gutema GB, Gadisa DA, Kidanemariam ZA, *et al.* Self-medication practices among health sciences students: The case of mekelle university. *J Appl Pharm Sci* 2011;**1**:183–9.
 - 25 Mehta RK, Sharma S. Knowledge , Attitude and Practice of Self-Medication among Medical Students. *J Nurs Heal Sci* 2015;**4**:89–96. doi:10.9790/1959-04118996
 - 26 Bollu M, Vasanthi B, Chowdary PS, *et al.* Prevalence of Self Medication Among the Pharmacy Students in Guntur : a Questionnaire Based Study . *World J Pharm Pharm Sci* 2014;**3**:810–26.
 - 27 Boateng D. Self-Medication Among Doctors and Pharmacists At the Korle Bu Teaching Hospital. 2009.

- 28 Donkor ES, Tetteh-Quarcoop PB, Nartey P, *et al.* Self-medication practices with antibiotics among tertiary level students in Accra, Ghana: A cross-sectional study. *Int J Environ Res Public Health* 2012;**9**:3519–29. doi:10.3390/ijerph9103519
- 29 Helal RM, Abou-Elwafa HS. Self-medication in university students from the city of mansoura, Egypt. *J Environ Public Health* 2017;**2017**. doi:10.1155/2017/9145193
- 30 Almasdy D, Sharrif A. Self-Medication Practice with Nonprescription Medication among University Students: a review of the literature. *Arch Pharm Pract* 2011.
- 31 James H, Handu SS, Khaja KAJ AI, *et al.* Influence of medical training on self-medication by students. *Int J Clin Pharmacol Ther* Published Online First: 2008. doi:10.5414/CP46023
- 32 Zafar SN, Syed R, Waqar S, *et al.* Self-medication amongst university students of Karachi: Prevalence, knowledge and attitudes. *J Pak Med Assoc* 2008.
- 33 A.F S. A descriptive study of self-medication practices among Palestinian medical and nonmedical university students. *Res Soc Adm Pharm* 2008;**4**:162–72.
- 34 Verma RK, Mohan L, Pandey M. Evaluation of self medication among professional students in North India: Proper statutory drug control must be implemented. *Asian J Pharm Clin Res* 2010;**3**:60–4.
- 35 Naqvi AA, Ahmad R, Qadeer O, *et al.* The prevalence of self medication and the factors influencing its practice in pharmacy students of Karachi, Pakistan: A mix mode study. *J Young Pharm* 2016;**8**. doi:10.5530/jyp.2016.3.11
- 36 Olayemi OJ, Olayinka BO, Musa AI. Evaluation of antibiotic self-medication pattern amongst undergraduate students of Ahmadu Bello University (Main Campus), Zaria. *Res J Appl Sci Eng Technol* Published Online First: 2010. doi:10.7860/JCDR/2016/18018.7847
- 37 Sontakke S, Bajait C, Pimpalkhute S, *et al.* Comparative study of evaluation of self-medication practices in first and third year medical students. *Int J Biol Med Res* 2011.
- 38 Kayalvizhi S, Senapathi R. Evaluation of the Perception , Attitude and Practice of Self Medication Among Business Students in 3 Select Cities , South India. *Int J Enterp Innov Manag Stud* 2007;**1**:40–4.
- 39 Siddique A, Mahmood H, Mukhtar S, *et al.* Self-medication practice among first year medical students in university college of medicine and dentistry , University of Lahore. 2015;**11**:20–1.
- 40 Balamurugan E. & GK. Prevalence and pattern of Self medication use in coastal regions of South India. *Br J Med Pr* 2011;**4**:a428.
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PREVALENCE AND PRECIPITATING FACTORS OF HEPATIC ENCEPHALOPATHY IN PATIENTS WITH LIVER CIRRHOSIS AND ASCITES ADMITTED AT KORLE BU TEACHING HOSPITAL IN GHANA.

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Abstract

Background: Hepatic encephalopathy (HE) is one of the most debilitating complications of cirrhosis leading to death and severely affects the lives of patients and their caregivers. Decreases in HE mortality and recurrence have been linked with timely identification and correction of potential precipitating factors and early treatment. The aim of this study was therefore to determine the prevalence and precipitating factors of patients with cirrhotic ascites admitted with overt hepatic encephalopathy at KBTH Accra, Ghana.

Materials and Methods: A cross-sectional study was conducted involving one hundred and three (103) patients admitted at medical block in the Korle-Bu Teaching Hospital (KBTH) with cirrhotic ascites from 25th March 2016 to 25th November, 2016. Demographic and clinical features including features of overt hepatic encephalopathy and possible precipitant were collected using a standardized questionnaire.

Results One hundred and three patients with cirrhotic ascites were recruited for the study with a mean age of 43.5 ± 12.2 years. Fifty-eight (56.3%) patients were males. The prevalence of hepatic encephalopathy was 25.24%. Precipitating factors were infections (53.8%), gastrointestinal bleeding (19.2%), electrolyte imbalance (9.2%) and constipation (3.9%). No precipitant was identified for one patient with hepatic encephalopathy.

Conclusion: Prevalence of overt hepatic encephalopathy in patients with liver cirrhosis and ascites is not uncommon in our setting and precipitants were identified for almost all of them except one patient. A similar study should be done on a larger scale in multiple centres and regions to get a well-balanced prevalence of hepatic encephalopathy and its precipitating factors.

Key Words: hepatic encephalopathy, liver cirrhosis, precipitating factors, Ghana.

Introduction

Hepatic encephalopathy (HE) describes a broad range of neuropsychiatric abnormalities caused by advance hepatic insufficiency or portosystemic shunting in the absence of neurological disorders.¹⁻² HE is one of the most debilitating complications of cirrhosis and severely affects the lives of patients and their caregivers.³ Based on the underlying hepatic abnormality, encephalopathy is subdivided into three types;² type A (associated with acute liver disease), type B (associated with portosystemic bypass and no intrinsic hepatocellular disease), and type C (associated with chronic liver disease). Type C HE can be further divided into three categories: i. Episodic HE (Spontaneous; recurrent; precipitated) ii. Persistent HE (Mild; Severe; Treatment dependent) and iii. Minimal or Overt HE. Overt HE (OHE) is a syndrome of neuropsychiatric abnormalities that can be detected by bedside clinical tests in contrast

to minimal HE (MHE) that requires specific psychometric tests for detection.⁴ The likelihood of developing hepatic encephalopathy correlates with the severity of the liver disease. Generally, at the time of diagnosis of liver cirrhosis, there is a 10-14% chance of OHE,⁵⁻⁷ 16-21% in those with decompensated cirrhosis⁸⁻⁹ and 10-50% in patients with transjugular intrahepatic portosystemic shunt.¹⁰⁻¹¹ The cumulated number indicates that OHE will occur in 30-45% of those with cirrhosis at some time during their clinical course and in the survivors in most cases repeatedly.¹² The risk for the first bout of OHE is 5-25% within 5 years after cirrhosis diagnosis, depending on the presence of risk factors such as other complications of cirrhosis and probably diabetes and hepatitis C.³ The pathogenesis of HE in cirrhosis is complex and multifactorial, but the key role is thought to be played by circulating gut-derived toxins of the nitrogenous compound, most notable ammonia. Management of HE primary involves providing supportive care, identifying and treating any precipitating causes, reducing nitrogenous load in the gut, and assessing the need for long term therapy and liver transplant evaluation. Ammonia lowering therapies such as non-absorbable disaccharides (lactulose, lactitol etc.) and selected antimicrobial (metronidazole, rifaximin etc.) are the main agents used to treat OHE.

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Common HE precipitating factors include sepsis, gastrointestinal (GI) bleeding, constipation, and diuretic use, and once treated, H.E usually subsides significantly.¹³ Decreases in H.E mortality and recurrence have been linked with timely identification and correction of potential causes and early HE treatment. There is a need to document the pattern of hepatic encephalopathy in adult population with liver cirrhosis in our setting as only reports from resource-endowed countries abound in the literature. This will no doubt allow a more appropriate management guideline, taking cognizance of resource availability. The aim of this study was therefore to determine the prevalence and precipitating factors of patients with cirrhotic ascites admitted with OHE at KBTH Accra, Ghana.

Methods

Formal approval of this study was obtained from the Ethical and Protocol Committee of the University of Ghana School of Medicine and Dentistry. This study was conducted in accordance with the Helsinki Declaration. The research design was a cross-sectional hospital-based study, carried out at the Department of Medicine, Korle-Bu Teaching Hospital (KBTH), Accra, from 25th March, 2016 to 25th November, 2016.

One hundred and three (103) patients with cirrhotic ascites admitted to the medical block of KBTH were consecutively recruited. All adult patients above 18 years with cirrhotic ascites who provided informed consent were included. Diagnosis of liver cirrhosis was made based on the clinical features, laboratory investigations and abdominal ultrasound findings suggestive of liver cirrhosis. After thoroughly explaining the study to patients, individuals who gave informed consent were recruited and a questionnaire was administered to obtain socio-demographic data and clinical history. For those patients with stage 3 and 4 HE, written consent was obtained from caregivers. Relevant history including alcohol use and clinical features of liver cirrhosis (spider angioma, palmar erythema, ascites, asterixis, hepatomegaly, splenomegaly and abdominal vein collaterals) were obtained. A diagnosis of hepatic encephalopathy was made when patient had impaired consciousness with a background liver disease in the absence of any neurological disorder or other causes of impaired consciousness. The West Haven criteria was used in grading the encephalopathy.¹⁴ The West Haven criteria is a semi-quantitative grading of mental state from trivial lack of awareness (grade 1) to coma (unresponsive to verbal or noxious stimuli (grade 4). The Child-Pugh scoring system was used for assessing the severity of liver disease on patient presentation.¹⁵ The scoring system takes into account the serum albumin, serum prothrombin time, and bilirubin as well as presence of fluid retention and encephalopathy; each of which is given a numerical score. There are 3 grades: A, B, and C depending on the total scores.

A sample of 15mls of venous blood was taken for haematological, biochemical and serological investigations. Abdominal paracentesis was performed using an aseptic technique at the right or left iliac fossa, 3cm above and 3cm medial to the anterior superior iliac spine. Exactly 15mls of ascitic fluid was collected using a sterile syringe for culture, cell count and differentials, albumin and protein. Diagnosis of spontaneous bacterial peritonitis was based on demonstration of more than 250 neutrophils/cm³ or positive fluid culture in ascitic fluid. Urine analysis (Proteins, leucocytes, erythrocytes, pus cell and other urine abnormalities) were done for all patients. All patients were tested for HBsAg and anti-HCV antibodies to determine the cause of liver cirrhosis. Chest X-ray was done for all patients with clinical diagnosis of pneumonia, mainly to look for areas of consolidation.

Furthermore, an abdominal ultrasound scan was performed for all patients. The following details were recorded: maximum vertical span of the liver; nodularity of liver surface; spleen size (length of its longest axis); and presence of ascites.

Data analysis: Data obtained were analysed using STATA 15 statistical software. Descriptive statistics was run for all the variables. The prevalence of OHE and other categorical variables were expressed as proportions. Biochemical parameters and Child-Pugh Score were reported as Mean \pm SD (normal data) and median (IQR) (non-normal data). The Student t-test or Mann Whitney U test were used to test the difference in means. Chi-squared test and the Fishers exact tests were used to determine the association of categorical variables and OHE. For all analysis, p-values < 0.05 were considered statistically significant.

Results

One hundred and three patients with cirrhotic ascites were recruited for the study with a mean age of 43.5 ± 12.2 years (age range 18 to 74) years. Fifty-eight (58, 56.3%) patients were males and 44 (43.4%) were females with male to female ratio of 1.7:1. HBV infection was the commonest cause (53.4%, 54/103) of liver cirrhosis and alcohol alone accounted for 21.4% of causes of liver cirrhosis. HCV infection accounted for 8.9% of cases and HBV infection in combination with alcohol accounted for 6.9% of the cases. Autoimmune hepatitis, fatty liver disease and congenital atresia were uncommon causes (Table 1).

Most patients admitted had H.E Grade 3, 38.5% (10/26), and Grade 4, 30.8% (8/26) severity (Table 2).

The prevalence of hepatic encephalopathy was 25.24%. The major precipitating factors of hepatic encephalopathy were infections (14/26, 53.8%) [(spontaneous bacterial peritonitis (26.9%), pneumonia (15.4%) and urinary tract infection (11.5%)], gastrointestinal bleeding (5/26, 19.2%), electrolyte imbalance (5/26, 19.2%) [hypokalemia (3/26, 11.5%) and hyponatraemia (2/26, 7.7%)]. Constipation and

unknown precipitants accounted for 1/26 (3.9%) each (Table 3).

The clinical feature significantly associated with hepatic encephalopathy were jaundice, fever and splenomegaly and the laboratory parameters associated with hepatic encephalopathy were high bilirubin mainly conjugated bilirubin, high INR and Child-Pugh score and low haemoglobin (Table 4, 5).

Table 1: Causes of liver cirrhosis

Causes	Encephalopathy		Total (%)
	Present (%)	Absent (%)	
Hepatitis B virus	12(11.6)	42(40.8)	54(52.4)
Alcohol	6(5.8)	16(15.6)	22(21.4)
Hepatitis C Virus	6(5.8)	3(2.9)	9(8.7)
Alcohol + Hepatitis B virus	2(1.9)	5(4.9)	7(6.8)
Autoimmune Hepatitis	0(0.0)	4(3.9)	4(3.9)
Congenital Biliary Atresia	0(0.0)	1(1.0)	1(1.0)
Unknown	0(0.0)	6(5.8)	6(5.8)

Table 2: Severity of Hepatic Encephalopathy

Severity of Encephalopathy (n=26)	Frequency (%)
Grade 1	3 (11.5)
Grade 2	5 (19.2)
Grade 3	10 (38.5)
Grade 4	8 (30.8)

Table 3: Precipitating Factors for Hepatic Encephalopathy

Precipitants	Frequency (%)
Infections	
Spontaneous Bacterial Peritonitis	7 (26.9%)
Pneumonia	4 (15.4%)
Urinary tract infections	3 (11.5%)
Upper GIB	5 (19.2%)
Electrolyte imbalance	5 (19.2%)
Constipations	1 (3.9%)
No precipitant found	1 (3.9%)

Table 4: Clinical Features of the Study Participants

Clinical symptoms and signs	Encephalopathy (Absent)	Encephalopathy (Present)	Total	p-value
	N (%)			
Ascites				0.252
<i>Moderate</i>	40 (51.9)	9 (34.6)	49	
<i>Severe</i>	37 (48.1)	17 (65.4)	53	
Jaundice	36 (46.8)	21 (80.8)	57	0.003
Abdominal Pain	39 (50.7)	15 (57.7)	54	0.534
Fever	27 (35.1)	15 (57.7)	42	0.042
Chills	20 (26.0)	11 (42.3)	31	0.116
Weight loss	64 (83.1)	20 (76.9)	84	0.481
Hematemesis	11 (14.3)	3 (11.5)	14	0.508
Clubbing	9 (11.7)	5 (19.2)	14	0.332
Palmar erythema	25 (32.5)	5 (19.2)	30	0.199
Pedal edema	61 (79.2)	17 (65.4)	78	0.155
Hepatomegaly	20 (26)	4 (15.4)	24	0.421
Splenomegaly	12 (15.6)	0 (0)	12	0.034

Table 5: Laboratory Parameters of the Study Participants

Liver function	Encephalopathy (Absent) (n=77)	Encephalopathy (Present) (n=26)	p-value
AST (U/L)	126 (66, 250)	142 (83, 287)	0.414
ALT (U/L)	58 (36, 94)	51 (40, 78)	0.529
ALP (U/L)	222 (147, 305)	209 (112, 294)	0.573
GGT (U/L)	152 (92, 298)	133 (63, 387)	0.501
Total Bilirubin (umol/l)	32 (18.9, 115)	130.7 (46, 314)	0.003
Direct Bilirubin (umol/l)	20.1 (8.3, 81.2)	105.2 (22, 260)	0.001
Total Protein (g/l)	70 (62, 76.6)	74.5 (61, 80)	0.398
Serum Albumin (g/l)	26 (22, 30)	24 (20,28)	0.08
INR	2 (1.4, 2.2)	7.5 (4, 10)	0.034
Child-Pugh Score	10 (8, 12)	13 (12, 13)	< 0.001
Full Blood Count			
Haemoglobin (g/dl)	10.8 (9.3, 12.1)	9.1 (7.5, 10.9)	0.001
WBC (10 ⁹ /l)	7.9 (5.6, 13.1)	12.5 (8, 16.4)	0.063
Platelet (10 ⁹ /l)	112 (71, 204)	124.5 (87, 176)	0.391
Renal Function Test			
Sodium (mmol/l)	134 (131, 139)	131.5 (127, 140)	0.150
Potassium (mmol/l)	4.1 (3.7, 4.6)	4.8 (3.7, 5.2)	0.206
Urea (umol/l)	5.4 (3.6, 8.5)	5.1 (3.8, 11.3)	0.395
Creatinine (umol/l)	80 (67, 106)	93 (73, 200)	0.050

Variables presented as median (IQR) p-values (Mann Whitney U test) WBC- white cell count

ALT- Alanine transaminase, AST- Aspartate transaminase, ALP- Alanine transaminase, GGT- Gamma glutamyl transaminase, INR- International normalize ratio.

Discussion

Hepatic encephalopathy is a serious complication of decompensated cirrhosis with a significantly high mortality if not managed appropriately and in a timely manner. Hence, there is an urgency to accurately diagnose these conditions, start appropriate therapy, and to maintain remission. Management of HE primarily involves providing supportive care, identifying and treating any precipitating causes, reducing nitrogenous load in the gut, and assessing the need for long term therapy and liver transplant evaluation. The aim of this study was therefore to determine the prevalence and precipitating factors of patients with cirrhotic ascites admitted with OHE at KBTH Accra, Ghana. To the best of our knowledge this study represents the first ever report of HE and its precipitating factors in cirrhotic patients in Ghana. This will go a long way in formulating rational strategies in its management including prophylaxis in view of the reported poor outcome.

In this study 25.2% of the participants had HE. The exact worldwide prevalence of HE remains unknown, and is possibly a result of differences in aetiological factors, severity of the disease, and challenges in diagnosing minimal or sub-clinical HE.¹⁶ Studies in developed countries have revealed that the prevalence of OHE at the time of diagnosis of cirrhosis is 10%–14% in general,^{5,6,7} 16%–21% in those with decompensated cirrhosis.^{8,9} The cumulated numbers indicate that OHE will occur in 30%–45% of those with cirrhosis at some time during their clinical course and in the survivors in most cases repeatedly.¹² This shows that hepatic encephalopathy in patient with decompensated liver cirrhosis is uncommon in our patients.

In this study clinical features associated with HE included high fever, jaundice and splenomegaly and laboratory parameters consist of high INR, high Child-Pugh score and bilirubin. These features are associated with advance liver cirrhosis and the prevalence of hepatic encephalopathy has been found to be higher in these patients. High bilirubin and INR are among five markers used to stage the severity of liver disease according to Child-Pugh rankings.¹⁵ Jaundice is a clinical indication of decompensated liver cirrhosis; fever is a sign of infection which is a common precipitant of HE and splenomegaly is a sign of portal hypertension. Incidence of HE was found to be high among those with portal hypertension according to Tapper et al.¹⁷

The precipitants encountered in the current study were infections, electrolyte imbalance, gastrointestinal bleeding and constipation. No precipitant was identified in only one patient. This confirmed the fact that in most cases of liver cirrhosis with acute or chronic HE, a precipitating factor is found.¹⁴ Previous studies have shown that infections and gastrointestinal bleeding are the most frequent precipitants of HE.¹⁸⁻¹⁹ A similar trend of precipitants of HE was also found in Nigeria study.²⁰ Sharma et al.,⁵ identified upper gastrointestinal bleeding

(47%), constipation (18%) and spontaneous bacterial peritonitis (12%) as the commonest precipitating event of HE, but precipitants was not found in 21% of their study population. Another study also identified dehydration, acute kidney injury, constipation, and infection as the most frequent precipitants of HE.²¹ The precipitating factors of HE is globally similar, but the predominant precipitants vary from one study to another. The reasons for these variations may be as a result of the aetiology and severity of liver disease and the drugs (Diuretics, Benzodiazepines, Lactulose or Lactitol etc.) the patients were taking before the studies. Majority of the patients in our study had Hepatitis B-related liver disease, while significant alcohol consumption was noted to be the second commonest caused. This is in keeping with earlier reports about the role of hepatitis B in causation of liver disease in Ghana.²² Efforts at improving the coverage of current immunization campaign against Hepatitis B certainly will help reduce the burden of Hepatitis B virus infection, whilst education on harmful alcohol use should be encouraged to prevent its effect on the liver in addition to other vital organs.

This study is not without limitations, due to the high cost of imaging patients in this study, we did not have brain computerized tomographic scan (CT scan) to exclude primary neurological disease. However, most of these patients already had pre-existing liver disease.

Conclusion and recommendations

Prevalence of HE in patients with liver cirrhosis and ascites is not uncommon in our setting and precipitants were identified for almost all of them except one patient. Therefore, clinicians should do proper examination to identify OHE early in patients with decompensated liver cirrhosis and identification of different precipitating factors for early treatment. A large scale multi-center study will provide a well-balanced prevalence of hepatic encephalopathy and its precipitating factors. Moreover, study to determine treatment outcomes will be essential in our setting.

Reference

1. Butterworth RF. Neurosteroid in hepatic encephalopathy: Novel insight and new therapeutic opportunities. *J Steroid Biochem Mol Biol.* 2016;160: 94-7
2. Ferenci P, Lockwood A, Mullen K, Tarter R. Hepatic encephalopathy-definition, nomenclature, diagnosis, and quantification: Final report of the working party at the 11th World Congresses of Gastroenterology, Vienna, 1998. *Hepatology* 2002; 35:716-21.
3. Hendrik Vilstrup, Piero Amodio, Jasmohan Bajaj, et al. Hepatic Encephalopathy in Chronic Liver Disease: 2014 Practice Guideline by the American Association for the Study of Liver Diseases and the European Association for the Study of the Liver. *Hepatology* 2014; 60: 715-735
4. Bajaj JS, Wade JB, Sanyal AJ. Spectrum of neurocognitive impairment in cirrhosis: Implications for the assessment of hepatic encephalopathy. *Hepatology* 2009;50:2014-21.
5. Sharma P, Sharma BC. Management Patterns of Hepatic Encephalopathy: A Nationwide Survey in India. *J of Clinical and Experimental Hepatology.* 2015;5(3): 199–203
6. Romero-Gomez M, Boza F, Garcia-Valdecasas MS, et al. Subclinical hepatic encephalopathy predicts the development of overt hepatic encephalopathy. *Am J Gastroenterol.* 2001; 96:2718–2723.
7. Jepsen P, Ott P, Andersen PK, Sørensen HT, Vilstrup H. The clinical course of alcoholic liver cirrhosis: a Danish population-based cohort study. *Hepatology.* 2010; 51:1675–1682.
8. Jang JW, Choi JY, Kim YS, Yoo JJ, Woo HY, Choi SK, et al. Effects of virologic response to treatment on short- and long-term outcomes of patients with chronic hepatitis B virus infection and decompensated cirrhosis. *Clin Gastroenterol Hepatol.* 2018;16:1954-1963.
9. KASL clinical practice guidelines for liver cirrhosis: Varices, hepatic encephalopathy, and related Complications. *Clinical and Molecular Hepatology* 2020;26:83-127
10. American Association for the Study of Liver D, European Association for the Study of the L. Hepatic encephalopathy in chronic liver disease. Practice guideline by the European Association for the Study of the Liver and the American Association for the Study of Liver Diseases. *J Hepatol.* 2014;2014(61):642–59.
11. NeSmith M, Ahn J, Flamm SL. Contemporary understanding and management of overt and covert hepatic encephalopathy. *Gastroenterology and hepatology.*2016;12(2); 91-100
12. Poordad FF. Review Article: the burden of hepatic encephalopathy. *Aliment Pharmacol Ther.* 2007; 25 suppl 1: 3-9
13. Elwir S, Rahimi RS. Hepatic Encephalopathy: An Update on the Pathophysiology and Therapeutic Options. *J Clin Transl Hepatol.* 2017;5(2):142-151
14. Blei AT, Cordoba J. Practice parameters committee of the American College of Gastroenterology. Hepatic encephalopathy. *Am J Gastroenterol.* 2001; 96: 1968-1976.
15. Durand F, Valla D. Assessment of Prognosis of Cirrhosis. *Semin Liver Dis.* 2008;28(1):110-122
16. Lewis M and Howdle PD. Neurology of liver failure, from Academic unit of medicine, St. James university hospital Leeds U.K. *QJ Med.* 2003; 96: 623-633.
17. Tapper EB, Henderson JB, Parikh ND, Loannou GN, Lok AS. Incidence of and Risk Factors for Hepatic Encephalopathy in a Population-Based Cohort of Americans With Cirrhosis. *Hepatology Communications.* 2019; 3(11): 1510-1519

18. Mumtaz K, Ahmed US, Abid S, et al. Precipitating factors and the outcome of hepatic encephalopathy in liver cirrhosis. *J Coll Physicians Surg Pak.* 2010;20:514–518.
19. Wang QM, Ji Q, Duan ZJ, et al. A study on the position and etiology of infection in cirrhotic patients: a potential precipitating factor contributing to hepatic encephalopathy. *Exp Ther Med.* 2013;6:584–590.
20. Onyekwere CA, Ogbera AO, Hameed L. Chronic liver disease and hepatic encephalopathy: Clinical profile and outcomes. *Niger J Clin Pract.* 2011;14:181-5.
21. Pantham G, Post A, Venkat D, Einstadter D, Mullen KD. A New Look at Precipitants of Overt Hepatic Encephalopathy in Cirrhosis. *Dig Dis Sci.* 2017;62(8):2166-2173
22. Blankson A, Wiredu EK, Gyasi RK, Adjei A, Tettey Y. Sero -prevalence of hepatitis B and C viruses in cirrhosis of the liver in Accra, Ghana. *Ghana Med J.* 2005; 39: 132-137.



THE FREQUENCY AND PATTERN OF COGNITIVE IMPAIRMENT IN THE ELDERLY AT THE OUT PATIENTS' CLINIC OF THE HOLY FAMILY HOSPITAL, TECHIMAN, GHANA

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Abstract

Background: Ghana's elderly population increased by 367 percent from 1960 to the year 2000. There have been few studies on cognitive impairment amongst elderly patients in Ghana.

Aim: This study was conducted to determine the frequency and pattern of cognitive impairment in the elderly at the outpatients' clinic of the Holy Family Hospital, Techiman, Ghana.

Methods: The study was a descriptive cross-sectional study. Cognitive impairment was assessed using modified versions of test your memory test, 10 word recall test, trail making test part B and the mini mental state exam. The effect of cognitive impairment on daily activities was assessed using the activities of daily living scale. Multiple regression analysis was done to determine factors associated with the various cognitive tests chosen.

Results: Forty-nine (49) percent of respondents had cognitive impairment using the Ten (10) word list recall

whereas 72% of the respondents had cognitive impairment on the modified Test your memory test. On the Mini mental state exam, 76% of respondents had cognitive impairment. Six percent of respondents had cognitive impairment on the Trail making test B. The cognitive domains most affected were visuospatial skills, semantic knowledge, arithmetic and attention. The least affected cognitive domains were verbal fluency, ability to copy, calculation, verbal recall and orientation. A higher educational level was associated with higher scores on all the cognitive tests chosen ($p < 0.003$).

Conclusion: It can be concluded that the frequency of cognitive impairment amongst elderly patients in Techiman is high with visuospatial skills, semantic knowledge, arithmetic and attention being the most affected cognitive domains.

Key Words: Cognitive impairment, 10 word recall test, mini mental state exam, trail making test-B, test your memory test

Introduction

The current population of adults aged 60 years and older in sub-Saharan Africa is 4.9% and this is projected to increase to 7.6% by 2050 (7). Within sub-Saharan Africa, Ghana is older than the average with 5.3% of older adults in the total population. This is expected to increase to 8.9% by 2050 (7). Reduction in fertility rates and improved health services have accounted for the rise in the elderly population in Ghana (8). Ghana's life expectancy has also increased for both males and females (9). Population ageing has security, health, social and economic consequences ranging from high demands on welfare and social needs to changes in family structure (10).

In sub-Saharan Africa, population ageing is particularly problematic because it is taking place with neither a comprehensive formal social security system

nor a well-functioning traditional care system in place for elderly people (10).

The prevalence of age-related health problems is becoming an important public health concern as proportions of older individuals in populations worldwide grow (11). Dementia is one of the major causes of disability in older people (12). It is characterized by irreversible cognitive decline that is severe enough to affect daily functioning (13). It arises from an interaction between genetic, environmental and behavioural factors, with severe adverse influences on social and physical activities and quality of life (13).

Dementia is common among elderly individuals and Alzheimer's disease (AD) may be present years before clinical symptoms present (14, 15). The rise in conditions such as hypertension, type two diabetes mellitus and obesity in developing countries and increasing urbanization has increased the risk for cognitive impairment (16–20). The age-adjusted dementia prevalence estimates are high ($\geq 5\%$) in certain Asian and Latin American countries, and about (1–3%) in India and sub-Saharan Africa (21). Dementia will cost developing countries an estimated US\$73 billion yearly (21).

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In cognitive impairment and mild cognitive impairment, the cognitive deficit is less severe than in dementia and normal daily function and independence are generally maintained. It is a chronic condition that is a precursor to dementia in up to one third of cases (13). Mild cognitive impairment is the transition between normal ageing and dementia (21).

Justification of the study

Developing countries are ageing faster than developed countries with major consequences and implications for all facets of human life (22). In December 2004, the African Union Commission launched a Policy Framework and Plan of Action to raise awareness about the special situation, needs and welfare of elderly people on the continent (23). The main goal of the Policy Framework and Plan of Action is to guide African Union Member States to design, implement, monitor and evaluate appropriate integrated national policies and programmes to meet the needs of the elderly (24). Chronic diseases are on the rise in Ghana especially amongst the elderly population and this has implications for the quality of life of the elderly (25). There have been few studies on cognitive impairment in the elderly in Ghana.

Relevance of the study to the practice of medicine.

The findings of this study will:

- a) Provide baseline and reference data on the frequency of cognitive impairment in the elderly at the out patients' clinic of the Holy Family hospital, Techiman.
- b) Provide information on the pattern of cognitive impairment in the elderly at the out patients' clinic of the Holy Family Hospital, Techiman.
- c) Provide information for health care professionals on the need to assess for cognitive impairment in elderly patients in Techiman.
- d) Provide local data that can be the basis for future research projects

Main objective

To determine the frequency and the pattern of cognitive impairment in the elderly at the out patients' clinic of the Holy Family Hospital, Techiman, Ghana.

Specific objectives

1. To determine the frequency of cognitive impairment amongst elderly patients at the Holy Family Hospital, Techiman.
2. To determine the pattern of cognitive impairment amongst elderly patients at the Holy Family Hospital Techiman.
3. To determine the association between cognitive impairment and quality of life amongst elderly patients at the Holy Family Hospital, Techiman.

4. To determine factors associated with cognitive impairment amongst elderly patients at the Holy Family Hospital, of Techiman, Ghana

Methodology

Study area

The study was conducted at the out patients' clinic of the Holy Family Hospital, Techiman, a 210 bed facility hospital that provides primary and secondary levels healthcare to the people of the municipality and beyond. Techiman is the capital of the Bono East Region of Ghana. It is a leading market town and has one of the biggest commodity markets in West Africa. Techiman had a settlement population of 104,212 people as at 2013. The study on population ageing in Ghana showed that the Brong Ahafo region (now divided into the Bono, Bono East and Ahafo regions) was one of the regions in Ghana with the highest numbers of elderly patients (22).

Study design

The study was a descriptive cross-sectional study.

Study period

The study was conducted over 5 months, from March 2015 to July 2015.

Sampling method

All Patients 65 years and older who reported at the out patients' clinic of the Holy Family Hospital, Techiman within the study period were potential participants for recruitment into the study and were approached for their participation into the study. They were then selected by a systematic sampling technique. Patients who agreed to participate in the study were asked to sign and date an informed consent form. Those who could not read and write were asked to thumbprint in the presence of an independent witness. Having consented, the patients were interviewed using a structured questionnaire to gather data on the socio-demographic characteristics, current and past medical histories after which physical examination was done. Anthropometric measurements were standardized using the same scales. Further, a neurological examination was done. Participants were examined for signs of Parkinson's disease, gait abnormalities and paresis in the limbs. The tendon reflexes were also assessed.

Relevant laboratory tests like fasting blood glucose, renal function test, liver function test and lipid profile were also done.

The estimated glomerular filtration rate (e GFR) was calculated using the Cockcroft-Gault equation (6).

Cognitive tests

Cognitive impairment was assessed using modified versions of test your memory test (TYM), 10 word recall test, trail making test part B and the mini mental state exam. Three assistants were trained to help administer the tests. Participants had a sample preview done with regards to the trail making test B.

In this study, the effect of cognitive impairment on daily activities was assessed using the activities of daily living scale (26). The test your memory test assessed orientation, semantic knowledge, calculation, verbal fluency, similarities, naming, visuospatial skills, ability to copy, ability to do test and recall of sentence. The mini mental state examination assessed orientation, registration, attention and arithmetic, verbal recall and speech.

The tasks were translated into the Twi language and back translated into English. Participants who could neither read nor write answered using the Twi language (27). Again, the tests had been modified to use local examples for knowledge questions. The mini mental state examination has been validated in many populations and its usefulness in elderly uneducated Nigerian subjects has been assessed (28). Our search did not find any validation of the test in Ghana. To validate test your memory test in our population, we compared it to the mini mental state exam using 30 randomly selected elderly patients at the out patients' clinic of the Holy family hospital, Techiman. When compared to the mini mental state exam, TYM had a sensitivity of 100% and a specificity of 100%.

Eligibility criteria

Inclusion criteria

All elderly patients (65 years and above) who attended the Out Patients' Clinic at the Holy Family Hospital, Techiman

All elderly patients who consented to partake in the study

Exclusion criteria

All patients below 65 years of age. All patients with background diseases that impair cognition like stages 3 to 5 chronic kidney disease, chronic liver disease and post stroke. All patients who declined to give consent.

Sample size estimation

The sample size was calculated using the formula:

$$n = z^2pq/d^2$$

n = the desired sample size

z = the standard normal deviation, set at 1.96 which corresponds to the 95% confidence level (29).

p = the proportion in the target population estimated to have a particular characteristic

q = 1.0- p

d= degree of accuracy desired, set at 0.05.

Using an estimated elderly population of 2.3% in Brong Ahafo Region (22) and using the above formula, a minimum sample size of 35 was required. However, 100 people were recruited into the study.

Ethical consideration

Ethical approval was obtained from the Committee on Human Research, Publication and Ethics of the Kwame Nkrumah University of Science & Technology School of Medical Sciences/Komfo Anokye Teaching Hospital.

All efforts were made to maintain confidentiality of patients' information. All patients' records were anonymized with a study number which was used in the data entry. Information of patients were kept confidential with access to the investigator and the supervisor only.

Statistical analysis

A database was created using EpiInfo™ 2008 version 3.5.1 for data entry. The data was exported first from EpiInfo™ to Excel spreadsheet for cleaning, and then to Stata Intercool 10 software for analysis. The analysis was done in three stages: Basic descriptive analysis, Chi square test and logistic regression. Basic descriptive analysis was performed in the form of frequency tables and charts for categorical variables and summary statistics for continuous variables to investigate the distribution of the variables. Chi square test was done to find out the association between the various outcome variables and the demographic characteristics. Age, sex, educational level, alcohol intake and estimated glomerular filtration rate were matched against the four cognitive tests chosen. Finally, multiple logistic regression analysis was employed to determine the risk factors of cognitive impairment. For the purposes of this study a p-value of less than or equal to 0.05 was deemed statistically significant and a 95% confidence interval was used.

Results

Age category of Respondents

There were more respondents within the 65-70 age group than any other age group. Eighty six percent (86%) of all respondents were between the ages of 65 and 82.

Educational level of Respondents

Fifty two percent (52%) of all respondents had no formal education.

Medical condition of respondents

The commonest medical condition was systemic hypertension and this accounted for 34.4% of all medical conditions. Other medical conditions of respondents included peptic ulcer disease (24.6%), chronic hepatitis B infection (3.3%), benign prostate enlargement (3.3%), lumbar spondylosis (9.8%) and sickle cell disease (1.6%).

Test your Memory test results according to age group

The highest scores in the test your memory test was in verbal fluency, ability to copy and calculation whereas the least scores were in visuospatial skills and semantic knowledge.

Mini Mental State Exam results according to age group

The highest scores on the mini mental state exam were in registration, recall and orientation whereas the least scores were in attention and arithmetic.

Socio-demographic characteristics of elderly population in Techiman

There were more respondents in the 65-70 age group than any other age group. 52 percent (52%) of respondents had no formal education whereas 48(48%) had some form of formal education.

Cuts offs for Cognitive impairment were 20 for 10 word recall test; 43 for test your memory test; 27 for mini mental state exam and 5 minutes for trail making test-B.

Table 1 showed that forty nine percent of respondents had cognitive impairment using the 10 word list recall test whereas in the modified test your memory test, 72% of the respondents had cognitive impairment. On the Mini mental state exam, 76% of respondents had cognitive impairment.

In the Trail making test-B, 50% of respondents were unable to do the test due to a lack of education. Only 6% out of the remaining 50% who were able to do the test scored above 5 minutes.

Table 1: Frequency of cognitive impairment in the elderly population in Techiman

Factor, N=100	Number	Percentage
<i>Total Score (10 Word Recall Test)</i>		
1 – 10	5	5.0
11 – 20	44	44.0
21 – 30	46	46.0
31 – 40	5	5.0
<i>Total Score (Modified Test Your Memory Test)</i>		
BELOW 26	14	14.0
27 – 30	19	19.0
31 – 34	18	18.0
35 – 38	12	12.0
39 – 42	9	9.0
43 – 46	10	10.0
47 – 50	18	18.0
<i>Total Score (Mini mental State exam)</i>		
0 – 10	10	10.0
11 – 20	40	40.0
21 – 26	26	26.0
27 – 30	24	24.0
<i>Trail making test-B (Minutes)</i>		
0.1 – 2	22	22.0
2.1 – 3	9	9.0
3.1 – 4	9	9.0
4.1 – 5	4	4.0
ABOVE 5	6	6.0
Unable To Do= 0	50	50.0

Performance of study participants on individual cognitive tests

The highest scores in the test your memory test was in verbal fluency, ability to copy and calculation whereas the least scores were in visuospatial skills and semantic knowledge.

The highest scores on the mini mental state exam were in registration, recall and orientation whereas the least scores were in attention and arithmetic.

Low educational levels limited the use of the trail making test-B with only 50% of respondents being able to perform the test.

Level of education and total scores on the various cognitive tests

Table 2 showed that a higher educational level was associated with higher scores on all the cognitive tests chosen.

Logistic regression models of predictors of cognitive impairment on the four cognitive tests

The unadjusted and adjusted estimates of independent predictors of cognitive impairment on each of the four tests of cognition for this study are shown in tables 3, 4, 5 and 6. Educational status and eGFR were independently associated with cognitive impairment on the 10 word recall test as well as Trail making test-B. Educational status was the only factor independently associated with cognitive impairment on the TYM whereas increasing age and educational status were found to be associated with cognitive impairment on the MMSE. Educational level was associated with cognitive impairment on all four tests (95% Confidence interval: CI 0.1-0.6, p value= 0.003; 95% CI: CI 0.0-0.1 p< 0.001).

Table 2: Level of education and total scores on the various cognitive tests

Factor, N=100	Education Level					P value
	None	Primary	JHS/Form 4	Secondary/ Technical/SHS	Tertiary	
Total Score (10 word recall test)						0.003*
1 – 10	4(7.7%)	-	1(6.7%)		-	
11 – 20	31(59.6%)	7(53.9%)	4(26.7%)	1(11.1%)	1(9.1%)	
21 – 30	16(30.8%)	6(46.2%)	8(53.3%)	8(88.9%)	8(72.7%)	
31 – 40	1(1.9%)	-	2(13.3%)	-	2(18.2%)	
Total	52(100.0%)	13(100.0%)	15(100.0%)	9(100.0%)	11(100.0%)	
Total Score (TYM)						<0.001*
Below 27	12(23.1%)	1(7.7%)	1(6.7%)	-	-	
27 – 30	16(30.8%)	2(15.4%)	-	-	-	
31 – 34	13(25.0%)	5(38.5%)	1(6.7%)	-	-	
35 – 38	7(13.5%)	3(23.1%)	2(13.3%)	-	-	
39 – 42	2(3.9%)	2(15.4%)	2(13.3%)	2(22.2%)	1(9.1%)	
43 – 46	2(3.9%)	-	3(20.0%)	1(11.1%)	4(36.4%)	
47 – 50	-	-	6(40.0%)	6(66.7%)	6(54.6%)	
Total	52(100.0%)	13(100.0%)	15(100.0%)	9(100.0%)	11(100.0%)	
Total Score MMSE						<0.001*
0 – 10	9(17.3%)	1(7.7%)	-	-	-	
11 – 20	33(63.5%)	5(38.5%)	2(13.3%)	-	-	
21 – 26	9(17.3%)	7(53.9%)	7(46.7%)	2(22.2%)	1(9.1%)	
27 – 30	1(1.9%)	-	6(40.0%)	7(77.8%)	10(90.9%)	
Total	52(100.0%)	13(100.0%)	15(100.0%)	9(100.0%)	11(100.0%)	
TRAIL MAKING TEST(Minutes)						<0.001*
0.1 – 2	4(7.7%)	3(23.1%)	2(13.3%)	6(66.7%)	7(63.6%)	
2.1 – 3	1(1.3%)	3(23.1%)	3(20.0%)	1(11.1%)	1(9.1%)	
3.1 – 4	-	4(30.8%)	4(26.7%)	1(11.1%)	-	
4.1 – 5	-	2(15.4%)	2(13.3%)	1(11.1%)	-	
ABOVE 5	-	1(7.7%)	2(13.3%)	-	3(27.3%)	
UNABLE TO DO= 0	47(90.4%)	-	2(13.3%)	1(11.1%)	-	
Total	52(100.0%)	13(100.0%)	15(100.0%)	9(100.0%)	11(100.0%)	

*Fisher's exact test

Table 3: Logistic regression of 10 word recall test against various factors

10 Word recall Test						
Factors	Crude OR	95% CI	p value	Adjusted OR	95% CI	p value
Age (years)						
65-70(Ref)	1					
71-76	2.6	0.9-7.6	0.09	1.6	0.4-5.6	0.493
77-82	5.4	1.8-16.3	0.003	3.5	0.1-12.9	0.055
83-88	1.7	0.2-11.9	0.592	0.6	0.1-4.9	0.615
89-94	12.8	1.3-12.5	0.029	3.5	0.3-37.9	0.311
Above 94	1.3	0.1-15.9	0.849	0.7	0.0-12.0	0.790
Sex						
Male (Ref)	1					
Female	1.5	0.7-3.3	0.322	0.8	0.3-2.1	0.622
Education level						
less educated (Ref)	1					
Junior level and higher	0.1	0.1-0.4	<0.001	0.1	0.1-0.6	0.003
Alcohol intake						
Yes (Ref)	1					
No	0.5	0.2-1.6	0.260	0.8	0.2-2.9	0.749
e GFR						
90 and below (Ref)	1					
above 91	0.1	0.3-0.4	0.001	0.2	0.0-0.7	0.012

OR: Odds Ratio, CI: Confidence Interval

Table 4: Logistic regression of modified test your memory test against various factors

Modified Test Your Memory Test						
Factors	Crude OR	95% CI	p value	Adjusted OR	95% CI	p value
Age (years)						
65-70(Ref)	1					
71-76	2.1	0.7-6.4	0.188	1.3	0.2-7.7	0.794
77-82	3.6	1.1-11.8	0.036	3.4	0.5-23.7	0.219
83-88	3.1	0.3-31.0	0.333	0.1	0.0-2.2	0.139
89-94	-	-	-	-	-	-
Above 94	1.6	0.1-18.9	0.729	0.4	0.0-89.7	0.754
Sex						
Male (Ref)	1					
Female	2.5	1.0-6.2	0.051	0.6	0.1-3.2	0.593
Education level						
less educated (Ref)	1					
Junior level and higher	0.01	0.0-0.5	<0.001	0.005	0.0-0.1	<0.001
Alcohol intake						
Yes (Ref)	1					
No	0.5	0.1-1.7	0.246	2.3	0.2-22.7	0.488
e GFR						
90 and below (Ref)	1					
above 91	0.2	0.1-0.6	0.005	0.5	0.1-2.5	0.438

OR: Odds Ratio, CI: Confidence Interval

Table 5: Logistic regression of mini mental state exam against various factors

Mini Mental State Exam						
Factors	Crude OR	95% CI	p value	Adjusted OR	95% CI	p value
Age (years)						
65-70(Ref)	1					
71-76	2.1	0.7-6.4	0.188	1.3	0.2-7.9	0.778
77-82	10.1	2.0-50.0	0.005	11.7	1.3-108.3	0.031
83-88	-	-	-	-	-	-
89-94	-	-	-	-	-	-
Above 94	1.6	0.1-18.9	0.729	0.5	0.0-55.6	0.782
Sex						
Male (Ref)	1					
Female	2.8	1.1-7.6	0.038	0.8	0.1-4.7	0.820
Education level						
less educated (Ref)	1					
Junior level and higher	0.01	0.0-0.1	<0.001	0.01	0.0-0.1	<0.001
Alcohol intake						
Yes (Ref)	1					
NO	0.2	0.0-1.2	0.074	0.9	0.1-15.1	0.938
e GFR						
90 and below (Ref)	1					
above 91	0.3	0.1-0.8	0.016	0.7	0.1-3.8	0.713

OR: Odds Ratio, CI: Confidence Interval

Table 6: Logistic regression of trail making test part B against various factors						
Factors	Crude OR	95% CI	p value	Adjusted OR	95% CI	p value
Age(years)						
65-70(Ref)	1					
71-76	1.1	0.4-3.1	0.897	1.0	0.3-3.5	0.977
77-82	3.1	1.1-8.9	0.037	3.2	0.9-11.8	0.081
83-88	-	-	-	-	-	-
89-94	-	-	-	-	-	-
Above 94	2.9	0.2-35.7	0.401	2.0	0.1-32.8	0.625
Sex						
Male (Ref)	1					
Female	1.4	0.6-3.1	0.393	0.7	0.2-2.1	0.552
Education level						
less educated (Ref)	1					
Junior level and higher	0.1	0.0-0.3	<0.001	0.1	0.0-0.3	<0.001
Alcohol intake						
Yes (Ref)	1					
No	1.8	0.6-4.9	0.279	3.6	1.0-13.0	0.048
e GFR						
90 and below (Ref)	1					
above 91	0.2-1.3	0.172	1.3	0.4-4.5	0.635	0.2-1.3

OR: Odds Ratio, CI: Confidence Interval

Discussion

This study showed that the most common age range for the elderly population in Techiman is the 65-70 age group. This is consistent with the Study of Ageing in Ghana by Chuks Mba et al (22) that found Ghana's elderly population to be concentrated in the younger age group of 60 to 69 years.

This study found a high level of illiteracy amongst study participants. The illiteracy rate was, however, lower than the 73.4% illiteracy rate detected by Tawiah in the study on Population ageing in Ghana (24).

More than half of the respondents had a chronic condition with systemic arterial hypertension being the most common medical condition. The frequency of systemic arterial hypertension (34.4%) was higher than the 14.2% detected by Biritwum et al (25). We found 1.6% of respondents had a stroke as against 2.8% detected in the study by Biritwum et al (25).

This study showed that the frequency of cognitive impairment is high ranging from 49% to 76% depending on the cognitive test used. Fifty percent of the respondents were unable to perform the Trail making test-B owing to a lack of education with 6% of the remainder scoring more than 5 minutes. This is higher than the percentage cognitive impairment detected in a review by Mavrodaris et al (30).

In that review to determine the prevalence of cognitive impairment in sub Saharan –Africa by Angelique Mavrodaris et al (30), the prevalence ranged from 6.3% in Nigeria to 25% in Central Africa Republic. The higher prevalence rate may be as a result of the study being conducted in a hospital setting as against some of the studies by Mavrodaris et al (30) that were conducted in the community. Most of the respondents had a chronic illness especially systemic arterial hypertension and diabetes mellitus and this increases the risk of cognitive impairment.

Again, the cognitive battery tests used in this study were different from the cognitive studies reviewed by Mavrodaris et al (30). The cognitive tests used in the review by Mavrodaris et al were adjusted to reflect literacy levels but that was not the case in this study. Finally, the age cut off in the review study by Mavrodaris et al was 50 years and above and may account for the lower figures of prevalence in that study.

In this study the cognitive domains least affected in the Test your memory test was verbal fluency, ability to copy and calculation whereas the least affected on the mini mental state exam were registration, verbal recall and orientation. The cognitive domains most affected were visuospatial skills, semantic knowledge, attention and arithmetic.

In contrast, in a study to determine the profile of dementia in a Nigerian community-types, pattern, and severity rating by Ogunniyi et al (31), the most impaired cognitive domains were in memory and

judgment. Low literacy levels amongst respondents in this study may explain the lower scores on visuospatial skills, semantic knowledge and arithmetic.

Only 6% of respondents who could complete the trail making test B scored above 5 minutes. This is consistent with the study by Ogunniyi et al on the profile of Dementia in Nigeria (31) that found personality changes to be the least affected.

When multiple logistic regression analysis was done, increasing age was not associated with lower scores on all the four cognitive tests chosen (tables 3, 4, 5 and 6). This is inconsistent with the Study on Global Ageing and Adult health (32) that found increasing age to be associated with lower cognitive scores on the 10 word recall test. It is also in contrast to the study by Mavrodaris et al (30) that found older age to be associated with dementia. The smaller sample size in this study as compared to the other studies may account for this.

Sex was not associated with lower scores on the on all the four cognitive tests chosen (tables 3, 4, 5 and 6). This is inconsistent with the study of Global ageing and Adult Health (32) and the study by Mavrodaris et al (30) that found female sex being associated with lower scores on cognitive tests. The smaller sample size in this study may account for this finding.

This study showed that higher total scores were associated with higher levels of education with most respondents at the junior high level of education and above having higher scores than their less educated colleagues. Multiple logistic regression showed an association between higher educational levels and higher scores on all the four cognitive tests chosen. This is consistent with the study of Global ageing and Adult health (32) that found higher educational level being associated with higher cognitive test scores on the 10 word recall test.

None of the respondents drank more than 21 units of alcohol a week. Logistic regression did not find an association between alcohol intake and scores on the 10 word recall test, mini mental state exam and Test your memory test (tables 3, 4 and 5). The low alcohol consumption amongst respondents may account for this. However, alcohol intake was associated with lower scores on the trail making test-B (95% CI: 1.0-13.0, p 0.048). Alcohol intake has an impact on visuospatial skills and may account for this.

Multiple logistic regression found an association between low eGFR and lower scores on the 10 word recall test (95% Confidence interval: CI 0.0-0.7, p value= 0.012). Thus kidney disease was associated with lower cognitive scores on the 10 word recall test. This is consistent with the study by Williams et al (33) that found chronic kidney disease to be associated with cognitive impairment. However, e GFR did not affect scores on the other cognitive tests chosen. The low sample size in this study may account for this.

Limitations

1. Additional surrogate biomarkers to evaluate the risk for cognitive impairment, such as apolipoprotein (apo) A-I, apoB, homocysteine, or noninvasive markers for atherosclerosis such as carotid intimal wall thickness or coronary calcium scores, could not be measured in this study due to financial constraints.

Magnetic Resonance Imaging brain scans and Cranial CT scans could not be done in patients with cognitive impairment since these investigative modalities were not available at the study site.

2. Several aspects of the study used self-report such as duration of smoking, family history of cognitive impairment, and associated risk factors. Therefore, under-reporting or over-reporting cannot be ruled out.

3. Several factors known to contribute to cognitive impairment i.e. Nutritional factors, infections like HIV were not screened for. Tests like thyroid function were also not done since they were not available at the study site.

4. The data collected and results or conclusions cannot be generalised for the whole of Ghana.

Conclusion

It can be concluded from this study that the elderly population in Techiman are in the relatively younger age group of 65-70 years. The frequency of cognitive impairment in elderly patients presenting at the out patients' clinic at the Holy Family Hospital, Techiman is high ranging from 49% to 76%. The cognitive domains most affected were visuospatial skills, semantic knowledge, arithmetic and attention. The least affected cognitive domains were verbal fluency, ability to copy, calculation, verbal recall and orientation.

Higher educational levels were associated with higher scores on all the cognitive tests chosen.

List of abbreviations

AD	:	Alzheimer's disease
ADLS	:	Activities of daily living scale
CIND	:	Cognitive impairment no dementia
eGFR	:	Estimated glomerular filtration rate
HIV	:	Human immunodeficiency virus
JHS	:	Junior high school
MCI	:	Minimal cognitive impairment
MMSE	:	Mini mental state examination
SHS	:	Senior high school
SD	:	Standard deviation
TMTB	:	Trail making test-B
TYM	:	Test your memory test

Definition of terms

1. Cognitive impairment was defined as a deficit in at least two aspects of cognitive function (1). The key areas of cognition are attention, memory, language, visuospatial skills, and frontal/executive functions (2, 3).

2. Elderly patients were defined as patients aged 65 years and above (4).

3. A high alcohol intake was defined as $\geq 14U$ per week for women, $\geq 21U$ per week for men (5). Current or past alcohol intake status was ascertained from either the patient or a reliable relative.

4. Low estimated glomerular filtration rate was defined as stages 3-5 using the Cockcroft-Gault equation (6).

References

1. Madero M, Gul A, Sarnak MJ. Cognitive function in chronic kidney disease. *Semin Dial.* 2008 Feb;21(1):29–37.
2. Murray AM, Tupper DE, Knopman DS, Gilbertson DT, Pederson SL, Li S, et al. Cognitive impairment in hemodialysis patients is common. *Neurology.* 2006 Jul 25;67(2):216–23.
3. Grabowski TJ, Anderson SW, Cooper GE. Neural substrate of cognition, *Continuum: Lifelong Learning.* 2002;8:7–40.
4. Gorman M. The ageing and development report: poverty, independence and the world's older people. *Earthscan Publ Ltd.* 1999;3–21.
5. Shaper AG, Wanathee G, Walker M. Alcohol and Mortality: explaining the U shaped Curve. *Lancet Lond Engl.* 1988;2:1268–73.
6. Cockcroft DW, Gault MH. Prediction of creatinine clearance from serum creatinine. *Nephron.* 1976;16(1):31–41.
7. United Nations Population Division. World population prospects: the 2012 revision. 2013.
8. Ghana Statistical, Service and Ghana Health Service. *Ghana Demographic and Health Survey* 2008. 2009.
9. United Nations. Population ageing and the situation of elderly persons. Vol. 1. 2009.
10. Cohen B, Menken J. Aging in sub-Saharan Africa: Recommendations for furthering research. Panel on policy research and data needs to meet the challenge of aging in Africa. Committee on Population. *National Research Council.* 2006;
11. World Health Organization. The world health report: primary health care now more than ever. Geneva; 2008.
12. World Health Organization. The global burden of disease: 2004 update. *Geneva;* 2008.
13. Albert MS, Dekosky ST, Dickson D, Dubois B, Feldman HH, Fox NC et al. The diagnosis of mild cognitive impairment due to Alzheimer's disease: recommendations from the National Institute on Ageing-Alzheimer's Association workgroups on diagnostic guidelines for Alzheimer's disease. 2011;270–9.
14. Petersen RC, Smith GE, Waring SC, Ivnik RJ, Tangalos EG, Kokmen E. Mild cognitive impairment: clinical characterization and outcome. *Arch Neurol.* 1999 Mar;56(3):303–8.

15. Petersen RC, Doody R, Kurz A, Mohs RC, Morris JC, Rabins PV, et al. Current concepts in mild cognitive impairment. *Arch Neurol*. 2001 Dec;58(12):1985–92.
16. Skoog I, Lernfelt B, Landahl S, Palmertz B, Andreasson LA, Nilsson L, et al. 15-year longitudinal study of blood pressure and dementia. *Lancet Lond Engl*. 1996 Apr 27;347(9009):1141–5.
17. Luchsinger JA, Mayeux R. Cardiovascular risk factors and Alzheimer's disease. *Curr Atheroscler Rep*. 2004 Jul;6(4):261–6.
18. Kivipelto M, Ngandu T, Laatikainen T, Winblad B, Soininen H, Tuomilehto J. Risk score for the prediction of dementia risk in 20 years among middle aged people: a longitudinal, population-based study. *Lancet Neurol*. 2006 Sep;5(9):735–41.
19. Ineichen B. Influences on the care of demented elderly people in the People's Republic of China. *Int J Geriatr Psychiatry*. 1998 Feb;13(2):122–6.
20. Whitmer RA, Gunderson EP, Barrett-Connor E, Quesenberry CP, Yaffe K. Obesity in middle age and future risk of dementia: a 27 year longitudinal population based study. *BMJ*. 2005 Jun 11;330(7504):1360.
21. Kalaria RN, Maestre GE, Arizaga R, Friedland RP, Galasko D, Hall K, et al. Alzheimer's disease and vascular dementia in developing countries: prevalence, management, and risk factors. *Lancet Neurol*. 2008 Sep;7(9):812–26.
22. Mba CJ. Population ageing in Ghana: research gaps and the way forward. *J Aging Res*. 2010;2010:672157.
23. Economic Commission for Africa. Economic Commission for Africa. Mission Report. South Africa; 2004. Report No.: ECA/SA/MR/2004/34.
24. Tawiah EO. Population ageing in Ghana: a profile and emerging issues. *Afr Popul Stud*. 2011;25(2).
25. Biritwum RB, Minicuci N, Mensah G, Yawson AE, Naidoo N, Chatterji S, Kowal P. Sociodemographic and socioeconomic patterns of chronic non-communicable disease among the older adult population in Ghana. *Glob Health Action*. 2014;212–92.
26. Ustün TB, Chatterji S, Kostanjsek N, Rehm J, Kennedy C, Epping-Jordan J, et al. Developing the World Health Organization Disability Assessment Schedule 2.0. *Bull World Health Organ*. 2010 Nov 1; 88(11):815–23
27. Pommergaard H, Burcharth J, Angenete E, Rosenberg J. Translation of Questionnaires Measuring Health Related Quality of Life Is Not Standardized: A Literature Based Research study. <https://doi.org/10.1371/journal.pone.0127050>. Published: May 12, 2015.
28. Gureje O, Unverzagt FW, Osuntokun BO, Hendrie HC, Baiyewu O, Ogunniyi A, et al. The CERAD Neuropsychological Test Battery: norms from a Yoruba speaking Nigerian Sample. *West Afr J Med*. 1995 Mar; 14(1):29–33.
29. Singh A.S, Masuku M.B. Sampling techniques and determination of sample size in applied Statistics research: an overview. *International Journal of Economics, Commerce and Management United Kingdom Vol. II, Issue 11, Nov 2014*. Licensed under Creative Common Page 1 <http://ijecm.co.uk/> ISSN 2348 0386.
30. Mavrodaris A, Powell J, Thorogood M. Prevalences of dementia and cognitive impairment among older people in sub-Saharan Africa: a systematic review. *Bull World Health Organ*. 2013 Oct 1;91(10):773–83.
31. Ogunniyi A, Gureje O, Baiyewu O, Unverzagt F, Hall KS, Oluwole S, et al. Profile of dementia in a Nigerian community--types, pattern of impairment, and severity rating. *J Natl Med Assoc*. 1997 Jun;89(6):392–6.
32. Carrol B, Kowal P, Naidoo N. Measuring cognitive status in older age in lower income countries: Results from a pilot of the Study on global AGEing and Adult Health (SAGE). 2012.
33. Williams UE, Owolabi MO, Ogunniyi A, Ezunu EO. Prevalence and pattern of neurocognitive impairment in nigerians with stages 3 to 5 chronic kidney disease. *ISRN Neurol*. 2013;2013:374890.

ANALYSIS OF CAESAREAN SECTIONS BASED ON ROBSON CLASSIFICATION AT A TERTIARY HOSPITAL IN GHANA: A CROSS-SECTIONAL PRE- AND POST-INTERVENTION STUDY.

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Abstract

Background: Globally, caesarean section (CS) rates are rising progressively in low- and middle-income countries (LMICs) similar to high-income countries creating huge clinical and public health concerns. The WHO recommends the use of Robson classification system as a global standard in an attempt to understand the determinants of the increasing caesarean births.

Objective: To determine baseline analysis of CS using Robson classification and to identify the trends and determinants of the rising CS rate

Methods: A cross sectional study was conducted with a pre-intervention (prior to implementation of Robson caesarean classification) and post-intervention (after implementation) phases at a tertiary maternity unit in Ghana

Results: The study included 20270 deliveries comprising 9890 (48.8%) and 10380(51.2%) in the years 2012 and 2013 respectively with mean (\pm SD) maternal age of 28.6 \pm 5.8 years. Caesarean birth occurred in 8121 (40.1%). Caesarean rate was highest and lowest among Robson group 9 and 3 in both the pre-intervention (92.5% and 8.4%) and post-intervention (90.9% and 12.0%) phases respectively. Robson groups 5 and 9 had the highest (32.0%) and lowest (3.2%)

relative contributions to the burden of CS in the pre-intervention period respectively. There were mixed findings regarding the patterns of relative contribution of the Robson groups to the burden of CS with an increase in groups 1,3,6,7 and 10, and reduction in groups 2,4,5,8 and 9 in the post-intervention year. There was statistically significant increase in the CS rate in Robson groups 1 (17.2% to 26.5%; OR=1.735, 95%CI 1.482-2.031), group 3 (8.4% to 12.0%; OR=1.478, 95%CI 1.237-1.768) and group 10 (33.8% to 38.7%; OR=1.236, 95%CI 1.056-1.449) in the post intervention phase.

Conclusion: Implementation of Robson classification into the maternity care resulted in identification of characteristics of women associated with caesarean birth: nulliparous or multiparous women with spontaneous labour and no uterine scar (group 1 and 3) and preterm gestation including previous uterine scar (group 10). We recommend further research into the clinical integration of Robson's caesarean classification with special focus on predicting maternal and perinatal outcomes.

Key Words: Robson, caesarean section, classification, Ghana

Introduction

Globally, caesarean section (CS) rates are rising progressively in low- and middle-income countries (LMICs) in a similar but at lower level compared with the reported high rates in the high-income countries. The rising caesarean rate is a major clinical and public health concern and a cause of global debate due to the associated potentially high maternal and perinatal risks.¹⁻⁴ However, there is considerable disagreement on the consensus concerning the appropriate caesarean rate for a given population. It is generally established that the rising rates is an issue that needs further investigation and continuous discussion to regulate the trends worldwide.⁵ The World Health Organization (WHO) recommended caesarean rates of 5–15% as the optimal

range that is considered life-saving for the mother and infant, and emphasized that lower rates suggest unmet need whereas higher rates indicate inappropriate patient selection for the intervention.⁶

Concerns have been expressed that caesarean sections are being over utilized in the absence of clinically acceptable indications. The CS rate at Korle Bu Teaching Hospital (KBTH), where the study was conducted, is high (approximately 40%) although the overall national rate is about 16%.⁷⁻⁹ Globally, several interventions and strategies have been implemented with the overall objective of reducing the non-medically indicated CS. Accordingly, various classification systems for CS have been described in an attempt to objectively identify reasons for the progressively increasing CS rates but none has been universally accepted, due to significant intra- and inter- institutional variations.^{1,5} In the process, the ten-group caesarean classification system was described by Michael Robson in 2001. This classification provides a framework for monitoring, auditing and analysing CS rates at the facility level and it is consistently applicable with minimal resources.^{10,11} The Robson's classification model (Table 1) is mutually exclusive, totally inclusive,

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clinically relevant and these unique features allow reporting and analysis of data in a clinically meaningful manner in relevant groups of women.¹⁰⁻¹²

A systematic review on the classification systems for caesarean delivery conducted by the WHO identified 27 classifications based on the indications, degree of urgency and women's characteristics.¹ The review determined that there is no ideal classification system for CS but a hybrid system using the Robson classification, based on women's characteristics could prove very helpful in understanding caesarean trends and the differences between diverse settings. In 2015, the WHO recommended the use of the Robson classification system for CS as a global standard for assessing and comparing of caesarean deliveries in and between health facilities⁴ and this statement has been supported by other international organizations.^{13,14}

The primary objective of this study was to provide baseline analysis of CS performed at the KBTH by using Robson classification and to identify the pattern and main determinants of the rising CS rate following its formal implementation in the routine clinical data collection.

Methods

This was a cross sectional study conducted at the Maternity of the Korle-Bu Teaching Hospital (KBTH), the largest teaching hospital in Ghana conducting about 10,000 annual deliveries. Korle-Bu Teaching Hospital is a tertiary referral centre situated in the capital, Accra and serves a population of over three million inhabitants. The national free childbirth health insurance scheme covers most of the pregnant women obtaining maternity services in this hospital.

The study consisted of prospective data collection on women who obtained delivery services at the maternity unit of KBTH from January 2012 to December 2013. The study design was two-fold comprising the pre-intervention phase, (from 1st January 2012 to 20th December 2012) and the post-intervention phase, (from 1st January 2013 to 31st December 2013). The Robson classification system (Table 1) was first introduced at the maternity unit in 2011 as part of a larger study titled "Validating Women's Self-Report of Emergency Caesarean Sections in Ghana and the Dominican Republic".¹⁵ The data collection was systematically done routinely at the Biostatistics unit of the Maternity block following formal training of the Research Assistants at the unit. The preliminary findings of the initial pre-intervention research were presented during a scheduled clinical meeting at the Department of Obstetrics and Gynaecology in December 2012. The prospects and clinical advantages of the Robson system were discussed, and the healthcare providers were encouraged to actively participate in the integration of the Robson classification at the department.

Further training of the Research Assistants was carried out and prospective data collection was continued with active supervision by one obstetrician in

the team. More and more medical staff in the Department had then become aware of the data collection on the Robson Ten Group classification system for caesarean section and its potential usefulness in contemporary obstetric practice. The issue of high CS rates was discussed and the potential of identifying specific determinants of the rising caesarean delivery via the use of the Robson classification was reiterated. Data collection during the year 2013 was considered post-intervention following the initial passive data collection in the year 2012 prior to its formal introduction and integration in the department, followed by creation of awareness of the potential benefits of the Robson classification. The study included all women who give birth at KBTH after foetal viability, defined as gestational age of 28 weeks or more. We excluded women who are referred to KBTH after delivery and those whose gestational ages were below 28 weeks at the time of termination of the pregnancy. The maternal variables extracted from the medical records included the demographic characteristics of the women (including maternal age), mode of childbirth, onset of labour, indication for CS, timing of the decision to perform the CS (emergency or elective). Other obstetric characteristics collected included parity, history of a previous caesarean, gestational age, multiple pregnancy, spontaneous or induced labour and foetal presentation.

The Ethical and Protocol Review Committee of the College of Health Sciences, University of Ghana approved the protocol of the study (Protocol ID number: MS-Et/M.11-P3.9/2012-13). Written informed consent was not obtained from the participants since the data extraction was undertaken only from the medical records without any direct contact with patients whose clinical data were utilized in the study.

Data analysis

The data were analysed using SPSS version 20 (Statistical Package for Social Sciences version 20.0, SPSS Inc.; Chicago, USA). Descriptive analysis was performed and findings were presented in percentages. Chi square was used to determine the association between the CS rates in between pre-intervention and post-intervention years. P-value of <0.05 was considered statistically significant.

Results

During the study period, 21,464 deliveries were conducted at the hospital out of which 1,194 (5.6%) were excluded from the analysis on account of incomplete data resulting in 20,270, comprising 9890 (48.8%) and 10380 (51.2%) deliveries respectively in the years 2012 and 2013. The mean (\pm SD) maternal age was 28.6 \pm 5.8 years. Among the total deliveries 8121 (40.1%) had caesarean section comprising 3868 (19.1%) and 4253 (21.0%) in the years 2012 and 2013 respectively. The distribution of CS rates within the various Robson classifications for the pre-intervention (2012) and post-intervention (2013) years are presented

in Tables 2 and 3 respectively. Caesarean section rate was highest and lowest among Robson group 9 and 3 in both the pre-intervention (92.5% and 8.4%) and post-intervention (90.9% and 12.0%) years respectively (Tables 2 and 3). Robson groups 5 and 9 had the highest (32.0%) and lowest (3.2%) relative contributions to the burden of CS in the pre-intervention period. Robson groups 5, 2, 4 and 10 (in decreasing order of frequency) had a composite contribution of 69.5% to the total CS performed in the pre-intervention year (Table 2). The overall CS rate for the pre-intervention year was 39.1% (3868 CS per 9890 deliveries).

In the post-intervention year, Robson groups 5 and 8 had the highest (29.6%) and lowest (2.2%) relative contribution to the burden of CS. Robson groups 5, 10, 1 and 2 (in decreasing order of frequency) had a composite contribution of 66.8% to the total CS performed in the post-intervention year (Table 3). The CS rate for the post-intervention period was 41.0% (4253 CS per 10380 deliveries)

The pattern of relative contribution of the various Robson groups to the burden of CS is shown in Figure

1. There was an increase in the relative contribution to CS in Robson groups 1,3,6,7 and 10 in the post-intervention year. Reduction in relative contribution to CS burden occurred in Robson groups 2,4,5,8 and 9 (Figure 1)

Over the two-year period, the highest and the lowest proportions of caesarean occurring in the Robson groups 9 and 3 respectively. The highest and lowest relative contribution to the burden of CS occurred in groups 5 and 9 respectively (Table 4). Robson groups 5, 2, 10, 4 and 1 (in decreasing order of frequency) had a composite contribution of 73.8% to the total CS performed in the hospital over the two-year period. Robson groups 2, 4 and 5 accounted for over half (54%) to caesarean burden.

There was statistically significant increase in the c-section rate in Robson groups 1 (17.2% to 26.5%; OR=1.735, 95% CI 1.482-2.031), group 2 (8.4 to 12.0%; OR=1.478, 95% CI 1.237-1.768) and Group 10 (33.8 to 38.7%; OR=1.236, 95% CI 1.056-1.449).

Table 1: The Robson Ten Group Classification for caesarean section¹⁰

Robson Classification
1. Nulliparous, single cephalic, \geq 37 weeks gestation, spontaneous labour
2. Nulliparous, single cephalic, \geq 37 weeks gestation, induced labour or caesarean before labour
3. Multiparous, single cephalic, \geq 37 weeks gestation, no uterine scar, spontaneous labour
4. Multiparous, single cephalic, \geq 37 weeks gestation, no uterine scar, induced labour or caesarean before labour
5. Multiparous, single cephalic, \geq 37 weeks gestation, with uterine scar
6. Nulliparous singleton breech
7. Multiparous singleton breech, including previous scar
8. Multiple pregnancies (includes previous uterine scar)
9. Singleton transverse, oblique or unstable lie, (including previous uterine scar)
10. Singleton cephalic, \leq 36 weeks gestation, including previous uterine scar

Table 2: Robson classification groups and caesarean section rates in the year 2012 (pre-intervention)

Robson classification	Number in Robson group n (%)	CS/Deliveries	CS rate (%)	Relative contribution to CS
1	1823 (18.4)	314/1823	17.2	8.1
2	775 (7.8)	563/775	72.6	14.6
3	2599 (26.3)	219/2599	8.4	5.7
4	817 (8.3)	462/817	56.5	11.9
5	1578 (16.0)	1239/1578	78.5	32.0
6	220 (2.2)	146/220	66.4	3.8
7	302 (3.1)	194/302	64.4	5.0
8	384 (3.9)	183/384	47.7	4.7
9	133 (1.3)	123/133	92.5	3.2
10	1259 (12.7)	425/1259	33.8	11.0
TOTAL	9890 (100.0)	3868/9890	39.1%	100

Table 3: Robson classification groups and caesarean section rates in the year 2013 (post-intervention)

Robson classification	Number in Robson class n (%)	CS/deliveries	CS rate (%)	Relative contribution to CS
1	1964 (18.9)	521/1964	26.5	12.3
2	727 (7.0)	503/727	69.2	11.8
3	2856 (27.2)	342/2856	12.0	8.0
4	753 (7.3)	390/753	51.8	9.2
5	1590 (15.3)	1261/1590	79.3	29.6
6	231 (2.2)	164/231	71.0	3.9
7	495 (4.8)	322/495	65.1	7.6
8	213 (2.1)	93/213	43.7	2.2
9	110 (1.1)	100/110	90.9	2.3
10	1441 (13.9)	557/1441	38.7	13.1
TOTAL	10380 (100)	4253/10380	41.0	100.0

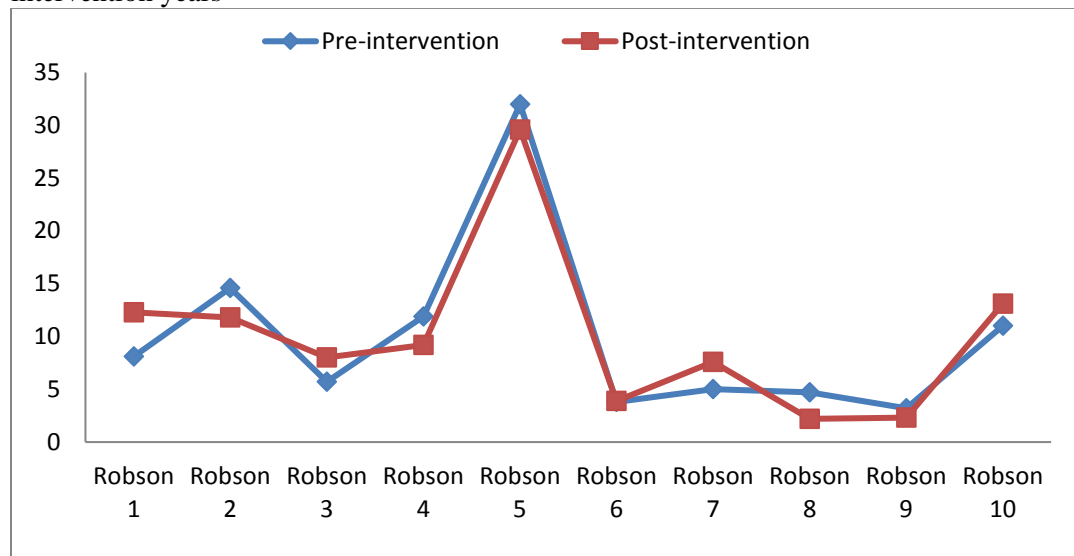
Table 4: Composite caesarean section rates based on Robson classification in the years 2012 (pre-intervention) and 2013 (post-intervention)

Robson classification	CS/deliveries	CS rate (%)	Relative contribution to CS (%)	Number in Robson class n (%)
1	835/3787	22.1	10.3	3787 (18.7)
2	1066/1502	71.0	13.1	1502 (7.4)
3	561/5455	10.3	6.9	5455 (26.9)
4	852/1570	54.3	10.5	1570 (7.8)
5	2500/3168	78.9	30.8	3168 (15.6)
6	310/451	68.7	3.8	451 (2.2)
7	516/797	64.7	6.4	797 (3.9)
8	276/597	46.2	3.4	597 (3.0)
9	223/243	91.8	2.7	243 (1.2)
10	982/2700	36.4	12.1	2700 (13.3)
TOTAL	8121/20270	40.1	100.0	20270 (100)

Table 4: Comparison of c-section rates between pre-intervention and post-intervention years using Robson classification.

Robson group	Pre-intervention (n=3868)	Post-intervention (n=4253)	P value	OR (95%CI)
1	314 (17.2)	521 (26.5)	0.001	1.735 (1.482-2.031)
2	563 (72.6)	503 (69.2)	0.140	0.846 (0.677-1.057)
3	219 (8.4)	342 (12.0)	0.001	1.478 (1.237-1.768)
4	462 (56.5)	390 (51.8)	0.059	0.826 (0.677-1.007)
5	1239 (78.5)	1261 (79.3)	0.585	1.049 (0.884-1.244)
6	146 (71.0)	164 (71.0)	0.289	1.241 (0.833-1.848)
7	194 (64.4)	322(65.1)	0.816	1.036 (0.768-1.398)
8	183 (47.7)	93 (43.7)	0.348	0.851 (0.608-1.192)
9	133 (92.5)	100 (90.9)	0.657	0.813 (0.325-2.031)
10	425 (33.8)	557 (38.7)	0.008	1.236 (1.056-1.449)

Figure 1: Pattern of relative contribution of Robson groups to the overall CS during the pre-and post-intervention years



Discussion

In this study, significant clinical findings relating to the Robson caesarean classification have been determined. The proportions of CS were highest and lowest among Robson group 9 and 3 in both the pre-intervention (92.5% and 8.4%) and post-intervention (90.9% and 12.0%) phases respectively. Robson groups 5 and 9 had the highest (32.0%) and lowest (3.2%) relative contributions to the burden of c-section in the pre-intervention period. Robson groups 5, 2, 4 and 10 had a composite contribution of 69.5% to the total CS performed in the pre-intervention year. In the post-intervention year, Robson groups 5 and 8 had the highest (29.6%) and lowest (2.2%) relative contribution to the burden of CS. Robson groups 5, 10, 1 and 2 had a composite contribution of 66.8% to the total CS performed in the post-intervention year. Overall, Robson group 5 had the highest relative contribution to the caesarean burden (30.8%) and this is consistent with other reports in both LMICs and high-income countries.¹⁶⁻¹⁸

Over the two-year period, the CS rate was 40.1% with the highest and lowest proportions occurring in the Robson groups 9 and 1 respectively. Robson groups 1, 2, 4, 5 and 10 had a composite contribution of 73.8% to the total CS performed in the hospital over the two-year period. Similarly, a study from Peru that showed that the high caesarean rate was contributed by Robson groups 1, 3, 4, 5, 7 and 10. In Ghana, the national caesarean rate is about 16%⁸ which is higher than the traditional recommendation (10-15%) by the WHO.⁶ More recently, WHO stated that caesarean rate higher than 10% at the population level is not associated with reductions in maternal and newborn mortality rates.⁴ Although CS is an effective life-saving intervention for the mother and fetus it must only be performed for medically acceptable

indications. In retrospective review at the same facility, CS rate of 46.8% was reported with Robson groups 2, 4 and 5 contributing to approximately 48% of caesarean burden¹⁹ compared with the 54% determined in our study.

In this study, there was statistically significant increase in the CS rate in Robson groups 1, 3 and 10 following the intervention. The increased rates in groups 1 and 3 might be partly attributed to suboptimal labour management resulting in prolonged labour or failure to progress. On the other hand, Costa et al reported a significant reduction in the caesarean rate in Robson group 1 from 70.5% to 42.6% in Brazil.²⁰ In group 10, the rise in CS rate from 33.8% to 38.7% might be due to the combination of prematurity and previous caesarean delivery which preclude induction of labour in such cases. Concerning the pattern of relative contribution of the various Robson groups to the burden of CS, there were mixed findings with an increase in groups 1, 3, 6, 7 and 10, and reduction in 2, 4, 5, 8 and 9 in the post-intervention year.

Intriguingly, the caesarean rate increased from 39.1% in the pre-intervention to 41% in the post-intervention period and this might be explained partly by the significant contribution from Robson groups 1, 3 and 10. It was anticipated that the overall caesarean rate might reduce with the increased awareness of more health workers about the implementation of the Robson ten group caesarean classification system in the hospital. However, the non-reduction in the CS rates in the current study might be caused by the tertiary status of the hospital where most of the clients have complicated cases referred from the primary and secondary health institutions in the southern part of the country. The policy of admitting mainly the complicated cases referred from the smaller facilities may explain the tilt in the denominator characteristics

of the client population with resultant increase in the caesarean rates. Similar finding of progressive increase in overall caesarean rate from 23.5% to 30% was determined in a study conducted in Peru over a period of 10 years with significant contribution from group 1, 3 and 5.²¹

In Robson group 6 (nulliparous with breech) and 7 (multiparous with breech presentation including previous uterine scar), there was an increase in both the caesarean rates and relative contribution to CS. This finding might be partly attributed to the high proportion of women with previous caesarean section in the obstetric population. For instance, breech presentation with a previous caesarean birth (Robson group 7) is a strong clinical indication for repeat caesarean as external version is contraindicated.

To reduce CS rate, there is the need to adequately assess the indications for primary caesarean birth as breech presentation and other abnormal foetal presentation preclude any attempts at achieving natural birth after prior CS. Also, the publication by Hannah et al that indicated significant perinatal morbidity and mortality associated with vaginal breech delivery markedly influenced intrapartum management of breech presentations.²² Hitherto, most women with breech presentation were mostly slated for vaginal delivery but the practice tilted the balance in favour of CS in attempt to reduce adverse perinatal outcome after the publication in the year 2000. In the study by Costa et al, all the women in groups 6, 7 and 9 were scheduled for caesarean section (100% in each group).²⁰ In a sharp contrast, CS rate and relative contribution to caesarean delivery in group 9 reduced from 92.5% and 3.2% in the pre-intervention to 90.9% and 2.3% in the post-intervention group respectively. This important finding may be partly explained by the improved advocacy for external cephalic version in the management of abnormal foetal presentation in the hospital.

The strength of this study relies in the prospective data collection and the comparison of the CS rates and the relative contributions of the Robson groups to caesarean burden in the pre-and post-intervention phases. The limitations of the study include the lack of comparison of the obstetric outcomes associated with the various Robson groups which contributed significantly to the caesarean burden. Another limitation is related to the short period between preintervention and post intervention phases.

In conclusion, nulliparous or multiparous women with spontaneous labour and no uterine scar (group 1 and 3) and preterm gestation including previous uterine scar (group 10) constitute the major characteristics associated with increased contribution to the burden of caesarean section in the hospital. There were mixed findings concerning the patterns of relative contribution of the Robson groups to the burden of CS with some groups showing an increase while others exhibited a decline in the post-intervention year.

Implementation of the Robson classification into maternity care has identified characteristics of women that contribute markedly to the high caesarean birth in the hospital. We recommend further research into the clinical practicability and usefulness of the Robson's caesarean classification for assessing and predicting maternal and perinatal outcomes.

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References

1. Torloni MR, Betran AP, Souza JP, Widmer M, Allen T, Gulmezoglu M, et al. Classifications for caesarean section: a systematic review. *PLoS One*. 2011;6(1).
2. Chu K, Cortier H, Maldonado F, Mashant T, Ford N, Trelles M. Cesarean section rates and indications in sub-Saharan Africa: a multi-country study from Medecins sans Frontieres. *PLoS One*. 2012;7(9).
3. Bragg F, Cromwell DA, Edozien LC, Guro-Urganci I, Mahmood TA, Templeton A, et al. Variation in rates of caesarean section among English NHS trusts after accounting for maternal and clinical risk: cross sectional study. *BMJ*. 2010;341:c5065.
4. Betran AP, Torloni MR, Zhang JJ, Gülmezoglu AM, Section the WHO/WG on C. WHO Statement on Caesarean Section Rates. *BJOG An Int J Obstet Gynaecol* [Internet]. 2016 Apr 1;123(5):667–70. Available from: <https://doi.org/10.1111/1471-0528.13526>
5. Brennan DJ, Robson MS, Murphy M, O'Herlihy C. Comparative analysis of international cesarean delivery rates using 10-group classification identifies significant variation in spontaneous labor. *Am J Obstet Gynecol*. 2009;201(3):308-e1.
6. World Health Organization (WHO). Appropriate technology for birth. *Lancet*. 1985;2:436–7.
7. Tunçalp Ö, Hindin MJ, Adu-Bonsaffoh K, Adanu RM. Assessment of maternal near-miss and quality of care in a hospital-based study in Accra, Ghana. *Int J Gynecol Obstet*. 2013;123(1):58–63.
8. Ghana Statistical Service (GSS), Ghana Health Service (GHS), and ICF. Ghana Maternal Health Survey (GMHS) 2017. 2018.
9. Seffah JD, Adu-Bonsaffoh K. Vaginal Birth After a Previous Caesarean Section: Current Trends and Outlook in Ghana. *J West African Coll Surg* [Internet]. 2014;4(2):1–25.
10. Robson MS. Classification of caesarean sections. *Fetal Matern Med Rev*. 2001;12(1):23–39.

11. Robson MS. Can we reduce the caesarean section rate? *Best Pract Res Clin Obstet Gynaecol* [Internet]. 2001;15(1):179–94.
12. Betrán AP, Gulmezoglu AM, Robson M, Merialdi M, Souza JP, Wojdyla D, et al. WHO global survey on maternal and perinatal health in Latin America: classifying caesarean sections. *Reprod Health*. 2009;6(1):18.
13. FIGO WGOI, Care OM. Best practice advice on the 10-Group Classification System for cesarean deliveries. *Int J Gynaecol Obstet*. 2016;135(2):232.
14. Farine D, Shepherd D. No. 281-Classification of Caesarean Sections in Canada: The Modified Robson Criteria. *J Obstet Gynaecol Canada* [Internet]. 2017;39(12):e551–3.
15. Tunçalp Ö, Stanton C, Castro A, Adanu R, Heymann M, Adu-Bonsaffoh K, et al. Measuring Coverage in MNCH: Validating Women’s Self-Report of Emergency Cesarean Sections in Ghana and the Dominican Republic. *PLoS One*. 2013;8(5).
16. Reddy AY, Dalal A, Khursheed R. Robson ten group classification system for analysis of cesarean sections in an Indian hospital. *Res J Obs Gynecol*. 2018;11:1–8.
17. Hounkpatin B, Aboubakar M, Dangbemey P, Tognifode V, Schantz C, Dumont A, et al. Practice of the Caesarean Section in Four Maternities in Benin Using Robson Classification. *Open J Obstet Gynecol*. 2020;10(01):65.
18. Barčaitė E, Kemeklienė G, Railaitė DR, Bartusevičius A, Maleckienė L, Nadišauskienė R. Cesarean section rates in Lithuania using Robson ten group classification system. *Medicina (B Aires)*. 2015;51(5):280–5.
19. Samba A, Mumuni K. A review of caesarean sections using the ten-group classification system (Robson classification) in the Korle-Bu Teaching Hospital (KBTH), Accra, Ghana. *Gynecol Obs*. 2016;6:385
20. Costa ML, Cecatti JG, Souza JP, Milanez HM, Gülmezoglu MA. Using a Caesarean Section Classification System based on characteristics of the population as a way of monitoring obstetric practice. *Reprod Health*. 2010;7(1):13.
21. Tapia V, Betran AP, Gonzales GF. Cesarean section in Peru: Analysis of trends using the Robson classification system. *PLoS One*. 2016;11(2).
22. Hannah ME, Hannah WJ, Hewson SA, Hodnett ED, Saigal S, Willan AR, et al. Planned caesarean section versus planned vaginal birth for breech presentation at term: a randomised multicentre trial. *Lancet*. 2000;356(9239):1375–83.

TRAUMATIC EXPERIENCES OF WOMEN LIVING WITH HIV/AIDS IN GHANA

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Abstract

Background: Trauma faced by women infected with HIV and AIDS poses great challenge to the coordinated fight against HIV and AIDS. Traumatizing events impacting people living with HIV and AIDS, most notably women, impede diagnosis, prevention and treatment efforts.

Methods: The study set out to investigate the life-threatening experiences of thirty-eight women living with HIV and AIDS in the Lower Manya Krobo District of the Eastern Region, Ghana. The study used focus-groups as method of data collection. The data was analysed through theme identification and grouping, along with selection of relevant quotes.

Results: The study revealed five major life-threatening experiences of the women: disclosure, mental ill-health, isolation, stigmatisation and financial challenges. The study concluded that women living with HIV and AIDS suffer enormous psychological burden of the pandemic in addition to physical challenges. However, it is the social burden of the pandemic that contributes significantly to the eventual death of the victims rather than the disease itself.

Conclusion: Consequently, HIV and AIDS education campaign should be intensified using a variety of media, targeting those social issues identified in this research as part of the efforts to fight the disease.

Key Words: *stigma, discrimination, people living with HIV and AIDS, serostatus, qualitative research.*

Introduction

Since AIDS was initially diagnosed three decades ago, incredible advances have taken place in the understanding, treatment and prevention of Human Immunodeficiency Virus (HIV) disease. In spite of these advancements, HIV continues to ravage the world's population¹. According to the Joint United Nations Programme on HIV/AIDS², an estimated 75.7 million people are living with HIV infection at the end of 2019 compared to other infectious diseases. AIDS was first identified in 1981 among homosexual men and intravenous drug users in New York and California³. Shortly after its detection in the United States, evidence of AIDS epidemics grew among heterosexual men, women, and children in sub-Saharan Africa¹. Ghana's first case was diagnosed in 1986 in Accra⁴ and later spread to other parts of the country.

Since the inception of the epidemic, over 75 million people have been infected and affected with the virus and as at the end of 2019, about 32.7 million have died of AIDS². New HIV infections have reduced by 40% since the peak in 1998, which recorded 2.8 people becoming infected compared to 1.7 million in 2019². Even though new HIV infections are levelling off or even declining in most countries, the virus is spreading rapidly through much of the developing world.

The HIV/AIDS burden on women continues to be a problem globally. The UNAIDS report that every week, around 5500 young women aged between 15-24 years become infected with HIV. In Sub-Saharan Africa, women have been hardest hit as five in six new infections among adolescents aged 15-19 years are among girls. Young women aged 15-24 years are twice as likely to be living with HIV than men². Women and girls accounted for about 48% of all new HIV infections in 2019. However, in sub-Saharan Africa, women and girls accounted for 59% of all new cases in the same year². This means that 59% of women in Africa who are infected are going through various forms of traumatic experiences.

Trauma is considered broadly as "an event, series of events, or set of circumstances that is experienced by an individual as physically or emotionally harmful or life threatening and that has lasting adverse effects on the individual's functioning and mental, physical, social, emotional, or spiritual well-being"⁵. Experiences of trauma can have long-lasting impacts on health including but not limited to, complex post-traumatic stress disorder⁶, symptoms of which include re-experiencing trauma, avoiding reminders of trauma, hypervigilance and arousal, negative self-concept, and relationship disturbances. Beyond affecting health, trauma may affect a patient's ability to communicate with and trust providers, and engage in care, which is especially important in HIV treatment⁷. In the United State for example, it is reported that health professionals may stigmatise women and question their decisions to carry pregnancies rather than terminate⁸.

Experiences of trauma in the Ghanaian context, emanate from multiple factors including but not limited to stigmatisation and discrimination. For

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example, pregnant women attending clinic in Ghana are mandated to go through HIV/AIDS test. The outcome of this test can be challenging as this requirement can potentially affect the mental health of these women due to the stigma and discrimination associated with the disease. It is estimated that more than one third (35%) of women around the world have experienced physical and/or sexual violence by an intimate partner or sexual violence by a non-partner at some point in their lives². According to Goffman, stigma is described as an “attribute that is deeply discrediting” imposed by others that reduces a person “from a whole and usual person to a tainted, discounted one” (p.3)⁹. Goffman goes on to say that when this labelling is linked to “discrediting dispositions” it has the tendency to be widely believed in the community¹⁰ which brings about “them” and “us” situation¹¹. Stigma is often associated with discrimination which is explained as an undesirable attribute of an individual which potentially can reduce the person’s status in the eyes of the public⁹. It is also seen as an attribute that links people to undesirable characteristics¹¹. Discriminated individuals are believed to possess some features conveyed as a social identity that is devalued in a particular social context¹².

Fear of stigma impedes prevention efforts, including discussions of safer sex and preventing mother-to-child transmission. People tend to avoid confronting their own risk and adopt preventive behaviour due to the separation between ‘us’ and ‘them’. Utilization of voluntary counselling and HIV testing (VCT) services and disclosure of HIV status are constrained because of the anticipated stigma and the actual experiences of People Living with HIV.

This study sought to explore the traumatic experiences that women living with HIV and AIDS face. It is reported that infected women and girls prefer to seek help from sources other than medical and professional counsellors due to stigma covertly and overtly receive from hospital staff. In some cases, women and girls living with HIV have been rejected by their loved ones and the people in their communities. They have also been treated unfairly in the workplace, and denied access to education and health services in some instances⁹.

Methods

The researcher was interested in obtaining information about the lived experiences of women living with HIV and who make meaning from their conditions hence qualitative research methodology was judged to be appropriate¹³ for this study. This type of research has the ability to find the unique voice within data in order to reach understanding of the participants’ perspectives. The focus of the study was to understand the traumatic challenges women living with HIV go through in the Eastern Region of Ghana. The women recruited for this work were members of an association of people living with HIV/AIDS at the

Manya Krobo District. They meet regularly but for the purpose of data collection, the researcher met them over a six-week period and the six sessions were facilitated by a social worker/counsellor and an HIV peer educator. All study procedures were approved by the institutional review board of the Researcher’s university (Cape Coast University, Cape Coast, Ghana).

Sample

Purposive sampling was used to recruit 38 women from an HIV support group association from the Manya Krobo District. The ages of respondents ranged between 21 to 58 years and had been diagnosed with HIV for an average of 6-years. Twenty-eight participants have had at least secondary education, three junior secondary education and seven had no formal education.

Data Analysis

Data was gathered over six-week period. Discussions from six support group meetings were recorded and transcribed verbatim. The researcher achieved rigour through extended consultations with the participants. Since participants belonged to the same support group association, there were no issues regarding trust building and this relationship ensured deep and rich conversations. Content analysis was performed by reading and rereading transcripts and coding and categorizing phrases or sentences into themes.

Results

HIV Disclosure

The study revealed that disclosure of HIV status by a woman can result in conflict and potentially cause intimate partner violence (IPV). The study participants reported they tried to hide their sero-positive status as far as possible from their partners immediately after diagnosis. To them, they feared being abused or harmed by their loved ones if they were to disclose their HIV status.

A 48-year-old lady puts it succinctly as follows: “my husband was diagnosed first but he did not tell me what was wrong with him. He even hid his medication from me. During this time, I was going through some health challenges so my physician suggested I go through HIV Test. Unfortunately, it came out positive but when I informed him (my husband), he was livid and threw me out of our matrimonial bed”. I slept in the children’s room for most part until my husband passed and the family asked me to vacate the property”.

Another said that her husband’s sisters nearly beat her up claiming she (the wife) had infected their brother. “My only crime was I opened up with one of my in laws whom I trusted and respected”. She gunned up against me with the rest of the family.

Mental Health Issues

In the current study, participants expressed higher levels of psychiatric symptoms which could be interpreted to include depression, anxiety and Posttraumatic Stress Disorder (PTSD) and is consistent with previous studies on trauma and mental health^{14,15}.

A participant had this to say: “following my diagnosis, I was so much afraid and this led me to become reserved. I couldn’t communicate the results to my husband. I lost trust in providers and people in general and I can say this was the most trying period in my life”. I stopped going to church and any other social activity. I was distraught most part of the day and at night, I couldn’t sleep. I also became absent-minded and couldn’t do anything meaningful throughout the day. At a point, I thought I was losing my sanity.

A young unmarried lady recounted: for me, I left for our village for some time but it didn’t help. I tried to relocate to another district to find a job there but when I did, I met someone from my locality who disclosed to my relatives where I was and they came for me. When they found me, I couldn’t tell them what was wrong so they suggested I seek spiritual help. I didn’t know what to say or do at this point because whatever you say or do will confirm their suspicion.

HIV Isolation

Respondents expressed the fear that disclosure of their seropositive status would provide grounds for their spouses to seek divorce.

A 45-year-old mother of six stated that “my husband’s family asked that I leave their son if I have AIDS. Painfully, I got it from him. I left but I couldn’t go with the kids and this has affected my health severely.

Another put it this way: I knew my husband had multiple sexual partners so, when I was diagnosed, I kept it to myself. I feared he will leave me to one of his girlfriends if he was to find out. I couldn’t bear the sight of losing all we have worked for over the years.

Stigmatisation

The study found that people living with HIV and AIDS are at the receiving end of stigma and discrimination. HIV and AIDS stigmatisation and discrimination have been seen all over the world although they manifest themselves differently between countries, religious groups and individuals. They are often seen alongside other forms of stigmatisation and discrimination, such as racism, homophobia or misogyny and can be associated with behaviours often considered socially unacceptable such as prostitution or drug use. Stigma directed at women living with HIV and AIDS not only makes it difficult for them to try to come to terms with and manage their illness on a

personal level, but it also interferes with attempts to fight the AIDS epidemic as a whole¹⁶.

Participants stressed, “people will talk, they will put a label on you. You may be very active working in the community but as soon as you are diagnosed with HIV, you wouldn’t get to serve anymore”. For Asor, a former pupil teacher, the challenge actually came from within. “I know there is stigma attached to the disease but I rather stigmatised myself”. I have not been able to forgive myself from contracting the virus. It has been very hard for me, she added.

Financial Difficulty

The study brought to public view the economic hardship PLWH face resulting from the labelling effect and associated stigma and discrimination attached to the disease.

They see us (members of the HIV/AIDS Association) as people with less value. Others think we are soon to die and don’t deserve to do anything for a living. One reported that she was refused a bank loan to expand her business because someone from the neighbourhood told the loan officer that she was a carrier.

A middle-aged woman said in tears, “I stopped my cooked food business because no one will buy from me for fear of contracting the disease”.

This is consistent with the theme on social isolation and exclusion. The study further highlighted how financial weight on PLWH contributes a significant roadblock to treatment adherence resulting from high costs of medication, transportation to and from treatment centres as well as the opportunity cost of attending clinic.

Discussion

Disclosure: participants in this study preferred not to disclose their HIV status. To them, disclosing one’s seropositive status puts the affected in a challenging and most depressing situation. Majority would prefer non-disclosure to avert the trauma and the stress of telling a loved one. This study is consistent with Okareh and others, who found that among HIV-positive women in Nigeria, thirty-seven per cent of participants reported that disclosure had resulted in partner conflict, and twenty per cent of women reported ongoing conflict or abuse with partners as a result of disclosure¹⁷. Again, a study in Zimbabwe also reported that HIV-positive women experienced higher rates of IPV after disclosure of HIV status than HIV-negative women but both experienced IPV, indicating that disclosure-related IPV is a concern for women regardless of HIV result¹⁸.

Mental Health Issues: The results of the study show that the effects of trauma on women living with HIV go beyond affecting the health of victims but their psychological and emotional well-being as well. The issues regarding trust and confidentiality at health facilities pose great challenges to these women in their

bid to avail themselves for treatment, care and support. This is consistent with previous studies^(6,7,8) all concluding that trauma had debilitating effect on a patient's ability to relate with and trust providers to provide care in a safe and sound atmosphere.

Isolation: HIV infected persons face physical, social, emotional, and economic challenges. However, these challenges have most telling effects on women. This is supported by a study in the United States which reported that women living with HIV have highly disproportionate rates of trauma exposure and recent posttraumatic stress disorder (30%) compared to the general population of women (5.2%)²¹. Social support is critical to the process of dealing with posttraumatic stress, as having others listen, understand, and reflect on an individual's traumatic experience can facilitate the development of new schemas and a revised and meaningful narrative about the trauma¹⁹. The women in this study expressed challenges they have had to endure as a result of their seropositive status. This correlates well with the theme on disclosure. Participants felt they stand to lose already existing relationships if their seropositive status were made known to families and close associates.

Stigmatisation: The women in this study indicated the stress of HIV and AIDS stigmatisation and discrimination. They narrated how stigma and discrimination is seen in their relations with community members, families and work colleagues. This is consistent with Peter Piot's conclusion that when stigma is directed at women living with HIV and AIDS not only does it make it difficult for them to try to come to terms with and manage their illness on a personal level, but it also interferes with attempts to fight the AIDS epidemic as a whole¹⁶. On a national level, the stigma associated with HIV can deter governments from taking fast, effective action against the epidemic, whilst on a personal level it can make individuals reluctant to access HIV testing, treatment and care. The fears expressed in this study corroborates earlier research on the subject.

Financial Difficulty: Many of the participants in the study reported that one of the most difficult challenges they face as HIV/AIDS victims is financial exclusion. The fear of job loss, divorce by a partner, stigma and discrimination all constitute financial loss. They explained that if people are dissociating from you, you are likely to lose your source of living. Participants' economic status have been negatively impacted. Economic insecurity resulting from stigma and social isolation was challenging to women who had been separated or lost their husbands to AIDS and are themselves HIV positive. This correlates well with Tarakeshwar and Co's²⁰ work which looked at the framework of spiritual coping with respect to cognitive theory of stress in addressing stressors unique to HIV disease. Threat of job loss or loss of a partner was perceived by the participants as highly traumatising and stressful whether perceived or actual.

The women in this study had experienced stress of disclosing their seropositive status, rejection by their loved ones, been divorce and perceived divorce as well as threat of job loss and actual job loss. These experiences, developed in them coping mechanisms such as social isolation (which is self-inflicted), secrecy and denial. Feelings such death, shame and frustration aggravated their self-discrimination. This study showed how trauma impacts the fight against HIV and AIDS. The researcher believes voluntary counselling and testing by professionals would be prompted by a reduction in traumatising events against infected persons.

Conclusion

In this qualitative study, the researcher found that HIV and AIDS related trauma impact negatively towards the coordinated effort directed at treatment, care and support. Understanding the traumatic experiences infected women go through are critical in overcoming the barriers that prevent people from seeking professional help. HIV and AIDS prevention research needs to accept the importance of trauma in HIV response, rather than be coy about it. Such, addressing HIV and AIDS related psycho-social challenges should be at the heart of HIV response, not at the periphery.

Recommendation

In the absence of a supportive legal framework, there is little hope if not impossible to tackle HIV and AIDS-related stigmatization, discrimination and denial. The study revealed that Ghana's efforts at containing the epidemic is not enough to educate people about HIV and AIDS, its mode of transmission or even about legal rights of infected persons. What is missing in the menu of strategies is government anti-discrimination framework supported by a law that will ensure the dignity of infected individual's rights. Such laws must fight popular myths, stereotypes and pronouncements that serve as breeding grounds upon which HIV and AIDS related stigmatisation and discrimination thrive. Again, discriminatory policies need to be developed by government and other employers and enforced to protect the dignity of infected and affected persons. It is important to mention confidentiality and respect for human rights as cardinal principles safeguarding and protecting the rights of people living with HIV and AIDS in Ghana. A more enabling environment needs to be created to increase the visibility of people with HIV and AIDS and to facilitate the formation of support groups so that traumatic experiences emanating from discrimination, stigmatization, and denial can be addressed collectively.

Most importantly, behaviour change communication in the media must focus on changing attitudes through safer sex education and training rather than fear and compulsion. The ultimate objective would be to help

people to change their sexual behaviour and the way the general public respond to those who are already infected with the virus. The importance of the Ghanaian hospitality needs to be emphasised and reinforced.

Finally, the role of traditional leaders and the clergy in bringing about social cohesion must be exploited in dealing with HIV and AIDS related stigmatisation and discrimination. Greater attention needs to be given to the gender-biased nature of HIV and AIDS related traumas. Efforts should be made to address not only women's risks of HIV and AIDS infection but their heightened vulnerability to the social stigma associated with the epidemic. In most Ghanaian societies, there exist a double standard where men are permitted (and even encouraged) to have more than one wife, while women are blamed for the consequences of multiple sexual behaviour. The effects of this double standard on women's health and well-being, property rights and rights of access to children are not healthy and need to be addressed urgently.

References

1. Joint United Nations Programme on HIV/AIDS., World Health Organization. AIDS epidemic update, December 2006. World Health Organization; 2006.
2. *Unaid J.* Fact sheet—latest global and regional statistics on the status of the AIDS epidemic. Geneva: UNAIDS 2020 Jun.
3. Joint United Nations Programme on HIV/AIDS. 2008 report on the global AIDS epidemic. *Unaid*; 2008.
4. Neequaye IE, Neequaye AR, Mingle IA, Ofori-Adjei D, Osei-Kwasi M, Grant F, Hayami M, Ishikawa RJ, Biggar RJ. Sexual habits and social factors in local Ghanaian prostitutes which could affect the spread of Human Immunodeficiency Virus (HIV). *Ghana Med J.* 21:12-15.
5. Substance Abuse and Mental Health Services Administration. (2014). *SAMHSA's Concept of Trauma and Guidance for a Trauma-informed Approach.* HHS Publication No. (SMA) 14-4884. Retrieved from Rockville, MD: Substance Abuse and Mental Health Services Administration:
6. Karatzias, T., Shevlin, M., Fyvie, C., Hyland, P., Efthymiadou, E., Wilson, D., Cloitre, M. (2017). Evidence of distinct profiles of posttraumatic stress disorder (PTSD) and complex posttraumatic stress disorder (CPTSD) based on the new ICD-11 trauma questionnaire (ICD-TQ). *Journal of Affective Disorders, 207,* 181-187.
7. Dawson-Rose, C., Cuca, Y. P., Webel, A. R., Baez, S. S. S., Holzemer, W. L., Rivero-Mendez, M., ... & Reyes, D. (2016). Building trust and relationships between patients and providers: An essential complement to health literacy in HIV care. *Journal of the Association of Nurses in AIDS Care, 27(5),* 574-584.
8. Kirshenbaum, S. B., Hirky, A. E., Correale, J., Goldstein, R. B., Johnson, M. O., Rotheram-Borus, M. J., & Ehrhardt, A. A. (2004). "Throwing the dice": Pregnancy decision-making among HIV-positive women in four U.S. cities. *Perspectives on Sexual and Reproductive Health, 36,* 106-113.
9. Goffman E. *Stigma: notes on the management of spoiled identity.* Englewood Hills, NJ: Prentice Hall; 1963.
10. Ogden J, Nyblade L. *Common at its core: HIV-related stigma across contexts.* Washington, DC: International Center for Research on Women (ICRW); 2005.
11. Reidpath DD, Chan KY. A method for the quantitative analysis of the layering of HIV-related stigma. *AIDS Care.* 2005;17(4):425_32.
12. Padilla, Amado M., and William Perez. "Acculturation, social identity, and social cognition: A new perspective." *Hispanic journal of behavioral sciences* 25.1 (2003): 35-55.
13. Padgett, D. K. (2017). *Qualitative methods in social work research* (3rd ed.). Los Angeles, CA: SAGE.
14. Brown JF. Faith-based mental health education: a service-learning opportunity for nursing students. *J Psychiatr Ment Health Nurs.* 2009; 16:581-8.
15. Hatzenbuehler M. Structural stigma: research evidence and implications for psychological science. *Am Psychol.* 2016; 71:742-51.
16. Piot P. Global AIDS epidemic: time to turn the tide. *Science.* 2000 Jun 23;288(5474):2176-8.3
17. Okareh OT, Akpa OM, Okunlola JO, Okoror TA. Management of conflicts arising from disclosure of HIV status among married women in southwest Nigeria. *Health Care Women Int.* 2015;36(2):149-60. [PubMed] [Google Scholar]
18. Shamu S, Zarowsky C, Shefer T, Temmerman M, Abrahams N. Intimate partner violence after disclosure of HIV test results among pregnant women in Harare, Zimbabwe. *PLoS One.* 2014;9(10): e109447. [PMC free article] [PubMed] [Google Scholar]

19. Kamen, Charles, et al. "The impact of stigma and social support on development of post-traumatic growth among persons living with HIV." *Journal of clinical psychology in medical settings* 23.2 (2016): 126-134.
20. Tarakeshwar, Nalini, Michelle J. Pearce, and Kathleen J. Sikkema. "Development and implementation of a spiritual coping group intervention for adults living with HIV/AIDS: A pilot study." *Mental health, religion & culture* 8.3 (2005): 179-190.
21. Machtiger, E. L., Wilson, T. C., Haberer, J. E., & Weiss, D. S. (2012). Psychological trauma and PTSD in HIV-positive women: A meta-analysis. *AIDS & Behavior*, 16(8), 2091–2100.



SPECIAL ARTICLE

SURGICAL MANAGEMENT OF PELVIC ORGAN PROLAPSE

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Pelvic organ prolapse (POP) is a common condition that affects the quality of life of affected women. A prevalence of 12% has been reported in Ghana with the condition affecting mainly the emotional wellbeing, sexual life and women's relationship with their partners. This review discusses the adequacy of the available surgical options for managing POP and provide our expert opinion and recommendations based on our experience.

Surgical management of POP is undertaken through 2 main approaches i.e., obliterative and reconstructive. Obliterative procedures should only be considered for women who are not sexually active and have no desire for future sex as it closes the vagina. Because of the significant contribution of the apex to vaginal support, inadequate apical support during prolapse repair may

lead to a vault prolapse or failure of anterior and posterior vaginal wall repairs. Vaginal mesh is not recommended for the repair of POP. We advise the performance of concurrent anti-incontinent procedure for women with symptomatic and occult stress incontinence at the time of prolapse repair. We do not however advocate the performance of prophylactic anti-incontinent procedure (i.e., anti-incontinent procedure for continent women with POP) at the time of prolapse repair.

Surgical repair of POP is expected to achieve good anatomical and functional outcome. It is therefore important that surgeons equip themselves with the skills and knowledge necessary to address all the problems confronting the patient.

Key Words: Pelvic Organ Prolapse, Surgery

Introduction

Pelvic organ prolapse (POP) defined by the International Urogynaecological Association and the International Continence Society as the descent of one or more of the anterior vaginal wall, posterior vaginal wall, the uterus, or the apex of the vagina (vaginal vault after hysterectomy)¹ is a common problem that affects the quality of life of affected women. The global prevalence range from 3-6% when defined by symptoms and up to 50% based on examination findings.² In Ghana a prevalence of 12 % has been reported with the condition affecting mainly the emotional well-being, sex life and women's relationship with their partners.³

The available management options for pelvic organ prolapse include watchful waiting in women with asymptomatic prolapse; conservative interventions (such as the use of vaginal pessaries and pelvic floor muscle training) and surgical management. Though conservative treatments may be effective in alleviating patients' symptoms, surgical corrections of the defects may eventually be needed for the satisfactory treatment of pelvic organ prolapse.

The objective of this review is to discuss the adequacy of the available surgical options for managing pelvic organ prolapse.

Surgical management of pelvic organ prolapse

"There is no condition that cannot be made worse by surgery". This quotation by Ulf Ulmsten finds relevance especially in surgery for pelvic organ prolapse where one is expected not only to achieve anatomical success but to restore the pelvic organs to function at their optimum. It therefore goes without saying that in pelvic organ prolapse repair, the surgeon faces a complex and intriguing challenge. Circumventing that challenge requires the surgeon to consider the following factors before embarking on surgical repair of pelvic organ prolapse.

1. Will the surgery be reconstructive or obliterative?
2. Will the uterus be conserved or removed?
3. Will the repair be done abdominally or vaginally?
4. Will the repair be done with native tissue or a graft?
5. Will a surgery for stress urinary incontinence be done concomitantly?
6. Can a general gynaecologist perform the surgery adequately?

1. Reconstructive or obliterative

Contrary to the reconstructive approach that involves suspension of the prolapsed vagina to restore anatomy and function, the obliterative approach involves vaginal closure with consequent loss of vaginal

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function. The obliterative procedure is typically reserved for the elderly who are no longer sexually active and have no desire for future sexual intercourse. Occasionally it may be used for women with significant anesthetic risk who have failed conservative management. Careful patient selection and adequate pre-operative counselling is key to avoid future regret.

Colpocleisis (an obliterative surgery) can be done with the uterus in-situ (Le Fort procedure) or after a hysterectomy and colpocectomy.

The Le Fort procedure involves removing a rectangular section of the vaginal epithelium from the upper two thirds of the anterior and posterior walls of the vagina and approximating the edges together while reducing the cervix in a cephalad direction. Two tunnels are created on the lateral sides of the vagina to allow for evacuation of possible uterine secretions. The cervical os is concealed after Le Fort procedure making evaluation of uterine bleeding difficult if not impossible after the procedure. A pap smear and evaluation of the endometrium should be performed before a Le Fort procedure.

A colpocectomy with colpocleisis involves removing the vaginal epithelium after a hysterectomy. Sequential interrupted purse-string sutures are placed in the fibromuscularis of the denuded vagina beginning from the apex and progressing distally towards the hymen. As the purse string suture is tightened, the prolapse is reduced into the pelvic cavity. Colpocleisis like Le Fort or Colpocectomy is usually combined with perineorrhaphy to narrow the genital hiatus.

During colpocleisis the distal 3 cm of the vaginal epithelium (under the urethra) is usually not removed. This is termed partial colpocleisis. By preserving this area under the urethra, access is maintained to perform concurrent or future suburethral procedures should stress urinary incontinence develop.

Complications include injury to the bladder and rectum during dissection of the vaginal walls. Regret over the loss of ability to have vaginal intercourse has been reported in some women.⁴

2. Hysterectomy or uterine conservation

Uterine preservation may be preferred by some women for a variety of reasons. Aside preservation of fertility, uterine preservation may be desired for psychological and cultural reasons as well as the perception that the cervix is vital for sexual satisfaction. Women at increased risk of cervical and endometrial carcinomas are however not candidates for uterine preservation and should be counselled for hysterectomy.

It is, important for surgeons to be skilled in uterine preservation procedures to ensure satisfaction of their patients. Equally important is the ability to offer adequate apical support after hysterectomy.

3. Abdominal versus vaginal repair

The choice of the route of surgery must be decided on after careful consideration of the risk and benefits

associated with the abdominal (open, laparoscopic and robotic) versus vaginal routes. The vaginal route allows for the correction of all prolapsed anatomic sites as well as the treatment of concomitant stress incontinence. In addition, it is associated with faster recovery and short hospital stay. The abdominal route (abdominal sacrocolpopexy) on the other hand is considered as the Gold standard as it is associated with lowest risk of dyspareunia, recurrence and repeat surgeries.⁵ It is however not suitable for the repair of isolated anterior and posterior vaginal wall defects. It is more invasive, stressful and associated with longer recovery time. The nature of the defect to be repaired, age of the patient, overall health of the patient and surgeons' skills determines the approach to the surgery.

Apical support of uterus and vagina

The apex of the vagina is suspended by the cardinal-uterosacral ligament complex which is directed towards the hollow of the sacrum supported by the pelvic floor muscles. The upper vagina rest horizontally over the levator ani which allows the vagina to close with rise in intraabdominal pressure. Loss of the muscular support leaves the connective tissues alone to bear the stress of increase in abdominal pressure which eventually leads to prolapse. When apical prolapse occurs, maintaining the vaginal length and directing the axis to rest on the pelvic floor is essential to ensure adequate function of the vagina and to prevent recurrence. There is a general acknowledgment that adequate support for the vaginal apex is an essential component of a durable surgical repair for women with advanced pelvic organ prolapse.⁶ Because of the significant contribution of the apex to vaginal support, inadequate apical support during prolapse repair may lead to failure of anterior and posterior vaginal wall repairs.⁷ This therefore leaves one to wonder whether good anatomical and functional outcome can be achieved in pelvic organ prolapse repair without good apical suspension.

There is a spectrum of options for managing apical prolapse. This can be achieved vaginally or abdominally. The abdominal route can be accomplished via the open, laparoscopic or robotic technique.

Vaginal surgeries for apical prolapse.

The available options include the Manchester operation, McCall Culdoplasty, Colpocleisis, high uterosacral ligament suspension, sacrospinous ligament suspension and iliococcygeus vaginal vault suspension.

I. The Manchester Operation

This procedure has undergone several modifications after it was first introduced by Archibald Donald of Manchester. The procedure involves cervical amputation with the shortening and anterior plication of the cardinal-uterosacral ligament complex on the remaining uterus. This can be combined with anterior and posterior vaginal repair.

The procedure is indicated in women who have completed childbearing and desire uterine preservation or have medical condition that make short operation desirable. It avoids the morbidity associated with vaginal hysterectomy but should never be performed in women desirous of future fertility as the cervical amputation leads to cervical stenosis or incompetence. It is important to rule out endometrial pathology before performing the procedure.

Specifically, the operation includes a circumferential incision around the cervix, dissecting the bladder off the cervix and uterus up to the vesicouterine fold without entry into the peritoneal cavity as the cervical stump lies outside the peritoneal cavity. The cardinal-uterosacral ligament complex on each side is dissected and isolated. Once isolated, they are transected from the cervix, shortened and resutured to the upper portion of the cervix near the internal os. The cervix is then amputated and Sturmdorf sutures are placed anteriorly and posteriorly to cover the amputated edges of the cervix with vaginal epithelium. An anterior colporrhaphy and posterior colpoperineorrhaphy are performed as indicated.

II. McCall Culdoplasty

McCall Culdoplasty described by Milton McCall was originally used for the treatment and prevention of enterocele at the time of hysterectomy. The procedure which also maintains vaginal length is widely performed by gynaecologist today.

The procedure is performed by passing a series of non-absorbable sutures to plicate the uterosacral ligaments beginning inside the peritoneal cavity at one uterosacral ligament followed by reefing the peritoneum to the contralateral uterosacral ligament. (Internal McCall sutures). In addition, 1 or 2 absorbable sutures are passed from the vaginal lumen just lateral to the midline of the posterior vagina wall into the peritoneal cavity. This same suture is then taken through one uterosacral across the intervening peritoneum and through the contralateral uterosacral ligament. It then exits the vaginal cuff just close to the midline (External McCall sutures). The external McCall sutures which provide apical support are tied in the lumen of the vagina while the internal McCall sutures are tied intraperitoneally.

McCall sutures utilizes the distal end of the uterosacral ligaments to provide apical support hence may not provide adequate vaginal length in cases of advanced apical prolapse where the apex of the vagina (and by inference the distal end of the uterosacral ligaments) is outside the vagina. In our practice the McCall culdoplasty is utilized as an apical procedure only when in our preoperative assessment point D on the POP-Q (i.e., the posterior fornix) is at negative 4 or less. The commonest complication of this procedure is ureteral kinking or obstruction.

III. High Uterosacral Ligament Suspension

While the McCall culdoplasty utilizes the distal end of the uterosacral ligament to suspend the vaginal apex, High uterosacral ligament suspension makes use of the proximal ends (Sacral portions) of the uterosacral ligaments to suspend the apex of the vagina directing it to the hollow of the sacrum and allowing it to be supported over the pelvic floor muscles.

The procedure involves placing 2 or 3 sutures on the proximal portions of each uterosacral ligament (the most distal suture should at least be at the level of the Ischial spine). The superior arms of these sutures are exteriorized sequentially through the anterior vaginal cuff and the inferior arms are exteriorized through the posterior vaginal cuff. Because this procedure utilizes non-absorbable sutures, there are exteriorized through the fibromuscularis of the vaginal cuff. When these sutures are tied the fibromuscularis of the apical vagina is closed (closing the vagina at the apex) and resuspended to the proximal uterosacral ligament.

The commonest complication of this procedure is ureteral kinking/ligation. It is therefore necessary to perform a cystoscopy at the end of the procedure to ensure ureteral patency.

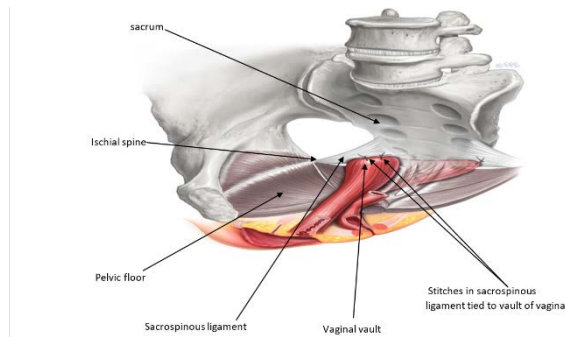
IV. Sacrospinous ligament suspension

This strong ligament which spans between the ischial spine and the sacrum has been utilized in apical suspension procedures for decades. The procedure can be done either bilaterally or unilaterally and studies have shown no difference in efficacy between the two. The sacrospinous ligament and the overlying coccygeus muscle can be accessed either through the paravesical space (anteriorly) or the pararectal space (posteriorly). Once accessed, the ligament is cleaned and delayed absorbable sutures are placed in the ligaments. A number of devices such as the aneurysm needle, the Miya hook and the Capiro are used to facilitate the placement of these stitches into the ligament. The stitches should be placed 2-3 cm medial to the ischial spine and should not go beyond the superior edge of the ligament. The stitches are then anchored to the apex of the vagina and tied to suspend the vault of the vagina.

Placing the stitch about 2-3cm medial to the ischial spine prevents the common complication of postoperative gluteal pain and life-threatening vascular injury which can result from entrapment of the pudendal nerve and injury to the internal pudendal artery respectively. The nerve and the vessels travel around the ischial spine. Again, the inferior gluteal artery passes posterior to the sacrospinous ligament and stitch placement through the 'belly' of the ligament (and not beyond its superior edge) avoids injury to this vessel. It is common to encounter some minor bleeding during the dissection to the sacrospinous ligament. These usually resolve with packing of the space. Recurrent or de novo post-operative anterior vaginal wall prolapse is common and result from deviation of the vaginal axis more posteriorly than the "natural" axis. This deviation places

the anterior vaginal wall in a position to receive most of the intraabdominal pressure.

Sacrospinous ligament fixation of vaginal vault



Anterior prolapse repair

The anterior vaginal wall is the most common site of prolapse and the less likely to achieve a long-term cure after repair. Repair of the anterior compartment is accomplished through three main methods. This includes anterior colporrhaphy, paravaginal repair and graft augmentation

a. Anterior colporrhaphy

Anterior colporrhaphy developed more than 100 years ago involves the plication of the fibromuscularis (pubocervical fasciae) of the anterior vaginal wall. The epithelium of the vagina is incised and dissected away from the underlying fibromuscularis or "fasciae". The dissection is carried laterally to the sidewall. A midline plication is then performed with interrupted or continuous sutures. Complications include haemorrhage, injury to the bladder, changes in bladder function, postoperative dyspareunia and urethral obstruction (especially after plication of the fibromuscularis underneath the trigone)

b. Paravaginal repair

This procedure described by George White may be performed vaginally, or abdominally (laparoscopically or open) abdominally. The aim is to reattach the anterior vaginal wall to the arcus tendinous fasciae pelvis (the white line). In the vaginal approach an incision is made in the anterior vaginal wall and the vaginal epithelium is dissected from the fibromuscularis. The dissection is extended laterally and the retropubic space entered. Using blunt dissection in the retropubic space the arcus is dissected from the posterior aspect of the pubic bone to a point just distal to the ischial spine. With the aid of a capio device, about 6 sutures are placed into each lateral pelvic sidewall incorporating the arcus tendinous fasciae pelvis. These sutures are attached to the anterior vaginal wall fibromuscularis or through the vaginal epithelium (if absorbable sutures are used) and tied. Anterior colporrhaphy can be used to compliment this

procedure for repair of midline defects. The major complication of this procedure is haemorrhage and urethral obstruction.

Paravaginal repair can also be approached abdominally. Here, entry and dissection is made into the retropubic space of Retzius to expose the pelvic sidewalls from the pubis to the ischial spine. With the bladder retracted medially, multiple sutures can be placed in the arcus tendinous fasciae pelvis and reapproximated to the pubocervical fasciae.

c. Graft augmentation

In an effort to improve anatomic outcomes of anterior repair, the placement of mesh to augment support of the anterior vaginal wall was introduced. This however became associated with a lot of problems arising from complications of mesh insertion including infection, mesh exposure and erosion, pain, sexual dysfunction and allergic reaction to the mesh. These complications coupled with the lack of evidence that vaginal mesh worked better than surgery without the use of mesh to repair POP led the U.S. Food and Drug Administration in 2019 to order the manufacturers of all surgical mesh products indicated for the transvaginal repair of pelvic organ prolapse (POP) to stop selling and distributing their products in the United States of America.⁸

Posterior prolapse repair

Posterior wall prolapse repair is commonly accomplished through posterior colporrhaphy though graft augmentation has been performed. The authors do not recommend the use of graft in repair of posterior wall prolapse because of mesh associated complication such as exposure and erosion, infection, and particularly scarring (which increases the occurrence of dyspareunia).

Posterior colporrhaphy which is a midline plication of the fibromuscularis (rectovaginal fascia) of the posterior vaginal wall is normally combined with perineorrhaphy. The procedure increases the fibromuscularis in the midline and decreases the posterior vaginal wall. The vaginal epithelium is incised in the midline and dissected off the underlying fibromuscularis. Plication of the fibromuscularis begins proximally and progresses towards the hymenal ring. Complications include injury to the rectum, constipation and dyspareunia.

Abdominal surgeries for apical prolapse.

The 2 commonly performed procedure for abdominal repair of apical prolapse are the abdominal sacrocolpopexy (ASC) and the uterosacral ligament suspension.

I. ASC

This procedure is considered the gold standard in apical prolapse repair as it is the most durable. It also provides longer vaginal length compared to the vaginal counterparts. Surgeons differ in opinion regarding which group of patients should be considered for abdominal sacrocolpopexy. While some surgeons believe it should be reserved for younger healthy women

who are better placed to withstand the stress of surgery and are more likely to place increased stress on the repair than older patients, others are of the opinion that the native tissue in older women are intrinsically deficient and they should receive a more durable repair than their younger counterparts. Our centre individualized patients to benefit from ASC based on their general health status and their need for adequate vaginal length for sexual intercourse.

The technique for Asc whether done laparoscopically, robotically or openly is virtually the same. It involves the placement of a graft material at the vaginal apex which is then anchored to the sacrum at the level of s1-s2. The peritoneum covering the vagina is opened and the rectum and bladder dissected to expose about 3-4cm of the rectovaginal fasciae and the pubocervical fasciae. One end of the graft is attached to the pubocervical fasciae anteriorly and the other end is attached to the rectovaginal fasciae posteriorly. Next the retroperitoneal space is open and the presacral space is dissected to expose the anterior longitudinal ligament. Care should be taken to identify and ligate the middle sacral vessels as injury to them can cause an uncomfortable bleeding at this area. The opened retroperitoneal space is extended from the presacral space superiorly to the previously dissected vaginal cuff inferiorly. The vaginal straps are joined together and anchored to the anterior longitudinal ligaments in front of the sacrum using interrupted permanent sutures. The mesh is then laid in along the curve of the sacrum and retroperitonealised.

Mesh erosion and life-threatening bleeding that can result from injury to the vessels in close proximity to or within the presacral space remain the major complications of this procedure. This procedure can be combined with culdoplasty or Burch colposuspension for stress incontinence.

II. Uterosacral ligament suspension

This procedure which is typically performed vaginally can also be approached abdominally. Similar to the vaginal approach, abdominal uterosacral ligament suspension involves placing permanent or delayed absorbable sutures through the proximal uterosacral ligament and attaching these sutures to the respective vaginal apex. When tied, these sutures resuspend the vaginal apex to the proximal uterosacral ligaments.

4. Native tissue versus graft repair

Repair of anterior and posterior vaginal wall prolapse has traditionally been achieved with the use of native tissue plication. This method has however been associated with high rate of recurrence especially in the anterior compartment. Attempts to improve the long-term outcome led to the use of synthetic mesh in prolapse repair. The use of transvaginal mesh in POP repair has however been associated with complications including infection, mesh exposure and erosion, sexual dysfunction, vaginal pain and allergic reaction to graft material. Considering the risk-benefit profile of using

transvaginal mesh in prolapse repair, U.S. Food and Drug Administration in 2019 ordered the manufacturers of all surgical mesh products indicated for the transvaginal repair of pelvic organ prolapse (POP) to stop selling and distributing their products in the United States of America.⁸

5. Concomitant surgery for stress incontinence

stress urinary incontinence; the leakage of urine with rise in intraabdominal pressure is commonly associated with pelvic organ prolapse. Stress incontinence may be symptomatic, occult (stress incontinence is evident only with the prolapse reduced) or may develop de novo (occurrence of stress incontinence in continent women after surgical repair of pelvic organ prolapse). Evidence supports the performance of concurrent anti-incontinent procedure for women with symptomatic and occult stress incontinence at the time of prolapse repair.⁹ The jury is still out and surgeons are split in the middle when it comes to performing a concurrent anti-incontinent procedure for continent women with pelvic organ prolapse. The practice at our centre is in favour of a two-stage procedure for continent women with pelvic organ prolapse hence we defer anti-incontinent procedure for continent women at the time of prolapse repair and will only perform an anti-incontinent procedure when de novo stress incontinence develops.

6. Can a general gynaecologist perform the surgery adequately ?

Patients with pelvic organ prolapse are delighted when surgery results in good anatomical and functional outcome, and resolution of all associated problems. It is therefore important for surgeons to evaluate themselves whether they have the skills and knowledge to resolve the problems confronting women with pelvic organ prolapse. Referring patients with pelvic organ prolapse to the appropriate specialty when one feels inadequate to provide the needed solution will be a step in the right direction. The ability to provide an adequate apical support and retain functional vagina length should be the prerequisite for taking on vaginal hysterectomy for POPs

Conclusion

Surgical management of prolapse goes beyond mere vaginal hysterectomy, anterior repair and posterior repair. Adequate suspension of the apex is perhaps the most important surgery in the management of POP. Failure to treat apical prolapse may not inure to the benefit of affected women and will eventually lead to dissatisfaction. It is therefore important that surgeons equip themselves with the skills necessary to treat apical prolapse satisfactorily.

References

1. Haylen BT, De Ridder D, Freeman RM, Swift SE, Berghmans B, et al. (2010) An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. *Neurourology and Urodynamics: Official Journal of the International Continence Society* 29: 4-20.
2. Barber MD, Maher C (2013) Epidemiology and outcome assessment of pelvic organ prolapse. *Int Urogynecol J* 24: 1783-1790.
3. Wusu-Ansah OK, Opare-Addo HS (2008) Pelvic organ prolapse in rural Ghana. *Int J Gynaecol Obstet* 103: 121-124.
4. von Pechmann WS, Mutone M, Fyffe J, Hale DS (2003) Total colpocleisis with high levator plication for the treatment of advanced pelvic organ prolapse. *Am J Obstet Gynecol* 189: 121-126.
5. Maher C, Feiner B, Baessler K, Christmann-Schmid C, Haya N, et al. (2016) Surgery for women with apical vaginal prolapse. *Cochrane database of systematic reviews*.
6. Brubaker L, Maher C, Jacquelin B, Rajamaheswari N, von Theobald P, et al. (2010) Surgery for pelvic organ prolapse. *Female pelvic medicine & reconstructive surgery* 16: 9-19.
7. Hsu Y, Chen L, Summers A, Ashton-Miller JA, DeLancey JO (2008) Anterior vaginal wall length and degree of anterior compartment prolapse seen on dynamic MRI. *International Urogynecology Journal* 19: 137-142.
8. Food U, Administration D (2019) FDA Takes Action to Protect Women's Health, Orders Manufacturers of Surgical Mesh Intended for Transvaginal Repair of Pelvic Organ Prolapse to Stop Selling All Devices [press release]. Online document at: www.fda.gov/news-events/press-announcements/fda-takes-action-protect-womens-health-orders-manufacturers-surgical-mesh-intended-transvaginal Accessed July 17.
9. Baessler K, Christmann-Schmid C, Maher C, Haya N, Crawford TJ, et al. (2018) Surgery for women with pelvic organ prolapse with or without stress urinary incontinence. *Cochrane Database Syst Rev* 8: Cd013108.

CASE REPORT

HYPOPHARYNGEAL SCHWANNOMA: A GHANAIAI CASE REPORT

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Abstract

This article seeks to highlight the need for a high index of suspicion for a hypopharyngeal tumour especially schwannoma in patients presenting with the feeling of a mass in the throat.

Schwannoma is a benign schwann cell encapsulated tumour with no genetic predilection. They are rarely found in the hypopharynx and when present may not cause any significant symptoms until they enlarge and cause dysphagia and upper airway obstruction because of laryngeal obstruction.

Schwannomas are differentiated from other soft tissue tumours like neurofibromas by the presence of Antoni A and B on histology and strong positivity for S100 protein with no or minimal mitotic activity.

These tumours are mainly managed by surgical excision either transorally or via lateral pharyngotomy.

We present the case of 28 -year-old man who presented to our facility with the feeling of a mass in the throat of 2 months duration. After flexible nasolaryngoscopy and CT scan of the neck, a hypopharyngeal tumour with a sessile base was found. The tumour was excised endoscopically after elective tracheostomy to secure the airway.

Patient's recovery was uneventful and has remained asymptomatic one-year post excision of the tumour.

Key Words: Hypopharyngeal tumours, schwannoma, endoscopy

Introduction

Benign tumours of the hypopharynx tend to be rare. Common types of benign hypopharyngeal tumours include neurofibroma, hemangioma, lymphangioma and lipoma¹. A schwannoma of the hypopharynx is even rarer. Malignant lesions in the hypopharynx are more often written about.

Schwannoma is a benign schwann cell encapsulated tumour. Schwannomas tend to have no genetic predilection². These tumours can be mistaken for globus pharyngeus. This is because when they are very small their clinical features may be few as the hypopharynx is an expansile segment of the digestive tract. Some lesions in the hypopharynx have thus even been missed on fiberoptic esophagogastrosocopy. However, as these benign tumours enlarge they can

cause dysphagia and obstruction of the upper airway as a result of laryngeal blockage. Some patients have died from such benign tumours³. It is key that in the diagnosis of hypopharyngeal tumours there is a good complementary collaboration between otolaryngologists who are supposed to manage these patients and gastroenterologists who may chance upon these lesions in their diagnostic workup for dysphagia⁴.

We present a case of hypopharyngeal schwannoma which was causing acute upper airway obstruction and was completely excised in piecemeal via endoscopy.

Case Presentation

A 28-year-old man started experiencing the feeling of a mass in the throat for about 2 months. Progressively, he noticed that the mass was increasing in size. He thus reported to our Ear, Nose and Throat Clinic having been seen and referred from a hospital near him. He had dysphagia and odynophagia. He had no fever, chills, headache, cough or rhinorrhea. He also had no known allergies nor lost weight.

Flexible nasolaryngoscopy done showed a round soft tissue mass in the hypopharynx obscuring view of the larynx as shown in figure 1. A CT scan of the neck was also done as shown in figure 2, to have a three-

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Conflict of Interest: None Declared

dimensional view of the mass. This showed a well-defined pedunculated mass attached to the left lateral side of the hypopharynx with thick peripheral enhancement and non-enhancing central hypodensity suggestive of necrosis or hemorrhage. An impression of a hypopharyngeal tumour was made. The patient was then booked for elective tracheostomy and excision of the hypopharyngeal mass. As patient was being worked up for his scheduled surgery, he presented to the emergency unit of our hospital in severe respiratory distress. He thus had an emergency tracheostomy and the lesion excised via direct laryngoscopy/pharyngoscopy using a Chevalier Jackson laryngoscope. The findings were two round soft tissue masses attached to the left lateral wall of the hypopharynx. Vocal cords and supraglottic structures were intact. Endoscopic resection was done using a curved laryngeal scissors and electrocautery. The excised masses were as shown in figure 3. The samples were then sent for histology.

Histology showed an encapsulated spindle cell tumour with neural differentiation. The nuclei of the tumour cells were serpentine with tapered ends and were monomorphic. The tumour appeared to have hypercellular (Atoni A) and hypocellular (Atoni B) areas intimately associated with each other as shown in figure 4. No mitoses or malignancy was seen. The tumour showed diffuse intense positivity with S100 as shown in figure 5.

The patient recovered well, and one-year postoperative period was unremarkable.

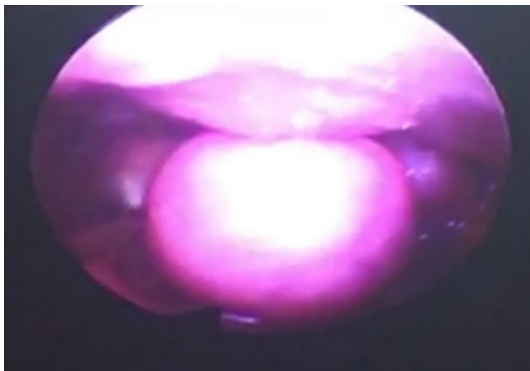


Figure 1: Hypopharyngeal mass as seen with a flexible nasolaryngoscope

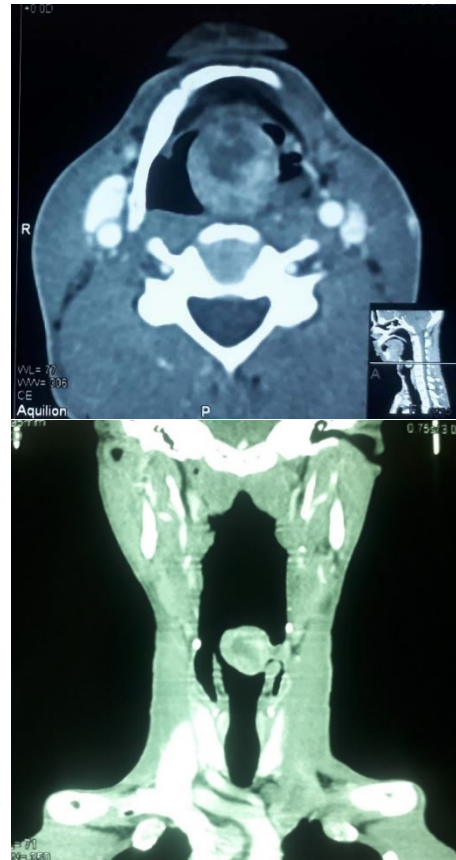


Figure 2: CT scans (axial and coronal views) showing the hypopharyngeal mass attached to the left lateral wall



Figure 3: Excised hypopharyngeal masses

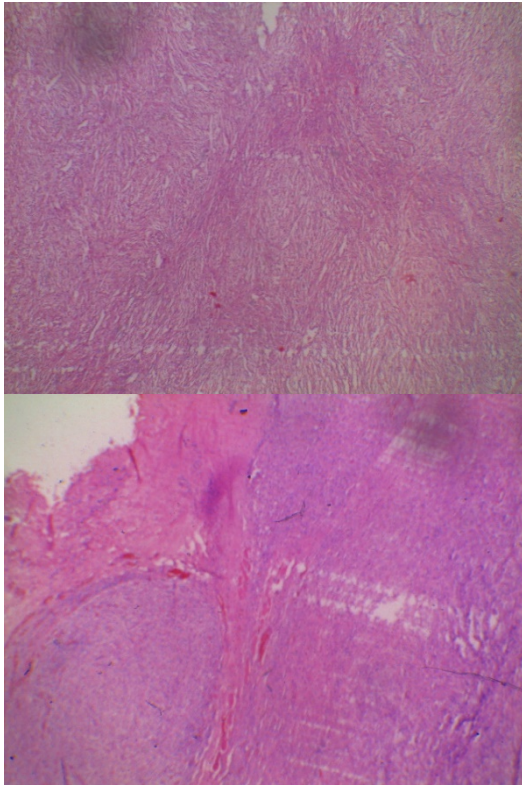


Figure 4: Micrograph of the tumour with H and E staining showing hypercellular and hypocellular areas.

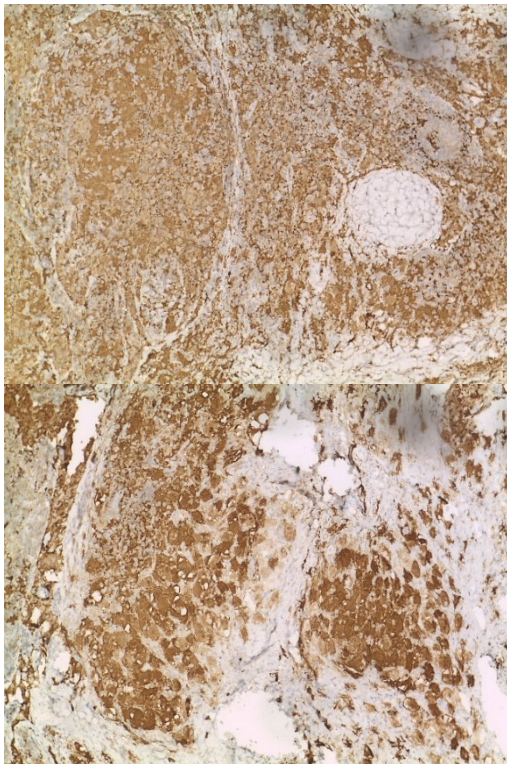


Figure 5: Micrograph of tumour showing S100 positivity of tumour cells in the hypercellular and hypocellular areas.

Discussion

Endoscopy and barium swallow have in the past been used for diagnosing these lesions. In recent times, MRI is preferable as it accurately diagnoses and allows for the origin of the pedunculated lesion in the parapharyngeal space to be clearly defined. CT scans can also be used for diagnosing schwannomas^{3,5}. We used CT scan for our patient since that was the available imaging modality in our centre.

The diagnosis of hypopharyngeal schwannomas may be delayed and thus treatment may also be given at a later stage.

Histologically schwannomas are characterized by the presence of Antoni A and B and strong positivity for S100 protein without any mitotic activity. These differentiate the schwannomas from neurofibromas which tend to have a greater mitotic activity with a higher propensity of malignant transformation⁶.

The main treatment methods have been transoral endoscopic resection or lateral pharyngotomy with total excision of the tumour depending on the size of the tumour². We chose the endoscopic approach since the size of the tumour allowed adequate access and total resection of the tumour.

Recurrence of hypopharyngeal polypoid schwannomas are rare and malignant transformation is low³. One-year postoperative period had been unremarkable.

Conclusion

A high index of suspicion for a hypopharyngeal tumour especially schwannoma is needed when evaluating patients presenting with the feeling of a mass in the throat for early diagnosis and timely treatment.

Acknowledgements

I write express my most sincere gratitude to all the nurses and doctors at the ENT Unit of the Cape Coast Teaching Hospital for helping us to take care of this patient.

Consent

Informed consent was obtained from this patient for the publication of this article. A copy is available for inspection by the editor.

References

1. Koide C, Imai A, Takahashi T. Benign hypopharyngeal tumor: Report of two cases. *J Jpn Bronchoesophagol Soc* 1992;43:492-9.
2. Ahmed AO, Umar AB, Aluko AA, Yaro MA. Hypopharyngeal Schwannoma: A rare case presentation and review of literatures. Vol 10, Issue 1, 2013, Pages 29 -32
3. Caceres M, Garrett HE. Large Pedunculated Polyps in the Esophagus and Hypopharynx. *The*

- Annals of Thoracic Surgery*. Vol 81, Issue 1, January 2006, Pages 393-396
4. Fenton JE, Hone S, Cormley P, O'Dwyer TP, Timon CI. Hypopharyngeal tumours may be missed on flexible oesophagogastroscopy. *BMJ* 311 (7005), 623-624, 1995
 5. Eckel HE, Jungehulsing M. *The Journal of Laryngology & Otology* 108 (2), 174-177, 1994
 6. Wanjari SP, Wanjari PV, Parwani RN, Tekade SA. Unusually large quiescent ancient schwannoma of hypoglossal nerve. *Indian J Dent Res* 2013;24:768-71
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OBJECTIVES

- To introduce Residents to the value, concept and practice of EBM and biomedical study designs
- To sensitize Residents to the value of systematically synthesized evidence as crucial for EBM
- To take Residents through how to find the evidence, formulate an appropriate clinical question, build search strategy and carry out focused searches from relevant electronic data bases
- To Residents through a step-by-step process of appraising evidence for relevance and reliability before applying it to the care of the patient, considering cost implications

LEARNING OUTCOMES

By the end of the course, Residents should be able to:

- Formulate an appropriate clinical question using PICOS: P= patient, I = intervention, C = Comparison/control, O = Outcomes and S = Study design
- Build search concepts and carry out search-to-retrieve studies to answer the clinical question
- Use validated checklists to critically appraise articles for the value of the evidence
- Apply the evidence to inform the decisions, choices and options in the care of the patient
- Assess the outcome of care provided to the patient and document experiences

COURSE OUTLINE

The course will be delivered using theory-grounded and problem-based learning approaches to introduce Residents to the Evidence-based Medicine concepts.

GROUP WORK

Residents will be divided into six groups and each group will appraise evidence from a particular research design method: Group 1 (systematic review and meta-analysis), Group 2 (randomized controlled trials), Group 3 (cohort studies), Group 4 (case-control studies), Group 5 (cross-sectional studies) and Group 6 (diagnostic accuracy tests)

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The order of the text should be as follows: **title page, abstract** (structured) of no more than 250 words with 2-8 key words (MeSH terms) at the bottom. The main text must be divided into the following sections: **introduction, subjects (or materials) and methods, results, discussion, conclusion, acknowledgements, references, tables, legends to figures and figures**. Each section should begin on a new page and all pages must be numbered consecutively, beginning with the title page

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EXAMPLES

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Book Chapter

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