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Editorial

Research Funding: The Path to Sustainable Evidence-Based Practice

In the December 2023 editorial, we wrote that Evidence-Based Practice which stands at the heart of modern healthcare is marked by rigorous research, critical thinking and unwavering dedication. It is required that medical educational institutions and hospitals strive to keep up with the growing trend of discoveries and innovation in medical practice. Such discoveries are however, made with deliberate investment of resources and time that can only be possible with adequate funding. Research funding is therefore, perceived as the lifeblood of scientific inquiry and technological development.

Research funding equips researchers with the financial capacity needed to conduct thorough studies, develop new methods, and refine existing practices. It also fosters collaboration among experts across diverse disciplines, helping to address complex, multi-faceted issues that require diverse perspectives.

Despite its importance, securing research funding remains a significant challenge. One of the primary issues is the allocation of funds. Government agencies, private investors, and philanthropic organizations may prioritize certain areas of research over others, leaving critical but underfunded sectors at risk. Furthermore, the competitive nature of

grant applications and the limited pool of available funding make it difficult for smaller institutions, researchers, or emerging areas of study to secure the resources needed.

To overcome these barriers, there is the need for collaboration between government bodies, academia, and the private sector. Partnerships between research institutions, private and public sectors can drive not only innovation but also the translation of research into practical solutions. However, such collaborations must be approached carefully, ensuring that commercial interests do not overshadow the integrity of the research process.

The need for strategic investment in research is clear. Policymakers, private organizations, and the general public must recognize the importance of consistent, long-term funding for research as an essential foundation for sustainable, evidence-based medical practice. The benefits of such investment ripple across society, leading to improved health outcomes, more sustainable environmental practices, and overall societal well-being.

Professor Enyonam Yao Kwawukume
Editor-in-Chief

COMMENTARY

Mitigating Environmental Degradation Through Waste Segregation And Recycling **Nuamah MA**

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Environmental degradation is a process through which the natural environment is compromised in some way; reducing biological diversity and the general health of the environment. It occurs when ecosystems are destroyed, wildlife is wiped out and natural resources like air, water and soil are depleted. This process can be entirely natural in origin, or it can be accelerated or caused by human activities that are seen as harmful or undesirable.^{1,2} Many international organizations recognize environmental degradation as one of the major threats facing the planet since humans have only been given one Earth to work with. If the environment becomes irreparably compromised, it could mean the end of human existence.²

Most environmental degradation in low and middle income countries is caused by uncontrolled human filth pollution. This contributes to the poor health condition in these countries as the filthy environment becomes fertile breeding ground and habitats for vectors of communicable diseases. Environmental degradation is a preventable global health treat with economic implications to individuals and government in our global village. Therefore, the adage “Your health is your wealth” is used by health promoters to show individuals and communities the importance of personal hygiene, sanitation, regular exercise and medical check up to mitigate preventable diseases.³

The Sustainable Development Goals (SDGs) offer a genuine chance to instigate transformation and notably measure the progress to address objectives that are common to all global inhabitants. It gives the basic rate and direction for every nation to provide basic infrastructure and services to make life and living in communities sustainable. The concept of sustainable development dates back to 1987 when the Brundtland Report of the World Commission on Environment and Development described sustainable development as an advancement or growth curve that satisfies current demands without compromising the ability of future generations to fulfill their own needs.⁴ Sustainability has since become a global issue of interest that seeks to be achieved by world economies and institutions.⁵ Higher Educational Institutions (HEIs) play major roles in safeguarding the environment since they are regarded as key partners in promoting environmental sustainability and educating individual and communities about its health and economic benefits. In a previous editorial we reported about the role of HEIs in establishing and implementing the ‘Green Campus Initiative’ on their campuses.⁶

The garbage disposal issue is a challenge in Ghana and as much as giant garbage collection companies in Ghana, like ‘Zoomlion’ try to mitigate the situation, the country is conditioned for only bulk garbage management, resulting in large quantities of trash and losing valuable recyclable materials that could be re-used to reduce the need for new raw materials as well as reducing the overall garbage production. The

recent issues on plastic pollution cannot be over emphasized. It is reported that 1.1 Million Tons of plastic waste is generated and 250,000 Tons is dumped into the Atlantic Ocean from Ghana annually.^{6,7} In addition to this, 86% of plastic waste is improperly disposed of, ending up in landfills, drains, rivers, and oceans as only 5% is collected for recycling.^{8,9} A lot of the plastic wastes on streets and stagnant drains become breeding ground for mosquitos; carriers of several preventable tropical diseases such as of malaria, yellow fever and elephantiasis.

A sustainable environment can be achieved as individuals and communities, as a whole, embrace the collective steps to prevent local pollutants to the environment. The aim of this editorial is to call on individuals and communities as a whole to embrace segregation of waste at source, use degradable materials like cloth bags and papers bags for shopping and storage to prevent non-degradable pollutants accumulating in the environment. It is also to call on stakeholders and policymakers to speed up measures to encourage recycling or up-cycling of useful garbage for a sustainable and healthy environment.

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Prevalence, Aetiology And Factors Associated With Heart Failure Among Pregnant And Postpartum Women Admitted To A Tertiary Hospital In Ghana

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Abstract

Introduction: Heart failure in pregnancy has been associated with poor outcomes in both mother and foetus/neonate. Maternal mortality remains a huge global challenge. Several studies have found higher rates of maternal mortality and morbidity as well as poor foetal and neonatal outcomes among pregnant women with heart failure. This study therefore sought to assess the aetiology and associated factors of heart failure among pregnant and postpartum women admitted into the Korle-Bu Teaching Hospital.

Aim: To assess the prevalence, aetiology and associated factors of heart failure in pregnancy and the postpartum period.

Methods: A cross-sectional study was carried out in the obstetric and medical wards of the Korle-Bu Teaching Hospital. One hundred and thirty- one confirmed cases of heart failure in pregnancy or within six months of the postpartum period were recruited over a 15-month period from February 2021 to June 2022. Data collected with a structured questionnaire including history, physical and clinical examination, were analysed using IBM

SPSS version 24 software. The results obtained were presented as texts, tables or graphs, and significance was set at 0.05.

Results: The prevalence of heart failure in pregnancy and the postpartum period was 0.9% during the study period. Common causes of heart failure included peripartum cardiomyopathy (69, 52.7%), hypertensive heart disease/disorders (41, 31.3%), valvular heart disease (8, 6.1%), and severe anaemia (5, 3.8%). Associated factors were Pregnancy Induced Hypertension (PIH) in an earlier pregnancy (69, 52.7% or current history of PIH (36, 27.5%), and chronic hypertension (41, 31.3%). Most participants presented with New York Heart Association (NYHA) class III (67, 51.1%), followed by class II (44, 33.6%), and class IV (20, 15.3%).

Conclusion: A history of PIH in a previous pregnancy and the presence of chronic hypertension were the most commonly associated factors with heart failure. Strict surveillance and monitoring by attending clinicians of pregnant women for early detection of heart failure is highly recommended.

Keywords: Heart failure, hypertensive heart disease, preeclampsia, pregnancy-induced hypertension, post-partum.

Introduction

Heart failure in pregnancy continues to pose a growing threat around the globe. Globally, cardiovascular disease is estimated to be present in 0.1- 4% of all pregnancies.¹ Heart failure and cardiovascular disease in general, has been reported to be among the top indirect or non-obstetric causes of maternal morbidity and mortality in many countries.²⁻⁶ Heart failure is known to account for about a quarter of maternal deaths in industrialised countries and even higher rates in Southern Asia and Sub-Saharan Africa: 29.3% and 28.6% respectively.⁴ While most developed countries have been able to largely eliminate obstetric complications such as ante-partum and post-partum haemorrhage that may lead to heart failure during pregnancy with severe anaemia, Ghana and other developing countries still have to grapple with these factors. Many studies have shown congenital heart disease to be the leading cause of maternal cardiac disease resulting in heart failure during pregnancy, which accounts for 75% of cases in the developed world.⁷⁻¹¹ In developing countries, rheumatic heart disease has been reported to be the leading cause of maternal cardiac disease leading to heart failure, accounting for as much as 72% of cases, as per findings of the Registry Of Pregnancy And Cardiac (ROPAC) diseases and Registry of Maternal Heart Failure.¹²⁻¹⁴ Pregnancy in itself is associated with important haemodynamic changes that can lead to decompensation of a previously compensated underlying pathology.^{1,15,16} It can also set up a series of mechanisms, not fully understood, which can lead to an acute decompensation in a previously healthy heart with no structural or functional abnormality, often seen in the entity known as peripartum cardiomyopathy.^{16,17,18} Heart failure generally has a poor prognosis.^{19,20} Heart failure in pregnancy has been associated with poor outcomes in both mother and foetus/neonate. Several studies have found higher rates of maternal mortality, increased caesarean section rates as well as operative vaginal delivery.²¹ Poor foetal and neonatal outcomes such as foetal death, low Apgar scores, preterm births, low birth weight and foetal growth restriction have all been associated with

heart failure in pregnancy.^{21,22} Much attention needs to be paid to this condition in order to achieve the Sustainable Development Goal (SDGs) of the United Nations, to reduce global maternal mortality to fewer than 70 maternal deaths per 100,000 live births by the year 2030.²³ The aim of this study therefore was to assess the aetiology and associated factors of heart failure among pregnant and postpartum women admitted into the Korle-Bu Teaching Hospital.

Methods

The study was a hospital based cross-sectional study carried out in the obstetric and medical wards of the Korle-Bu Teaching Hospital (KBTH), which generally receives referrals from hospitals in the Greater Accra region and oversees an average of 11,000 deliveries annually (2019 annual report of the department, unpublished).

The study population were all pregnant in-patients of the obstetric department or post-partum women within six months of delivery on medical wards with a confirmed diagnosis or differential diagnosis of heart failure within the period of February 2021 to April 2022.

Consecutive patients with confirmed de-novo heart failure during pregnancy or within six months of the post-partum period were recruited into the study without any form of stratification from the obstetric and medical wards of the KBTH concurrently, till the required number of participants was obtained.

Using a prevalence rate of 8% for pregnancy related heart failure from previous studies.²⁴ A sample size of 113 was obtained using the Cochran's sample size formula for single proportion.²⁵ With the assumption of 15% non-response rate, a total of 131 patients with heart failure in pregnancy and the postpartum period were recruited into the study.

Inclusion criteria were Pregnant and postpartum women with confirmed heart failure above 18 years. Exclusion criteria were pregnant and postpartum women having heart failure with other confounding causes of acute pulmonary oedema, like End Stage renal disease (ESRD) and pregnant or postpartum

women whose current diagnosis of heart failure was unrelated to the most recent pregnancy.

Participants' histories were obtained using a standard structured questionnaire, covering demographic characteristic, reproductive and clinical histories. Specific heart failure symptoms including dyspnoea, paroxysmal nocturnal dyspnoea, orthopnoea, pedal oedema, easy fatigability, nocturnal cough) were documented. Clinical diagnosis of heart failure was based on Framingham's criteria.

Data was analysed using IBM SPSS version 22. Descriptive analysis of demographic parameters including age, ethnicity, religion, marital status, and level of education was done and displayed in tabular form. Continuous variables are presented as mean $\pm$ and standard deviation. Relevant data is also appropriately displayed in bar graphs when indicated. A p-value less than 0.05 is considered statistically significant.

Ethical approval was obtained from the Korle-Bu Teaching Hospital Ethical Review Committee (KBTH-IRB 00025/21). Written permission was also obtained from the heads of departments where the study was carried out. The purpose and

details of the study was explained clearly to the participants in a language they could understand, an interpreter was provided where necessary. Participants were reassured of their prerogative to choose to participate in the study or not and the fact that enrolment into the study was wholly voluntary and that their care was not going to be jeopardized by refusing to participate in the study. Written informed consent was subsequently obtained before subjects were enrolled in the study.

Results

During the study period, a total of 14,539 pregnant women in-patients were admitted into the obstetrics department. Prevalence was thus 135/14539 which comes to a prevalence rate of 0.9% or 9 in 1000 pregnant in-patients over the period of study.

The mean age of the participants was 32.6 ± 6.2 years. Akan's formed the majority of Ethnic representation 42% and for educational background, 39.7% were secondary school (SHS) leavers and formed the bulk of respondents (Table 1). Most (44.3%) of the respondents were petty traders, 15.3% were unemployed. Other demographics parameters are summarized in Table 1.

Table 1 Demographic characteristics of women with heart failure in pregnancy and post-partum period at KBTH

Variable	Participants (N=131)
Age (years)	32.6±6.2
Ethnicity, n (%)	
Akan	55 (42.0)
Ga	18 (13.7)
Ewe	35 (26.7)
Northern tribe(Hausa, Dagomba and Frafra)	18 (13.7)
Others	4 (3.9)
Educational Level, n (%)	
Primary	34 (26.0)
Secondary	52 (39.7)
Tertiary	34 (26.0)
Post-tertiary	2 (1.5)
No formal education	8 (6.1)
Occupation, n (%)	
Unemployed	20 (15.3)
Petty trader	58 (44.3)
Civil servant	18 (13.7)
Business owner	2 (1.5)
High income professionals	6 (4.6)
Others	27 (20.6)
Residence, n (%)	
Urban	126 (96.2)
Rural	5 (3.8)
Religion, n (%)	
Christianity	112 (85.5)
Islamic religion	18 (13.7)
Traditional religion	1 (0.8)
Marital status, n (%)	
Single	33 (25.2)
Married	96 (73.3)
Separated	1 (0.8)

Abbreviation: n,number; %, Percent

The most common aetiology of heart failure from this study was Peripartum cardiomyopathy 69 (52.7%) followed by hypertensive heart disease 23 (17.6%) and pregnancy-induced hypertension with 18 (15.3%) valvular heart disease 8 (6.1%) and severe anaemia 5 (3.8%) (Figure 1). These were classified as major causes as found in this study. The other rare aetiologies were congenital heart disease, sickle cell cardiomyopathy, core pulmonale and mixed aetiology. The two patients with mixed aetiology of disease were one case of severe anaemia and valvular heart disease and the other of valvular and congenital heart disease (Figure 1).

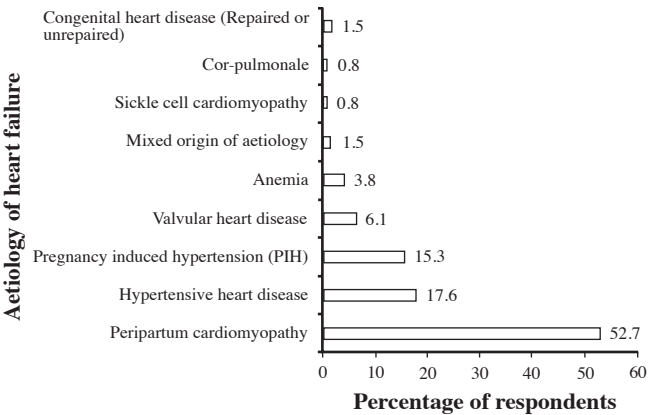


Figure 1 Aetiology of heart failure in pregnant and postpartum women at KBTH

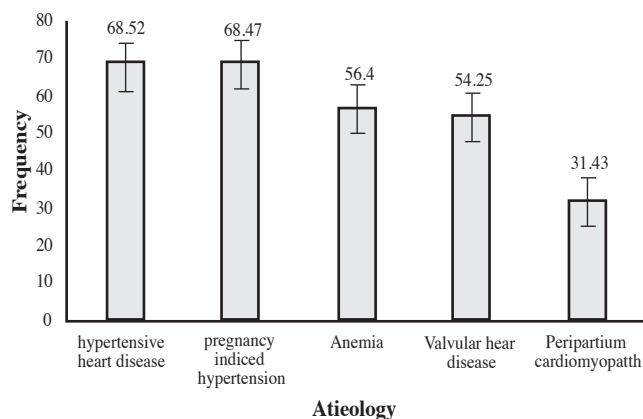
The most common factors found to be associated with heart failure among pregnant and post-partum women in the study were a history of PIH or Pre-eclampsia or Eclampsia in an earlier pregnancy (52.7%). History of dyslipidemia and smoking were found to be least risk factors (Table 3).

Table 2 Factors associated with heart failure in pregnancy and postpartum period

Variable	Frequency (%)
PIH/Pre-eclampsia/eclampsia in an earlier pregnancy	69 (52.7)
Personal history of chronic hypertension	41 (31.3)
Current history of PIH/pre-eclampsia/eclampsia	36 (27.5)
Family history of hypertension	36 (27.5)
Personal history of structural heart disease	11 (8.4)
Family history of heart disease	10 (7.6)
Family history of diabetes	10 (7.6)
History of alcohol intake	5 (3.8)
History of diabetes	4 (3.1)
History of dyslipidemia	1 (0.8)
History of smoking	1 (0.8)

More than half, 67 (51.1%) of study participants presented with New York Heart Association (NYHA) class III heart failure, 44 (33.6%) were in NYHA class II heart failure and 20 (15.3%) had NYHA class IV heart failure.

The mean Ejection Fractions (EF) for the five most frequent aetiologies of heart failure in pregnant and postpartum women is shown in figure 2 below: Patients who had peripartum cardiomyopathy had the least EF (mean 31.4%) while patients with hypertensive heart disease had highest EFs of 68.5% (Figure 2).

**Figure 2. Mean ejection fraction of the 5 major aetiologies among patients (p< 0.001)**

Discussion

The aim of this study was to assess the aetiology and associated factors of heart failure among pregnant and postpartum women admitted into the Korle Bu Teaching Hospital.

The prevalence rate of 0.9% pregnant women over the period of the study generally falls within the worldwide estimate of cardiovascular disease in pregnancy (including heart failure) which is estimated to be present in 0.1-4% of all pregnancies.¹ The prevalence of 0.9% in this study is however much lower than that in northern Nigeria where 4.2% of all patients referred for echos had Peripartum Cardiomyopathy (PPCM).²⁶ In fact Northern Nigeria has been reported in other studies to have the highest global prevalence of peripartum cardiomyopathy.^{27,28} Postpartum customary birth practices are associated with this high figure.

Akinwusi et al., also found hospital based incidence of maternal heart failure to be 2.2/1000 in South-west Nigeria.²⁹ Moreover, incidence rates of PPCM leading to heart failure in pregnancy was found to be 1 in 1000 pregnant women in South Africa and 1 in 3800 deliveries in Burkina Faso.^{22,30}

Peripartum cardiomyopathy was the leading cause of heart failure in pregnancy in this study (52.5%) followed by hypertensive heart disease (17.6%), Gestational hypertension (15.3%), valvular heart disease (6.1%) and severe anaemia (3.8%). Less common causes were congenital heart disease, sickle cell cardiomyopathy and core pulmonale. Comparing the present finding with most studies done in Sub-Saharan Africa, rheumatic valvular heart disease is a major aetiological cause of heart failure in pregnancy while this study found only 6% of respondents.^{13,31,32} This can be accounted for by the urban setting in which the study was conducted and the averagely high educational status of the women (at least SHS). It could also be accounted for by the fact that most of these studies were done over ten years ago and there could have been a major epidemiological shift in terms of aetiology since the time of those studies.

Nonetheless, rheumatic valvular heart disease remains a relevant challenge to be tackled in Sub-Saharan Africa as shown in a more recent study by Lumsden et al., who reported rheumatic heart disease among 75.3% of participants in Western Kenya³¹, compared to more industrialized countries where most of cardiac decompensation in pregnancy was due to repaired (mostly) or unrepaired congenital heart lesions as well as ischemic heart disease resulting often from advanced maternal age of childbearing.^{14,15}

Karaye and colleagues noted that Peripartum cardiomyopathy was common in North-western Nigeria.²⁶ In their study, 54 newly diagnosed patients with PPCM from 3 referral hospitals in Kano, Nigeria were followed up to assess 1 year survival in these patients. In a hospital-based study on incidence of maternal heart failure during pregnancy in Nigeria by Akinwusi et al.,²⁹ found 10 cases of heart failure over a 7-year review of hospital records. Seven out of the 10 (70%) had hypertensive heart failure.

This study found multiple preventable risk factors leading to heart failure in pregnant and postpartum women presenting to the Korle Bu Teaching Hospital. In this study, a history of PIH/Pre-Eclampsia/Eclampsia in a previous pregnancy was the most common risk factor associated with the development of heart failure from both hypertension and peripartum cardiomyopathy. However, patients with heart failure secondary to underlying hypertension were mostly found to have high blood pressure readings in the current admission. According to Ngayana et al., women with early onset pre-eclampsia are at an increased risk of future cardiovascular events.³³ Pre-Eclampsia/eclampsia has been shown to have a strong association with the development of peripartum cardiomyopathy from studies.^{33,34}

Patients with PIH and hypertensive heart disease had the highest mean of EF 68.4% and 68.5%, respectively. Builler et al., noted in their study that chronic hypertension and hypertensive disorders of pregnancy such as PIH and pre-eclampsia were

most frequently associated with preserved left ventricular ejection fraction³⁵ while patients with PPCM had the lowest mean ejection fraction of 31.4%, which fits in the definition for the PPCM criteria³⁶ of EF of less than 45%.

Conclusion

The prevalence of heart failure in pregnancy was 0.9% in this study, which is much lower than that in Northern Nigeria, but comparable to that of South Africa which was about 1% and much higher than that of Burkina Faso which was approximately 0.03%. The commonest aetiology of heart failure in this study was peripartum cardiomyopathy. Multiple preventable factors leading to heart failure in pregnant and postpartum women presenting to the Korle Bu Teaching Hospital were found in this study, chief among them being PIH and chronic hypertension.

Some limitations of the study included the fact that B-type Natriuretic Peptide (BNP) or N-terminal pro B-type Natriuretic Peptide (NT-pro BNP) which is very useful in excluding patients with non-cardiac causes of pulmonary edema could not be done owing to cost and accessibility challenges coupled with long waiting time for results during the time of the study. In addition, because study design was cross-sectional, causality could not be established.

Recommendations include conducting further longitudinal studies with controls to properly assess risk factors among this study population and possibly conducting a well-funded study to incorporate the use of useful biomarkers such as BNP and NT-pro BNP.

Conflict of Interest

The authors declare that they have no competing interest.

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Prevalence And Diagnosis Of Febrile Illnesses In Children Under Five Before And During The COVID 19 Pandemic

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Abstract

Introduction: Febrile illnesses are a common concern among children under five. Whilst prevalence and diagnostic investigations for febrile illnesses in this age group have been extensively studied globally, understanding its specific context in Ghana is crucial, particularly in the face of COVID 19 pandemic which also associated with fever. Incidentally, they contribute significantly to the burden of disease among children in low- and middle-income countries. In Ghana, febrile illnesses are a major health issue among children, leading to a substantial number of outpatient visits, hospital admissions, complications and death. Therefore, understanding true prevalence and diagnostic investigations is important.

Methods: This was a descriptive cross-sectional study with retrospective review of records using complete census of all children under five who had febrile illnesses and visited the Family Health

Hospital within the period of 1st January 2019 to 31st December 2020.

Results: Prevalence of febrile illnesses in 2020 was 825 out of 3,703 attendances of children under 5 representing 22.28% and this was lower than that of 2019 which registered 3,705 febrile illnesses cases out of 6,047 total attendances (61.27%). Malaria, Gastroenteritis, Rhinitis, Enteric Fever and Otitis media were the top five prevalent conditions in both 2019 and 2020 with malaria forming 40.19% and 40.52% for 2019 and 2020 respectively. Referral for diagnostic investigations prior to diagnosis and treatment was high for both 2019 and 2020 representing 77.52% and 75.52% respectively.

Conclusion: The study found the prevalence of COVID 19 was higher in 2019 than 2020. Education of caregivers and early treatment intervention can be undertaken to reduce risk of infection and mitigate adverse health outcomes.

Keywords: Febrile illnesses, COVID 19, descriptive cross-sectional study, complete census, prevalence.

Introduction

The World Health Organization (WHO) had announced on May 5th, 2023, that COVID-19 was no longer a public health emergency of global concern.¹

Though the pandemic is over, certain nuances of its effect such as patronage of health services and delivery of standard care to people, especially to children under the age of five who need a special level of care, have to be explored. One such area is the management of fever-related conditions during the

COVID 19 season. This emanates from the fact that the pandemic had fever as one of its key symptoms. According to Laurence et al., a temperature of over 37.5°C is defined as fever.² The expressions fever, fever-related conditions and febrile illnesses are used interchangeably in this study. This is because they essentially refer to the same thing albeit fever talks about the symptom or sign the patient presents with whilst fever-related conditions or febrile-illnesses more or less are diagnoses which have fever as key components. It is worth emphasizing that even before the onset of the pandemic, the World Health Organization in 2017 had stated that febrile illnesses are a significant public health concern, particularly in low- and middle-income countries where they contribute to a substantial burden of disease among children.³ Similarly, Roddy et al published a study in 2019 which stressed that Severe-Febrile-Illness (SFI) is a common cause of morbidity and mortality across Sub-Saharan Africa (SSA) and that burden of SFI in SSA is currently unknown and its estimation is fraught with challenges.⁴ This is due to a lack of diagnostic capacity for SFI in SSA. In West Africa, the high prevalence of febrile illnesses, including malaria, respiratory tract infections, and diarrheal diseases, pose significant challenges to the healthcare systems.⁴

Furthermore, the Ghana Health Service stated in its 2018 Survey that malaria, which is a major cause of fever, accounts for approximately 30% of all outpatient visits and 20% of all hospital admissions in children under five in Ghana.⁵ One in five children under five (20%), according to the Ghana Statistical Service (2014) had a fever in a survey conducted that same year.⁶ According to Ghana Demographic and Health Survey (2008), fever is most common among children age 12–23 months (26%). Among children who had fever, more than half (51%) were taken to a health facility or provider; 43% took antimalarial drugs; and 25% took antibiotic drugs. Children are most likely to be brought to a health facility in the Upper East region (76%) and least likely in the Central region (32%). Children in the wealthiest households are twice as likely to be brought to a

health facility compared with children living in the poorest households (80% versus 41% respectively). Seeking treatment for children with fever is higher in urban areas and increases with a mother's education.⁷

In a study published in 2022 after a scoping review was conducted from searching through different databases (Medline, Google Scholar, etc.) for original articles published between December 2019 and September 2021, it was revealed that there was a general reduction in the use of health services during the COVID 19 season. It was concluded that the impact of the pandemic on use of primary care services, were unmet health needs and inequalities in access.⁸

Methods

This study was a retrospective review of febrile cases reported in 2019. The data was obtained from the Hospital Automation Management System (HAMS) of the Family Health Hospital (FHH). The period of the study was between 1st January and 31st December 2019 representing the first batch of data for the period before COVID 19 whilst the second batch of data was between 1st January and 31st December 2020 which was during the COVID 19 pandemic seasons. The study site was Family Health Hospital, a private health facility located at Teshie, Accra-Ghana.

The study population comprised of all children whose ages were less than 5 years, attended the Family Health Hospital and had been diagnosed with at least one febrile illness within the study period. Their attendance was by virtue of referral, OPD attendance or emergency. Patients with missing or incomplete data were excluded. Also, patients who reported more than once with the same febrile condition during the period of the illness had their second and subsequent visits excluded, since all the cumulative visits were technically seen together as a single visit.

A complete census of the study population was used to enhance generalizability. A total of 9,752 consisting of 6,047 in year 2019 and 3,705 in 2020 were used for the study. A data abstraction form

was developed from Microsoft Excel purposely to extract the relevant information with the following sub-headings: demographic data such as age, sex, residential location, referral for investigations, and principal diagnosis.

Results

Prevalence of febrile illnesses in 2020 was 825 out of 3,703 attendances (22.28%), which was significantly lower than that of 2019 which had 3,705 cases out of 6,047 total attendances (61.27%)(Figure 1). Malaria, Gastroenteritis, Rhinitis, Enteric Fever and Otitis media were the top five prevalent conditions in both 2019 and 2020 with malaria forming 40.19% and 40.52% for 2019 and 2020 respectively (Table 1). Referral for diagnostic investigations prior to diagnosis and treatment was high for both 2019 and 2020 representing 77.52% and 75.52% respectively.

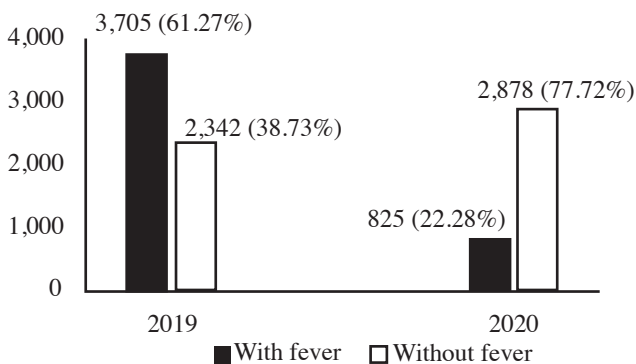


Figure 1 Distribution of prevalence of febrile illnesses among children under 5 for 2019 and 2020

Table 1 Prevalence of febrile illnesses by specific/principal diagnosis

Principal diagnosis	2019 Freq	%	2020 Freq	%
Malaria	2,303	40.19	436	40.52
Gastroenteritis	788	13.75	135	12.55
Rhinitis	745	13.00	88	8.18
Enteric Fever	379	6.61	46	4.31
Otitis media	244	4.26	91	8.46
Acute bronchitis	205	3.58	7	0.65
Sepsis	182	3.18	58	5.39
Urinary tract infection	192	3.35	25	2.32
Bronchopneumonia/chest infection	170	2.97	22	2.04
Tonsillitis	165	2.88	24	2.23
Sepsis	144	2.51	59	5.48
Conjunctivitis	82	1.43	10	0.93
Pyrexia	39	0.68	39	3.62
Otitis externa	33	0.58	17	1.58
Others	59	1.03	19	1.77
Total	5,730	100	1,076	100

Abbreviation: freq, frequency; %, Percent

Table 1 shows the most prevalent febrile illnesses presented at the Family Health Hospital in the years 2019 and 2020. “Others” include diverse diagnoses that appeared relatively less number of times. In 2019, some of the diagnoses in the other session were septic wounds, septic arthritis, parotitis, impetigo, folliculitis, skin sepsis, teething syndrome, pharyngitis, and sinusitis. In 2020, some of the conditions in the “other” category were, acute pharyngitis, skin sepsis, vulvovaginitis, urethritis, and teething syndrome.

Table 2 Referral for diagnostic investigations both years at FHH

	2019 cases	%	2020 cases	%
Number of patients referred for investigations	2,872	77.52	623	75.52
Number of patients not referred for investigations	833	22.48	202	24.48
Total febrile illnesses	3,705	100	825	100

This table shows all subjects who were diagnosed with febrile illnesses with our without confirmation by investigations. In 2019, it was found that 2,872 cases out of total 3,705 febrile illness cases were referred for diagnostic investigations and that represented 77.52%. In 2020, it was also realized that 623 cases out of 825 febrile illness cases representing 75.52% were referred for investigations before final treatment.

Discussion

This current review found that the prevalence of febrile illnesses in 2020 was 22.28% of all attendances, a decrease from 2019, which had 61.27%. Malaria was a significant contributor to these cases. General attendance at Family Health Hospital 2020 was 39% lower than that of 2019. This finding is similar to another study conducted in the UK by Aldridge et al which showed a decline in paediatric emergency by 34%,⁹ Meher et al., also reported a decline in outpatient attendance and indoor pediatric admissions of 60% and 49.8% respectively in India,¹⁰ and Chelo from Cameroun found a decline by 52% in general hospital attendance.¹¹ In Ghana, there was a decline in admissions at the Tamale Teaching Hospital (TTH) by 12% reported by Abdul-Mumin et al.¹² Perhaps, since TTH is a teaching hospital in the Northern region of Ghana and receives more emergencies and referrals from different hospital in the region, the drop was not as high as the 39% drop seen in this study at Family Health Hospital, a private hospital in the Greater Accra region, the southern part of Ghana.

Total prevalence of all forms of febrile illnesses was 61.27% and 22.28% for the years 2019 and 2020 at Family Health Hospital. The prevalence in 2020 declined almost three times that of 2019. The quantum of decline in the number of febrile illnesses far outstripped the drop in attendance in the year 2020. This could be accounted for by the fact that fever was one of the case definitions of the COVID-19, the rest being cough or difficulty in breathing. Parents of the children would prefer to stay home with their children who could be having fever and resort to other means of treatment such herbal or patronage of services from pharmacies as against coming to a hospital where they could contract the disease itself. Another assertion that gives credence to the decline in attendance is the fact that those cases that shared the similar symptoms with COVID 19 such as malaria, bronchopneumonia, rhinitis, and acute bronchitis had dropped. Acute bronchitis declined drastically than bronchopneumonia; perhaps as a result probably it presenting with features that mimicked COVID 19 disease in the perception of many people. Therefore, there was a paradoxical drop, albeit they could have been diagnosed as pneumonia and put on treatment if they sent such children to the hospital. All of that confirmed the report by Assefa et al., which revealed disruptions in access to health facilities and delays in fever diagnosis and treatment as due to fear of COVID 19 exposure.¹³ Other reasons that may be attributable to the decline in the prevalence could stem from morbid fear of getting diagnosed with the COVID 19 disease which would not only be dreadful but the treatment protocol which included quarantine for several weeks could obviously be a nightmare.

In addition, contracting COVID-19 gradually gained notoriety for stigma and name-calling in some communities in Ghana. Another possible reason could be as a result of increased handwashing practices, mask wearing and personal hygiene protocols that were trumpeted by the President of Ghana, heralded by the health agencies and the protocol subsequently integrated into public and private service points to reduce spread of COVID 19. A study by, Breman et al., reported that the prevalence of febrile illnesses contributed to 50% to

childhood morbidity in sub-Saharan Africa.¹⁴ This may be explained by the fact that Breman's study was an average figure from general reports of febrile illnesses in some selected Sub-Saharan African Countries. In other words, it is fair to infer that extremes of low and high cases of febrile illnesses in the various countries were making up the figure of 50% childhood morbidity and not necessarily specific to all countries, including Ghana. In another study conducted in 2023, the prevalence of febrile illnesses involving Sub-sahara African countries was stated as 40.1%.¹⁵ However, with this study, public facilities were the most frequently visited, accounting for 68.1%. A similar reason could be assigned to Dalaba's report published in 2021 which placed prevalence of febrile illnesses at 21%.¹⁶ This is because Kassena-Nankana District in the Northern Region of Ghana, where the study was conducted, has a low socioeconomic dynamics and that may account for low health seeking behaviour.

Malaria, gastroenteritis, rhinitis, enteric fever and otitis media were the top 5 febrile illnesses for both 2019 and 2020. There were not much changes in the diagnoses that came out as a result of febrile illnesses for both studies. Other diagnoses that had relatively lower frequencies however varied between the two years. Malaria was three times as high as gastroenteritis, the second commonest, in both 2019 and 2020. This may be explained by the endemicity of malaria in Ghana and other Sub-sahara Africa countries as corroborated by Kiemde et al., whose study placed malaria first, followed by diarrhoeal conditions.¹⁷ Though Kiemde's study was done in Burkina Faso, Ghana's neighbouring country. This is also not too different from a study by Mensah whose laboratory study in Ghana placed malaria as the main prevalent febrile illness.¹⁸ Perhaps similar febrile conditions exist between the two countries as a result of similar sociocultural and economic circumstances in Ghana and the neighboring country. Both 2019 and 2020 had similar high referral rates for investigation (77.52% and 75.52%

respectively) but lower than that of Prah et al.,¹⁹ who reported 84%. It was, however, higher than the figure quoted by Adorka et al.,²⁰ whose report stated that 17% were always sent for microscopic identification before prescribing antibiotics and 32% of samples were always sent for culture sensitivity tests. These differences could be explained by the fact that Prah's study was on the use of rapid diagnostic testing which could be done by doctors, nurses and other prescribers alike resulting in a higher figure. Even so, only 9% reported complete reliance on the results. This was significantly different from that of the results of this study which showed prevalence rates that emanated from different diagnostic forms. For a example, this most likely restricted medical consultation to trained prescribers whose propensity to request for investigations can be said to be evidence-based. The results were further limited by the fact that only 4 hospitals in Ghana, as well as 100 prescribers were selected for the study in Prah's publication and therefore it raised an issue of generalizability.

Conclusion

In conclusion, the study found the prevalence of febrile illnesses in children under 5 before COVID-19 pandemic was high in 2019 and markedly low in 2020; and this can be attributable to the pandemic which reduced attendance in health facilities for febrile illnesses globally. However, both 2019 and 2020 exhibited a high rate of referral for diagnostic investigations prior to final diagnosis and subsequent treatment, a clear demonstration of commitment to evidence-based medicine.

Conflict of Interest

The authors declare that they have no competing interest.

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Anthropometric Parameters Of Children With And Without Sick Cell Disease Admitted To The Department of Child Health, Korle Bu Teaching Hospital

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Abstract

Introduction: A key component in the comprehensive care of children with Sick Cell Disease is the monitoring of their nutritional status. This allows for the early detection of growth failure and related nutritional deficiencies. This study provides a valuable insight into the relationship between anthropometric parameters of children with and without Sick Cell Disease (SCD). It also informs the development of evidence-based interventions that can improve the health and well-being of affected children.

Aim: To determine the association between the anthropometric indices of children with and without Sick Cell Disease at the Korle Bu Teaching Hospital of Ghana.

Methods: This was a comparative cross-sectional study at the Korle Bu Teaching Hospital of Ghana. A systematic probability sampling method was used to recruit 50 children with Sick Cell Disease and 50 without the condition. The anthropometric parameters were measured and plotted on the World Health Organization standard growth

charts. Data was analyzed using IBM Statistical Package for the Social Sciences version 25.0.

Results: The prevalence of malnutrition among children with SCD who were above and below age 5 were 29% and 21.1%, respectively. This was higher than what was obtained for the control group (21% and 13%, respectively). The anthropometric characteristics of children with Sick Cell Disease and those without it did not correlate. A significant association was however observed between the anthropometric parameters of the children with SCD and their haemoglobin values as well as the prevalence of vaso-occlusive crises within the past year (p-value <0.05).

Conclusion: This study found that children with SCD were more undernourished than their non-affected counterparts. The number of vaso-occlusive crises and hemoglobin levels were significantly influenced by anthropometric characteristics. Malnourished children with Sick Cell Disease (SCD) were more likely to experience vaso-occlusive crises and low haemoglobin levels.

Keywords: Anthropometry, Malnutrition, Sick Cell Disease, Pediatrics

Introduction

Sickle Cell Disease (SCD) is a genetic blood disorder that is recognized as one of the most common chronic diseases among humans with different clinical manifestations. Around 5% of the world's population is estimated to have SCD and thalassemia-associated genes, World Health Organization (WHO).¹ The majority of children born with Sickle Cell Disease live in the developing world with an estimated 240,000 born annually from Sub-Saharan Africa.² In Ghana, 2% of all annual newborns suffer from sickle cell disease, with 25% of the general population being carriers of the Sickle Cell Gene.³

Childhood is a crucial time for a person's growth and development, particularly in terms of the processes involved in the body's biological maturation, and a balanced diet can help this mechanism work better.² A key component of comprehensive care for children with Sickle Cell Disease is the monitoring of growth and nutritional status, which enables early detection of growth failure and related conditions.⁴ Understanding the nutrient requirement for the age-group is crucial and demands complete attention because insufficient nutrient intake can lead to excesses or deficiencies, which severely jeopardizes the nutritional status.

Although there is a noticeable variation between the body shapes of children with SCD and those without SCD, the body mass index classification cut-off is regrettably the same for both groups of children.⁵ Stunting and undernutrition mark the nutritional status of sickle cell patients, but some surveys have shown trends of overweight in some countries.⁶⁻¹¹

There is limited information to guide the development of evidence-based interventions to enhance the health and well-being of affected children. The primary aim of this study was to examine the associations between the anthropometric parameters of children with and without SCD in a teaching hospital in Ghana.

Methods

This a comparative cross-sectional study carried out at the Department of Child Health Korle Bu Teaching Hospital (KBTH). The study population is made up of children with Sickle Cell Disease between the ages of 1 to 15 years who were attendants at the KBTH Paediatric Sickle Cell Clinic within the study period.

The control group was drawn from age-matched and sex-matched non-Sickle Cell Disease patients who were recruited from the outpatient department of the Department of Child Health (DCH), KBTH during the study period. The sample size was calculated using the Braxton-Health formula below:

$$n = \frac{(r+1)(p)(1-p)(Z\beta + Z\alpha/2)^2}{p_1 - p_2}$$

Fifty children with SCD (Cases) and fifty age-matched and sex-matched children without SCD were selected as the control group. Anthropometric measurements including weight, height, mid-upper arm circumference, and the haemoglobin levels of all participants were recorded, together with demographic details of the patients and their parents/caregivers. The Statistical Package for Social Sciences (SPSS) version 25.0 was used for the analysis. To investigate the relationships among the anthropometric indices, descriptive and inferential statistics were used. The Chi-square test of association was used to compare the anthropometric characteristics between the cases and controls. A Multivariate Analysis of Variance (MANOVA) was used to determine the association between anthropometric parameters and haemoglobin levels. The Wilks' Lambda test was used to determine the association between the number of vaso-occlusive crises among children with SCD in the previous year and their anthropometric parameters.

Ethical approval was obtained from the Ethics Committee of the Korle Bu Teaching Hospital and Family Health University College Ethics and Protocol Review Committee (FHUC-EPRC-0282023). Informed consent was obtained from the parents/caregivers and assent from children over 7 years. No personally identifying information was collected and the confidentiality of respondents was ensured.

Results

There were 64% (32) males and 36% (18) females in each group. In terms of age distribution, most of the respondents, (58%) in both groups, were between the ages of 7 and 15 years, 12% within the ages of 1 and 2 years, and the remaining were from the ages of 3 and 6 years, which represented 30% of the respondents in both groups as illustrated in Table 1.

Table 1 Demographic characteristics of Cases and Controls

Demographic Variable	Category	Case		Control		Total	
		Frequency	Percent (%) of group	Frequency	Percent (%) of group	Frequency	Percent (%)
Age Group (years)	1 – 2	6	12.0	6	12.0	12	12.0
	3 – 6	15	30.0	15	30.0	30	30.0
	7 – 15	29	58.0	29	58.0	58	58.0
Sex	Male	32	64.0	32	64.0	64	64.0
	Female	18	36.0	18	36.0	36	36.0
Class	Not in school	6	12.0	6	12.0	12	12.0
	Nursery	6	12.0	6	12.0	12	12.0
	Kindergarten	6	12.0	6	12.0	12	12.0
	Primary	20	40.0	20	40.0	40	40.0
	JHS	8	16.0	7	16.0	15	15.0
	SHS	4	8.0	5	8.0	9	9.0
Sex of guardian	Male	11	22.0	8	16.0	19	19.0
	Female	39	78.0	42	84.0	81	81.0
Level of Education of Guardian	None	1	2.0	1	2.0	2	2.0
	Basic	7	14.0	6	12.0	13	13.0
	JHS	4	8.0	5	10.0	9	9.0
	SHS	11	22.0	15	30.0	26	26.0
	Vocational	10	20.0	11	22.0	21	21.0
	Tertiary	17	34.0	12	24.0	39	39.0
Employment status	Employed	47	94.0	47	94.0	94	94.0
	Unemployed	3	6.0	2	4.0	5	5.0
	Retired	0	0.0	1	2.0	1	1.0
Occupation	Unemployed	3	6.0	3	6.0	6	6.0
	Professional	24	48.0	21	42.0	45	45.0
	Civil Servant	4	8.0	3	6.0	7	7.0
	Artisan	17	34.0	16	32.0	33	33.0
	Student	1	2.0	0	0.0	1	1.0
	Trader	1	2.0	7	14.0	8	8.0
Marital Status	Single	9	18.0	10	20.0	19	19.0
	Married	39	78.0	33	66.0	72	72.0
	Divorced	1	2.0	4	8.0	5	5.0
	Co-habiting	1	2.0	3	6.0	4	4.0
Ethnicity	Ga/Adangbe	12	24.0	16	32.0	28	28.0
	Akan	23	46.0	21	42.0	44	44.0
	Ewe	9	18.0	8	16.0	17	17.0
	Northerner	5	10.0	5	10.0	10	10.0
	Other	1	2.0	0	0.0	1	1.0

Weight for Height (WFH), Length/Height for Age (L/HFA), Weight for Age (WFA), and Mid Upper Arm Circumference (MUAC) were plotted for all participants below the age of 5 years (38). Body Mass Index (BMI) for Age and HFA was computed for all those over the age of 5 years (62). The comparison of the nutritional status of respondents in the cases and control groups are presented using tables.

From Table 2, many of the respondents in both groups had normal weight for height measurements. There were 73.7% (14) respondents in the cases group who were of normal weight as against 84.2% (16) of cases in the control group. Around 21% (4) of the respondents with SCD were found to be moderately malnourished compared to none from the control group. The Chi-square test was used to determine the association between the weight-for-height measurements for both groups. There was no significant association between the two groups.

Table 2 Weight for height for the cases and the control groups of under 5.

Weight for Height	Cases	(%)	Control	(%)	P value
Obese	1	5.2	1	5.2	0.10
Overweight	0	0.0	2	10.5	
Normal	14	73.7	16	84.3	
Moderately Malnourished	4	21.1	0	0.0	
Total	19	100.0	19	100.0	

It was observed that most of the respondents had normal height-for-age; 74% (14) of cases with SCD as compared to 63% (12) without the disease. Eleven percent (2) of the cases were stunted compared to 5.2 % (1) from the control group. The number of respondents in the control group who were tall for their age, 31.6% (6), was twice the number in the cases group who were in the same category, 15.8%. The chi-square test yielded a p-value of 0.475 which was not evidence enough to suggest a significant association between the two groups in terms of their height for age measurement

Many of the respondents in the two groups had normal Mid-Upper Arm Circumference (MUAC)

measurements; 84.2% (16) in the cases group and 89.5% (17) in the control group. About 16% (3) of participants in the SCD group were moderately malnourished as against 11% (2) in the control group. The chi-square was however 0.631. thus, failing to reject the null hypothesis.

In terms of weight for age, 22 (70.0%) of the respondents in the control group were either of normal weight, or overweight/obese. There were no reports of underweight among participants in the control group. In the SCD group, 73.7% (14) of respondents were of normal weight, compared to 89.5% (17) in the control group. Malnourished responders made up 21.1% (4) of the SCD group. This indicates a higher prevalence of malnutrition among children with SCD than those without the disease. The p-value was, however, 0.099.

Table 3 shows the distribution of participants based on their BMI for age, i.e. for both cases and controls. This was calculated for all participants over the age of 5 years. A large proportion of the interviewees in the two groups were noted to be of normal weight: 77.4% (24) in the control group and 67.8% (21) in the case group. Compared to the control group's 13% (4), respondents in the SCD group's 29% (9) respondents were significantly thinner. The chi-square test however yielded a p-value of 0.343.

Table 3 BMI for age for both the SCD and Non-SCD of groups 5 years and above.

Weight for Height	Count	(%)	Count	(%)	p value
Obese	1	3.2	1	3.2	0.34
Overweight	0	0.0	2	6.4	
Normal	21	67.8	24	77.4	
Thinness	4	12.9	1	3.2	
Severely Thin	5	16.1	3	9.8	
Total	31	100.0	31	100.0	

In the control group, the mean haemoglobin level was observed to be 11.99g/dl, while in the cases group, it was found to be 8.62g/dl. Furthermore, the spread or variability of haemoglobin levels differed between the two groups. The standard deviation of haemoglobin levels was 2.18 for non-SCD patients, while for SCD patients, it was 1.62. A p-value of <0.001 was obtained indicating a significant association between

the categorical anthropometric measurement and haemoglobin levels.

It was shown that 44% of Cases had no incidence of vaso-occlusive crises in the previous year, whereas the remaining 66%(66) had at least one episode. About 6% of respondents reported experiencing at least three episodes of vaso-occlusive crises in the previous year. Further analysis of the crises revealed that 42.8%(28) of the respondents who had at least one crisis over the past year mainly suffered from hyper-hemolytic crisis accompanied by the passage of cola-colored urine.

Table 4 shows the distribution of participants with SCD based on the number of admissions in the previous year. About 85.8% of SCD patients who experienced at least one crisis in the previous year were admitted to the hospital at least once.

The majority of those who had at least one admission (21/24,87.5%) were diagnosed with abdominal vaso-occlusive crises, 29%(7) presented with chest discomfort, and 16.7% (4)with bone pain crises.

Table 4 Number of Admissions among SCD respondents.

Number of Admissions	Frequency	Percent (%)
0	4	14.2
1	12	42.8
2	8	28.6
3	2	7.1
4	2	14.3
Total	28	100.00

The Wilks' Lambda test was used to determine the association between the number of vaso-occlusive crises and the anthropometric parameters. The p-value obtained was <0.001 indicating a significant association between the categorical anthropometric measures and the prevalence of vaso-occlusive crisis.

Discussion

The nutritional status of SCD and non-SCD patients were compared using the Z-scores of weights for height, weight for age, height for age, BMI for age,

and MUAC for both groups. The findings from the current study differ from that of a study by Mukherjee and Gangakhedar (2004)⁸ who found that in comparison to healthy children of the same sex and age, male and female SCD patients were shown to have reduced weights, heights, sitting heights, mid-upper arm circumferences, skin fold thickness, and body mass indices. These findings lead to the conclusion that SCD patients tend to be smaller, shorter, and undernourished than Non-Sickle Cell Disease children. It is also different from a study by Osei-Yeboah and Rodrigues (2011)¹² who found that 61.3% of SCD patients were malnourished as compared to 28.35% of non SCD patients. This is however similar to that of Mitchell et al.,⁹ who found out that children with SCD generally exhibit normal growth during childhood and adolescence although 5-10% are at risk of poor growth or obesity. In all of the anthropometric indices between the SCD and non-SCD, it was observed that there was no significant association between the indices and the respondents. Therefore, it can be inferred that the prevalence of undernutrition among participants with SCD has improved over time. This improvement may be ascribed to health education initiatives and improved SCD patient health care services, including enhanced functioning of sickle cell clinics, various treatment options, and routine monitoring.

The mean haemoglobin level among SCD patients in this study is lower than non-SCD patients and there is also greater variability in haemoglobin levels among the non-SCD patients than SCD patients. Comparing the findings from this study to that of a study conducted by Islam et al.,⁵ in Nigeria, the mean haemoglobin levels obtained were slightly lower than what was obtained in the current study. A significant association was noted between anthropometric measurements and haemoglobin levels of children with SCD. Mandese et al., demonstrated that low body weight and BMI might adversely affect total haemoglobin levels.⁷ Dos Santos et al., on the nutritional status of children and adolescents with Sickle Cell Disease observed that, there was a significant association between the nutritional status of children and adolescents with SCD and their haemoglobin levels. SCD patients are known to have low haemoglobin levels despite their nutritional status as compared to non-Sickle Cell

Disease children.⁴ This is similar to findings from the current study in which a significant decrease in the haemoglobin levels of children with SCD compared to those without the disease was noted. This may be attributed to the underlying genetic basis of the disease.⁵

A research on the management of vaso-occlusive crisis in Sickle Cell Disease, Yale et al., found that the most prevalent sites of discomfort were the chest, abdomen, and back.¹³ Salako et al., 2020 on the pattern and severity of vaso-occlusive crises in SCD patients found that the commonest sites of pain were the extremities (upper and lower limbs) though pain in the lower limbs were commoner.¹⁴ Sixty-six per cent of the SCD patients in this study experienced at least one crisis in the previous 12 months. Haemolytic crises accounted for 42.8% of all reported crises, with abdominal pain and acute chest syndrome (chest pain) following closely behind. This may be explained by the fact that the majority of study participants were dehydrated and were at risk of malaria and other infectious diseases that may have predisposed them to haemolysis.

From the current study, the highest number of admissions within a year reported by a participant was 4 and this was reported by 14.3% of the participants. Most of the participants representing 42.8% of those with SCD had been admitted once, whilst 14% had no admission within the past year. These findings are contrary to what was found in a systemic literature review of 1436 literature on the frequency of vaso-occlusive crises in SCD patients. It was reported that the proportion of patients experiencing ≥ 3 VOCs/year ranged from 4 to 67% and the proportion of

patients experiencing ≥ 5 VOCs/year ranged from 18 to 59%.¹⁵ This is likely because of the limitation in our sample size compared to the other studies.

The limitations of this study include no consideration made for participants' dietary habits, medication schedule, and level of physical activity, however comparison of demographically match cases and controls could mitigate this limitation.

Conclusion

The findings of this study indicate that the prevalence of undernutrition among respondents with SCD was relatively higher than those without the condition. There was no significant association between the nutritional status of children with and without SCD. A statistically significant association was however obtained between the anthropometric measurements and the haemoglobin levels of participants from the two groups. Among the children with sickle cell disease, the number of vaso-occlusive crises that occurred in the previous year is also statistically and significantly influenced by their nutritional status.

Acknowledgement

The authors are grateful to the Department of Child Health, KBTH for the support during the study. Appreciation also goes to the parents/guardians and children for participating in this study.

Conflict of Interest

The authors declare that they have no competing interest.

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Factors Affecting Antihypertensive Adherence Among Pregnant Women Receiving Antenatal Care At A Private Hospital, Ghana

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Abstract

Introduction: Hypertension is a chronic medical condition of elevated blood pressure (systolic/diastolic of 140/90 mmHg or more). Gestational hypertension is hypertension that occurs after 20 weeks of gestation in pregnant women with previously normal blood pressure. Adherence to antihypertensive treatment is crucial for effectively managing hypertension during pregnancy.

Aim: The aim of this study was to elucidate the factors affecting antihypertensive adherence among women receiving antenatal care.

Methods: This cross-sectional study used questionnaires to collect data on adherence to medications during pregnancy. Inclusion criteria were women attending antenatal care clinic at Family Health Hospital. Data collected were analyzed using the Statistical Package for Social Sciences (SPSS) version 27 and the results were summarized using frequency tables, percentages, pie charts, mean and standard deviation.

Results: There were 150 respondents. Risk factors of hypertension in pregnancy included salt intake 147 (98.0%), obesity 144 (96.0%), advanced maternal age 137 (91.3%), and family history 40 (26.7%). Almost all (149, 99%) of the respondents knew untreated hypertension risked maternal and fetal health. Most participants knew symptoms of high blood pressure included (148, 98.7%) and severe headache (124, 82.7%). Using scores (mean $\pm$ standard deviation) factors influencing medication non-adherence included forgetfulness (3.02 ± 0.39 of 5), concern about safety of medication mean 2.99 ± 0.433 and cost of the medications (2.93 ± 1.2).

Conclusion: The participants of the study were aware of the prevalence and risks of hypertension in pregnancy. Forgetfulness, safety concerns about medications and financial barriers caused non-adherence to antihypertensive during pregnancy. Education to ensure adherence to treatment is key as this ensures optimal blood pressure levels, a key element in the management of hypertension during pregnancy.

Keywords: Adherence to antihypertensive, chronic medical conditions, eclampsia, pregnancy-induced hypertension

Introduction

Hypertension is a chronic medical condition characterized by elevated blood pressure (systolic and diastolic blood pressures of 140/90 mmHg or more).¹ It is becoming more prevalent, and as such,

is emerging as one of the most important chronic conditions of public health concern.² The key element in the management of hypertension is adherence to treatment to ensure optimal blood pressure levels.³ Antihypertensive medications and diet are the first line in the management of high blood pressure.³

Pregnancy-Induced Hypertension (PIH) refers to conditions characterized by blood pressure rising during pregnancy and it is classified into gestational hypertension, preeclampsia, and eclampsia.¹⁻⁴ Pregnancy-induced hypertension or Gestational hypertension is defined as hypertension occurring after 20 weeks of gestation in women with previously normal blood pressure.^{2,3} Preeclampsia without severe features is characterized by systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg or both and mostly with proteinuria.¹ Preeclampsia with severe features involves systolic blood pressure ≥ 160 mmHg or diastolic blood pressure ≥ 110 mmHg or both, or related symptoms and laboratory abnormalities.² Eclampsia is a severe type of pregnancy-induced hypertension involving elevated blood pressure and associated seizures, and it happens in about 1 in 1,600 pregnancies.^{2,4} Pregnancy-induced hypertension is a major contributor to maternal and perinatal morbidity and mortality. In the United States, about 15% of maternal deaths are attributable to hypertension, making it the second leading cause of maternal mortality.⁵ In Ghana, hypertensive disorders were found to complicate 12.7% of pregnancies in a major hospital, making it one of the most common medical disorders during pregnancy.⁶ Pregnancy complicated with hypertensive disorder is related to an increased risk of adverse fetal, neonatal and maternal outcomes.⁷ Severe hypertension increases the mother's risk of cardiac failure, heart attack, renal failure and cerebral vascular accidents.⁵ In addition, the fetus is at increased risk from complications like poor placental transfer of oxygen, growth restriction, preterm birth, placental abruption, stillbirth and neonatal death.⁵ Globally, hypertensive disorders represent the most common medical complications of pregnancy with a reported incidence of 5–10%.⁸ The World Health Organization estimates that at least one woman dies every seven minutes from complications of pregnancy-induced hypertension disorders.⁹

Non-adherence to medication can contribute significantly to treatment failure.¹⁰ Adverse effects, complex dosage schedules, and lack of understanding

of the condition are some of the topmost factors associated with poor adherence to anti-hypertensive medications in the general population and also in pregnant women.³ Good adherence to treatment for chronic hypertension and for pregnancy-induced conditions of elevated blood pressure, such as gestational hypertension, is important to optimize health outcomes for the mother and the fetus.¹¹ Thus, the objectives of the study are to assess adherence to anti-hypertensive medication by pregnant women and to identify the factors associated with adherence or non-adherence.

Methods

This cross-sectional descriptive study was done in the Family Health Hospital, located in Teshie, the Greater Accra region, Ghana from 4th to 31st March, 2023. The study population comprised of pregnant women who attended Antenatal Care (ANC) clinic at the Family Health Hospital at the time of the study. The inclusion criteria were pregnant women who were able to provide informed consent to participate in the study. The exclusion criteria were women who were unable to read the questionnaire, understand the written English or the explanation in the local language provided by the principal investigator or the research assistant helping in administering the questionnaire. The purpose of the study was explained to all participants who signed a consent form. Data was collected using self-administered questionnaire or an interviewer-administered questionnaire to participants who were less fluent in English and needed explanation in the local language of choice to help them answer correctly. The questionnaire included question about socio-demographics, knowledge on risk factors of hypertension, treatment, reasons for non-adherence to medications and the effect of hypertension on pregnancy outcome. Results were analyzed using SPSS version 27 and data was summarized using frequencies, percentages, pie charts, mean and standard deviation. Approval for the study was granted by the Ethical and Protocol Review Committee of the Department of Community Health, Family Health Medical School FHUC-EPRC-005/2023).

Results

One hundred and sixty of the 200 women approached met the inclusion criteria for the study. 152 agreed to participate and 2 were excluded for incomplete sociodemographic data. The sociodemographic data

of participants is shown in table 1. The majority of the participants (60.7%) were in the 19–28 years old range, most were married and all of them were religious. Eighty percent of the participants had more than primary education and 52% were self-employed.

Table 1 Sociodemographic Characteristics of study participants

Variable		Frequency	Percent
Age	<18	15	10
	19-28	91	60.7
	29-38	42	28
	39-48	2	1.3
Religion	Christian	102	68
	Muslim	48	32
Marital status	Married	118	78.7
	Single	17	11.3
	Cohabiting	15	10
Education level	No formal education	10	6.7
	Primary school	20	13.3
	Junior high school	22	14.7
	Senior High school	73	48.7
	Tertiary	25	16.7
Occupation	Unemployed	20	13.3
	Self-employed	78	52
	Government employee	48	32
	Private employee	4	2.7

Perceived risk factors for hypertension included salt intake 147 (98.0%), obesity 144 (96.0%), advanced maternal age 137 (91.3%) and family history 40 (26.7%). Most of the participants (124, 82.7%), believed hypertension can occur in pregnancy and

symptoms that can be associated with hypertension during pregnancy include: high blood pressure (98.7%), swelling (80.7%) and headaches (82.7%) (Table 2)

Table 2 Knowledge of symptoms associated with hypertension during pregnancy

Variable N (%)	True N (%)	False N (%)	Uncertain N (%)
High Blood Pressure	148 (98.7)	2 (1.3)	-
Swelling of hand and feet	121 (80.7)	29 (19.3)	-
Severe Headache	124 (82.7)	24 (16.2)	2 (1.3)
Blurred vision	40 (26.7)	84 (56.0)	26 (17.3)

Abbreviation: N, Frequency; %, Percentage of response

The majority (135, 90%) of respondents had ever been prescribed antihypertensive medications during pregnancy or lactation, in the previous or current pregnancy. Key factors that contribute to non-adherence to antihypertensive are shown in Table 3. The table includes mean scores (range of scores from 1 to 5) and standard deviations for each reason. The three most prominent reasons for medication non-adherence were forgetfulness (mean 3.02, SD 0.392), concerns about medication safety for the baby (mean 2.99, SD 0.433), and cost of medication (mean 2.93, SD 1.202).

Table 3 Key factors that contribute to non-adherence to antihypertensive medications

Variable	Mean score	STD
Forgetfulness	3.02	.392
Concerns about medication safety for the baby	2.99	.433
Cost of medication	2.93	1.202
Lack of understanding of adherence importance	2.13	.877
Cultural or religious beliefs	2.09	.827
Side effects experienced	1.80	.927

Abbreviation: STD, Standard Deviation

Using cross tabulation, there was no significant association between age group, religion, marital status, and occupation ($p > 0.05$) in this study (Table 4). However, knowledge level shows a significant association with adherence ($p = 0.02$). Individuals with high knowledge levels tend to have better adherence compared to those with average or low knowledge levels.(Table 5)

Table 4 Bivariate and multivariate analysis of risk factors

Variable	Good Adherence N (%)	Poor adherence N(%)	p-value
Age group			0.72
<18	4(26.7)	11(73.3)	
19-28	38(41.8)	53(58.7)	
29-38	17(40.5)	25(59.5)	
39-48	1(50.0)	1(50.0)	
Religion			0.17
Christian	23(47.9)	25(57.1)	
Muslim	37(36.3)	65(53.7)	
Marital Status			0.91
Single	7(41.2)	10(58.8)	
married	53(39.8)	80(60.2)	
Education			0.49
No formal Education	5(50)	5(50)	
Primary	8(40)	12(60)	
Junior High School	12(54.5)	10(45.5)	
Senior High School	25(34.2)	48(65.8)	
Tertiary	10(40.0)	15(60.0)	
Occupation			0.77
Government em- ployed	21(43.8)	27(56.3)	
Private employed	1()26.0)	3(75.0)	
Self employed	29(45.0)	49(62.8)	
Unemployed	9(45.0)	11(55.0)	
Knowledge			0.02*
High	42(47.7)	46(52.3)	
Average	15(34.9)	28(65.1)	
Low	3(15.8)	16(84.2)	

Abbreviation: N, Number or respondents; % percentage participants; *, Significance ($p < 0.05$)

The multiple regression analysis (bivariate and multivariate) between various independent variables and adherence to anti-hypertensive medication shows only knowledge of participants have significant association with adherence with anti-hypertensive medication with Crude Odds Ratio (COR) of 5.0 (95% C.I. 1.10-47.1) and an Adjusted Odds Ratio (AOR) of 4.7 (95% C.I. 1.14-38.50) (Table 5).

Table 5 Bivariate and multivariate analysis of risk factors

Variable	COR (95% C.I)	AOR (95 % C.I)
Age group		
>28	1.03(0.51-2.15)	1.05(0.47-2.28)
≤28		
Religion		
Christian	1.01(0.80- 3.24)	1.01(0.81- 3.15)
Muslim		
Marital status		
Single	1.06(0.37-2.84)	1.08(0.39-2.91)
Married		
Education		
No Formal Education	1.54(0.42-5.56)	1.59(0.41-4.54)
Formal Education		
Employment		
Unemployed	1.26(0.49-3.27)	1.25(0.48-3.25)
Employed		
Knowledge		
Poor	5.0(1.10-47.1)	4.7(1.14-38.50)
Good		

Discussion

Adherence to treatment for chronic and pregnancy-induced hypertension is important to optimize health outcomes for the mother and the fetus. Most pregnant women in this study knew that hypertension occurs in pregnancy, they were able to correctly identify some symptoms and risk factors associated with hypertension in pregnancy, and knew that untreated hypertension could affect both the mother and baby. High levels of knowledge (82.7%), majority of the respondents revealed that they did receive information or education about hypertension during pregnancy from a healthcare professional.

Regarding risk factors of hypertension, the majority of respondents believed obesity is a potential cause of hypertension during pregnancy, which is in tandem with the findings of Bellamy who stated that obesity is a risk factor for PIH.¹² The majority of respondents did not perceive PIH to be genetic or have a link to family history, which

opposes the findings of Zhang et al., which says PIH may be influenced by genetics.¹³ However, this study agreed with Zhang et al., and Roberts et al. that advanced maternal age was associated with PIH.^{13,14} Another risk factor is the high intake of salt, highly perceived by the respondents in this study to be a risk factor for PIH, in agreement with Heaman et al., who mentioned bad eating habits as a risk factor.¹⁵ Regarding symptoms that can be associated with hypertension during pregnancy, most participants identified high blood pressure, swelling in the hands and feet and severe headaches as symptoms of PIH which is true according to the Magee and American College of Obstetricians and Gynecologists (ACOG).^{2,3} However, in contrast to what these authors mentioned, this study had the majority having mixed feelings of blurred vision being a symptom of hypertension.

In contrast to a study by Kaufman and Birks, respondents in this study reported high rates of counseling from healthcare providers.¹⁶ This difference may be due to the attention patients receive from this private hospital which specializes in maternal health care with high level obstetricians and gynecologists.

The average knowledge on the potential side effects of anti-hypertensive which include dizziness, nausea, fatigue, and birth defect, were very low as compared to what was shared by the Mayo Clinic.¹⁷

The study revealed that majority of the pregnant women missed their prescribed antihypertensive medication during pregnancy as a result of forgetfulness just as Kaufman and Birks postulated.¹⁶ A common reason medication that was prescribed was missed could be attributed to negligence. Another factor that may contribute to missed medication is concerns about medication safety for the baby. The study reported an average level of concern. This suggests that some pregnant women have reservations regarding the safety of antihypertensive medication for their babies, which may influence their adherence behaviour. This assumption that medication non-adherence is based exclusively on lack of knowledge fails to recognize

that there are other factors which need to be considered to give a broader picture of the problem of non-adherence such as patient's beliefs.¹⁸ The lack of understanding about the importance of medication adherence suggested a low level of understanding among respondents, indicating that some pregnant women may not fully comprehend the significance of adhering to their prescribed antihypertensive medication regimen.¹⁸ Finally, the cost of medication emerged as a potential barrier to adherence. This indicates that the financial burden associated with obtaining antihypertensive medication may vary significantly among pregnant women, potentially influencing their ability to consistently adhere to their prescribed treatment.

The limitation of the study was the inability to distinguish between the types of antihypertensives which were used by the respondents making it seem that over 90% of the participants were on antihypertensives. This was not anticipated during the pretest and could have affected the prevalence of hypertension among pregnant women. However, the focus of the current study was on factors affecting the adherence so the knowledge that most of them had ever been prescribed antihypertensive treatment was an added value, knowing respondents have experience on the subject matter. The strength of the study is the fact that it reported respondents' real experiences and motives for adherence or non-adherence to antihypertensive in pregnancy.

The results suggest that many pregnant women, for lack of understanding of the benefits of antihypertensives, may default on management leading to adverse pregnancy outcomes. We therefore, recommend extensive explanation of the benefits of adherence to antihypertensive treatment in pregnancy to help increase adherence for positive outcome.

Conclusion

The study revealed that majority of pregnant women recognized that hypertension can occur during pregnancy. The study identified symptoms associated with hypertension during pregnancy, including high blood pressure, Swelling of hands and feet, and severe headaches. Respondents strongly affirmed that untreated hypertension during pregnancy poses risks to both the mother and the baby. The study emphasized that non-adherence to prescribed medication was influenced by factors beyond lack of knowledge, such as forgetfulness. Thus, further studies must be conducted to properly elucidate more factors affecting antihypertensive adherence in order to effectively manage hypertension and increase positive outcomes among women during pregnancy.

Acknowledgement

The authors would also like to thank Professor Timothy Johnson and the team from University of Michigan for listening to the presentation and giving valuable comments to improve the manuscript.

Funding

This was provided by Schweitzer Michi-Ghana Medical Student Research Grant through Michigan University funded by Mrs. Elaine Schweitzer to enable the study to be undertaken successfully.

Conflict of Interest

The authors declare that they have no competing interest.

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Prevalence And Factors Associated With Post-Caesarean Section Wound Sepsis In A Private Hospital In Ghana: A Retrospective Audit

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Abstract

Introduction: Post-Caesarean Section wound sepsis remains a significant concern in maternal healthcare, particularly in low-income countries such as Ghana. Various risk factors can contribute to the prevalence of Post Caesarean Section (CS) wound sepsis, including obesity, diabetes, immune-suppressive disorders, previous CS, medication use, lack of pre-incision antimicrobial care, prolonged labour, and surgery.

Aim: This study aimed to investigate the prevalence and risk factors associated with post CS wound sepsis at Family Health Hospital over a one-year period.

Methods: A retrospective audit analysing electronic patient records of all women who underwent CS delivery between January 1, 2019 and December 31, 2019, at Family Health Hospital was conducted. Data collection and analysis were conducted using Microsoft Excel and IBM SPSS version 25, respectively. Statistical tests, including chi-square analysis, were employed to examine the association

between selected independent variables and the prevalence of surgical site infection.

Results: The prevalence of post CS wound sepsis in this study was 5.17% which is within the normal global prevalence range. The number of CS done was equally distributed with an average of 9 procedures per month. There was no statistically significant relationship between the risk factors studied such as Antepartum infection, Anaemia, and Post CS wound sepsis.

Conclusion: This study aimed to contribute valuable insights into the prevalence and risk factors of post CS wound sepsis, which could inform discussions and strategies to reduce maternal mortality rates, particularly in resource-constrained settings for safe CS delivery and post-operative care. By identifying key risk factors, healthcare providers and policymakers can implement targeted interventions to improve obstetric care and outcomes for women undergoing CS delivery in low-income countries.

Keywords: Sepsis, post-caesarean section infection, surgical site infection, maternal healthcare

Introduction

Caesarean Section (CS) is one of the most common obstetric procedures in Ghana. Post CS wound sepsis constitute a substantial burden on health systems in developing countries.¹ Post CS wound sepsis is one of the most common complications for patients who have undergone CS.² It is a widespread contributing factor to maternal mortality.² Some studies suggest its increase could be due to antimicrobial resistance.³ Furthermore, post CS wound sepsis can lead to septic shock if poorly managed. The current global post CS wound sepsis prevalence is 3.7-24.2%.⁴ Studies in some Low-and-Middle-Income Countries (LMIC) such as India and Brazil reported incidence rates of 24.2% and 11-25%, respectively.⁵ However, post CS infection rates in High-Income-Countries (HIC) appears to be lower, for instance the National Nosocomial Infection System (NNIS) in the USA, reports an incidence of 3.5% in low-risk women and 8.11% in high-risk women. The risk factors observed for CS wound infections are obesity, diabetes, immune-suppressive disorders, a previous CS, medications like steroids, lack of pre-incision antimicrobial care, prolonged labour and surgery.⁶ CS is usually done under aseptic conditions, nevertheless, the risk of post CS wound sepsis always exists which puts post CS wound sepsis as one of the most common nosocomial infection.⁷ The rate of CS surgery is increasing globally and thus, wound sepsis – the most common complication of CS, is also increasing by 3-15%.² In Ghana, the rate of CS is 6.59% and women age 30-34 years are more likely to have a CS.⁸

In health facilities that do not have the capacity to carry out CS safely or treat post CS complications, wound sepsis is associated with maternal mortality rate of up to 3%.⁹ In Sub-Saharan Africa post CS wound sepsis ranges between 1.7%-10.4%.¹⁰ This has been attributed to poor access to health care services which is below 3% and thus, leading to poor postnatal follow-up and wound care.¹¹ In the African context, post CS wound sepsis is associated with poverty, environmental pollution, poor pre-operative care, malnutrition, anaemia, wound contamination, poor antibiotic selection and poor immunity.¹²

The majority of post CS wound sepsis have pathogens that are methicillin-resistance, thus, this poses as a healthcare challenge due to the limited class of drugs available in several health centers.¹³

It goes without saying that, in order to meet the goal set by the United Nations' Sustainable Development Goal (SDG) 3.1, we must aim to drastically reduce post-caesarean section wound sepsis. Tackling this challenge also has benefits for the health care system since post CS wound sepsis leads to prolonged hospital stays. Implementing regular hand hygiene, keeping wounds clean and covered, strict aseptic preparation of surgical sites, appropriate antibiotic prophylaxis and appropriate use of theatre wear are steps to mitigate post CS wound infection. The use of monofilament sutures, subcuticular sutures and covering surgical incisions with dressings able to absorb exudates are some of the best practices to be adopted.¹⁴ This study aimed to investigate the prevalence and risk factors associated with post CS wound sepsis at the study site over a one-year period.

Methods

This research was conducted at Family Health Hospital (FHH), a 24-hr private hospital with a 70-bed capacity located in Teshie, a coastal town in the Ledzokuku Municipality, in the Greater Accra Region of Ghana. The hospital functions as a general community hospital with specialist services that include obstetrics and gynecology and pediatrics. A retrospective audit of patient records of all women who were delivered by CS at FHH in a 1-year period between 1st January, 2019 and 31st December, 2019 was done. Patients' electronic records were accessed to identify women diagnosed with post CS endometritis or surgical site infection. Patients' information on clinical course, outcome, subsequent hospital admission, repeat surgery, severe morbidity and mortality were captured.

Data collected was initially entered into Microsoft Excel and later transferred to IBM SPSS version 25 for analysis. The results were analyzed using frequencies, means, proportions and percentages and were presented in summary tables and charts. Chi-square test was performed on categorical data

to test association between selected independent variables and the proportions of women with surgical site infection.

Results

A total of 114 women were identified as having delivered by Caesarean Section (CS) in the study period (1 January, 2019 – 31 April, 2019). Nine (9) women were excluded, due to minimal or lack of clinical records. Finally, a total of 105 patients with complete records were included in the analysis, with an average of 9 procedures per month. Most of the women (73%) were between the ages of 31 and 40 (Figure 1), while the mean age was 33.7 years and a standard deviation of 2.67.

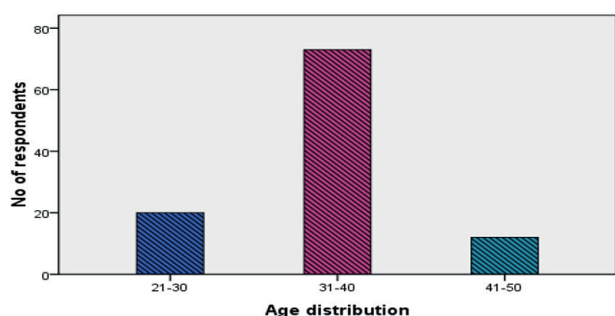


Figure 1 Age distribution of the study population.

Sixty-three percent of the women were multiparous at the time of CS. None of the women were found to have smoked cigarettes either before or during the pregnancy. Approximately 86.7% of the women had only their weight available without their respective heights and therefore BMI could not be calculated.

Majority (69.5%) of the women had blood hemoglobin (Hb) > 11g/dl before the procedure. Only 1 (0.95%) of the women was known to be HIV positive, however there was no additional information such as when the diagnosis was made, when antiretroviral therapy was started or compliance with therapy. Diabetes Mellitus was diagnosed or known in 6 (5.71%) of the women. This included both pre-gestational and gestational diabetes.

Hypertensive disorders were present in 16.2% of the women included. This included preeclampsia. The

number of women who had antepartum infection were 21 (20%). The gestational age in completed weeks at delivery ranged from 35 to 42 weeks. Also 21 (20%) went into labour before caesarean section was performed. Those with a history of Premature Rupture of Membranes (PROM) before CS were 7(6.7%) and 6 women (5.71%) were identified with post CS wound sepsis. Anaemia, HIV, diabetes, hypertension, antepartum infection, hemoglobin, labor prior to CS, premature rupture of membranes (PROM) did not show significant relationship with post CS wound sepsis in our study.

Discussion

This study was a retrospective audit of records of women who delivered by CS at Family Health Hospital (FHH) to ascertain the prevalence and risk factors associated with Post-Caesarean Section wound sepsis at Family Health Hospital, Teshie, Greater Accra Region.

Out of the 105 women who delivered by CS, the prevalence of post CS wound sepsis identified was 5.7%. This results agrees with the current post CS prevalence rate of 3.7 to 24.2% of Wloch et al.⁴ However, studies in some Low-and-Middle-Income Countries (LMIC) such as India and Brazil reported incidence rates of 24.2% and 11-25%, respectively, which is higher than the results from the current study.⁵ Firstly, the low prevalence rate reported in our study can be attributed to the small numbers used in our study and also the study site being a private hospital with lower patient doctor ratio. Secondly, there is high quality of care among CS births in this private hospital with special obstetrics and gynaecology interest with strict adherence to infection prevention protocols and aseptic techniques during wound management.^{5,6}

Another reason for the low prevalence observed could be that, majority of the women (69.5%) were older and multiparous (60%). Younger age and nulliparity have been positively correlated with increased risk of post CS wound sepsis even though the cause remains unclear.⁴ This may also explain why age was not found to be significantly associated with post CS wound sepsis (p-value = 0.170) in our study.

Anaemia has commonly been described as an associated factor for the development of post-operative sepsis.¹ However, in this study anaemia as risk factor did not show statistical significance (p -value = 0.285). This could be likely due to a very low prevalence of anaemia, given that only 3 (2.86%) patients with post CS wound sepsis presented with a Hb below 11g/dL. This contrasts sharply with that of a South African study, where anaemia was present in 39.4% of participants who later succumbed to pregnancy-related wound sepsis, as severe anaemia can cause reduced resistance to sepsis and slower recovery from infection.¹

HIV infection was not found to have any statistical association with post CS infection in this study. Earlier reports have observed that women living with HIV infection have a higher risk of post CS wound sepsis especially when they are not yet on Highly Active Antiretroviral Therapy (HAART) or have low Cluster of Differentiation 4 (CD4) count, WHO stage 3 or 4 disease or with opportunistic infections.¹⁵ It is possible that the only woman who was found to be HIV positive was on HAART and as such was not vulnerable to opportunistic infections that will result in post CS wound sepsis.

In the current study, diabetes was not found to be a statistically significant risk factor for post CS sepsis (p -value = 0.535) as none of the women with diabetes (5.71%) developed post CS wound sepsis. The highest risk of sepsis existed in women with pre-gestational diabetes, but those women with gestational diabetes were also at increased risk.¹⁶ Great care should be taken in the FHH setting to achieve optimal glycaemic control, to decrease other risks related to diabetes in pregnancy. The great majority of women had well-controlled blood glucose level with little, or no target-organ involvement by the time of delivery. This, together with the relatively low numbers in general, might explain the lack of statistical significance found in this study.

Hypertension was found not to be a statistically significant risk factor for post CS sepsis (p -value = 0.974). In this study, this can be attributed to a very low rate (5.9%) of hypertensive disorders with post CS wound sepsis in the study population.

Nevertheless, women suffering from hypertensive disorders in pregnancy have been shown to have an increased risk of developing post CS wound sepsis.¹ This can be explained by the good care rendered to women at the FHH setting to achieve diserable blood pressure control, in order to decrease other risks related to hypertension in pregnancy.

The presence of active antepartum infection, such as chorioamnionitis, urinary tract infections have been well established by previous reports as a significant independent risk factor for post CS sepsis, especially endometritis.¹⁷ However, the index study did not yield a statistically significant (p -value = 0.747) result as only 33% of the women who presented with antepartum infection had evidence of sepsis after CS.

Women in active labour prior to CS have been found to be independent risk factor for post CS sepsis.¹⁸ The study acknowledges the previously proven association between active labour and post CS sepsis and postulates that this was not used in the index study due to very few women with both active labour and sepsis (1%).

Conclusion

This study was the first audit done on post CS sepsis in the FHH setting. From the study, post CS sepsis showed a prevalence of 5.17% that compares with the current global prevalence. Further studies can be conducted to explore the experiences of patients with post CS sepsis and its predictors.

Conflict of Interest

The authors declare that they have no competing interest.

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What Drives Client Choices? Factors Influencing Optical Frame Selection At Korle-Bu Teaching Hospital Eye Centre

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Abstract

Introduction: Visual impairment is a significant global health concern and there is growing demand for optics and optical frames. The factors affecting the choice of optical frames may be varied as a result of changing personal or society needs.

Aim: To determine the factors affecting the choice of optical frames in the Korle Bu Teaching Hospital.

Methods: This was a cross-sectional study conducted at the Lions Eye Centre of the Korle Bu Teaching Hospital. Data was entered using Excel and exported to be analyzed using Statistical Package for Social Sciences -23 (SPSS 23). Analysis was descriptive and association tests using the Chi-square test and forest plots to find statistically significant variables ($p < 0.05$).

Results: From the study, 80 out of 100 participants answered they liked optical frames, 16 responded

that they did not like them and 4 did not respond. The mean age $\pm$ standard deviation of the respondents was 36.1 ± 16.2 . Over half (55.4%) of the respondents had obtained tertiary education. Among the respondents, 43% were formally employed, 29% were informally employed and 18% unemployed. Two (2) people received high-income, 46 and 26 persons respectively received medium and low incomes, whilst the rest did not disclose their wealth index. A significant association was found between the age of participants and the choice of optical frame.

Conclusion: From the study, only age was a significant factor that influenced the choice of optical frames. It is desirable for the department to stock a variety of frames according to the age range of the clients.

Keywords: Optical frames, refractive error, vision correction, visual impairment

Introduction

Visual impairment is a significant global health concern as over 70% of the workforce requires vision correction.¹ Persons with visual impairment because of refractive error range from 82 million to 184 million, comprising one-third to nearly half of all those with impaired vision.² It has been documented that 35% to 85% of persons with a refractive error in developing countries are without glasses, even among groups with a strong requirement for highly accurate vision such as professional drivers.^{3,4}

Also, one out of every four children have a vision problem even though 80% of all learning takes place visually in children.⁵ Approximately, 30% to 60% of rural Chinese secondary students have myopia (spherical equivalent -0.50 diopters in both eyes), whereas, nearly two-thirds of these children do not own or wear appropriate glasses.⁶ Refractive error is associated with significant decrements in self-reported visual function in these children.⁵⁻⁶ About 143 million adults (64% of the adult population) wear prescription eye wears. These prescription eye wears include the use of

reading glasses, eye protections such as goggles and sunglasses.^{3,7,8} Glasses, also called spectacles or eyeglasses, are devices made up of glass or hard plastic lens mounted in a frame that holds them.⁹ About 75% of eyeglasses frame purchases are for frames of \$150 or less.^{3,10}

Choice of frames are influenced strongly by various factors. When choosing frames for fashion and clinical purposes various factors are considered which include color, quality, brand and makeup.¹¹ Generally, the makeup of optical frames has become significantly modernized and hence institutions like hospitals should pay attention to it and adapt. Glasses that are to be provided for clients must always be available, affordable, beautiful and comfortable. As other Sciences like plastics, reconstructive surgery and prosthetics meet emotions, psychological and fashionable needs of their client, so should optics.¹⁰ This study aims therefore, to highlight significant factors contributing to the choice of optical frames at the Korle-Bu Teaching Hospital.

Methods

This was an observational cross-sectional study conducted at the Optics Unit in Lions Eye Center of the Korle-Bu Teaching Hospital (KBTH). It is a tertiary teaching facility and has a full complement of staff for effective Eye Health delivery. The study population consisted of patients assigned to the Optic center to take glasses at the facility. Inclusion criteria were patients between the ages of 15 to 60 years diagnosed to take or replace glasses at the Optics Unit. Exclusion criteria were patient who did not consent to participate and patients who could not read English to fill the forms or did not understand the language of the interviewer for a verbal explanation in the local language. The sample size was calculated from Cochran's formu-

lae for sample determinations for a cross-sectional study.^{7,9} A total of 100 participants were included in the study. Approval for the study was sought from the Ethical and Protocols Review Board of School of Dispensing Optics, Oyoko. Permission was obtained from the Eye Centre at KBTH to allow access to patients' data. The collection of data was from 3rd March 2020 to 20th June 2020 after approval of the study. Information required was read in English and/or explained in other local dialects (Twi or Ga) for clients who could not see properly or understand English. The data captured had two main parts. Socio-demographic and factors affecting optics frame choices. All information was carefully taken and checked to reduce error and missing data. To ensure confidentiality, names of participants did not appear on any report. The data was analyzed with excel and statistical package for Social Science (SPSS) version 23.0 software. Simple frequency, percentages, mean, standard deviation, and cross-tabulations computed were used to describe the data. Chi-square and logistic regression (inferential statistics) were used, and statistical significance set at a confidence level of 0.05.

Results

There were 55 female and 45 male respondents. From the results, the mean age $\pm$ Standard deviation of the respondents was 36.1 ± 16.2 . Over half (55.4%) of the respondents had obtained tertiary education and 97% had at least primary education. Forty-three percent (43%) were formally employed, while 29% were informally employed. Forty-eight (48%) respondents were within medium to high income status and 18 were unemployed (Table 1).

Table 1 Socio-demographics of participants.

Variable	Frequency	Percentage
Gender		
Male	45	45
Female	55	55
Total	100	100
Age Group		
18-24	19	19
25-34	33	33
35-44	15	15
45-54	9	9
55+	18	18
Unknown	12	12
Total	100	100
Level of education		
No education	2	2
Primary	4	4
JHS	9	9
SHS/Vocation/Technical	28	28
Tertiary	56	56
Unknown	1	1
Total	100	100
Income status		
Low (690 and below)	26	26
Medium (690-5110)	46	46
High income (5110 above)	2	2
Unknown	26	26
Total	100	100
Employment status		
Formally employed	43	43
Informally employed	29	29
Unemployed	18	18
Retired	6	6
No response	4	4
Total	100	100

As shown in Table 2, majority (80%) of respondents liked optical frames and the choice of frames depended on multiple factors. However, from the Student T test analysis, only age was significantly associated with the choice of optical frames (p=0.00).

Table 2 Distribution of participant’s preference in features of frames

Variable	Frequency	Percentage
Do you like optical frames		
Yes	80	80
No	16	16
No response	4	4
Total	100	100
Will go for any frame		
Yes	64	64
No	34	34
No response	2	2
Total	98	100
Look out for brand		
Yes	54	54
No	43	43
No response	3	3
Total	100	100
Look out for color		
Yes	71	71
No	28	28
No response	1	1
Total	100	100
Look out for design		
Yes	75	75
No	23	23
No response	2	2
Total	100	100
Look out for durability		
Yes	87	87
No	11	11
No response	2	2
Total	100	100
Wearing a frame without a lens		
Yes	32	32
No	66	66
No response	2	2
Total	100	100
Look for other purposes		
Yes	61	62
No	37	37
No response	2	2
Total	100	100
To effectively maintain optical frames		
Yes	68	68
No	30	30
No response	2	2
Total	100	100

Of factors associated with preference, the odd ratios (ORs) were higher in choosing any (2.6; 95% CI: 0.63-15.23) and durable frames (2.17; 95% CI: 0.26-10.03) than preference for specific colors (0.88; 95% CI: 0.24-3.63), designs (0.85; 95% CI: 0.22-4.23) or branded products (0.57; 95% CI: 0.16-1.09). Factors such as income level, education level or gender did not show statistically significant associations with the choice of optical frames. (Figure 1)

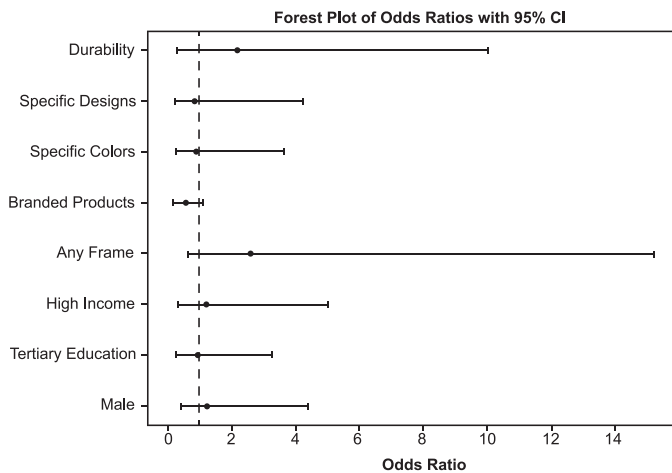


Figure 1 Odds ratio using forest plots

Respondents equally agreed or were neutral (30% each) concerning spending for a quality frame. However, they were more neutral (34%) on concerns about the price of optical frame (Figure 2).

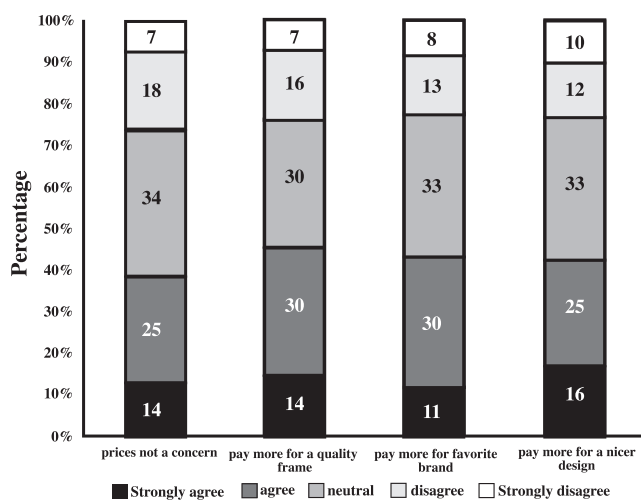


Figure 2 Assessment of features clients are willing to spend on

Discussion

The study highlights the factors affecting the choice of optical frames. The results show that the mean age of the respondents (36.1 years) was lower and 97% had at least primary education which were different from a previous study in another geographic area in the same country (mean age = 39.2 years, SD = 11.8 years) and 95% of the participants had at least basic education).¹¹ Eighty percent of our respondents, as compared with 91% of respondents in another study, like optical frames.² With regards to overall adoption, a study conducted in Ghana revealed that there was low spectacle coverage in the population, with most people not patronizing spectacles even when necessary.¹⁴ The study highlights the critical need for educational initiatives aimed at addressing the widespread lack of awareness regarding the necessity of spectacles. While cost was identified as a significant concern, it is important to note that this study was not population-based, which limits the generalizability of its findings. Nevertheless, the data revealed that the cost of services remains a substantial barrier to the utilization of spectacles.¹⁴

The results indicate that respondents exhibited a neutral stance towards pricing, with a willingness to pay more for higher-quality frames. The mean willingness to pay for a more aesthetically pleasing design was average and moderate. This finding suggests a potential market for stylish and affordable eyewear, indicating that consumers are open to investing in products that combine quality with design. In contrast to findings from a European study, which noted that frame selection was influenced by various factors such as eye condition, face shape, skin tone, eye color, personality, and lifestyle, this study did not observe similar trends among its participants.^{14,15,16} This discrepancy may highlight cultural differences in attitudes toward eyewear and the factors influencing purchasing decisions.¹³ Additionally, a UK study found that only 3% of 1,074 individuals were inclined to undergo eye examinations, largely due to financial barriers.^{14,17} This reluctance to invest in optical frames reflects a broader trend of unwillingness to prioritize eye care when faced with cost considerations.^{13,17,18}

Overall, the findings suggest that there are significant differences in the factors affecting the choice of optical frames across various regions. While age plays a significant role in determining the likelihood of people taking optical frames, the cost of service and financial barriers can hinder the use of spectacles.

In conclusion, the findings of this study reveals the importance of further research to explore the specific factors influencing individuals' decisions regarding eye care. Future studies could benefit from a population-based approach to provide a more comprehensive understanding of the barriers

to spectacle utilization. Additionally, investigating the effectiveness of different educational strategies could help identify the most impactful methods for raising awareness about the importance of eye health. Education and promotion are necessary to address the lack of awareness about the need for spectacles, and the willingness to pay more for quality frames is a key factor in the choice of optical frames.

Conflict of Interest

The authors declare that they have no competing interest.

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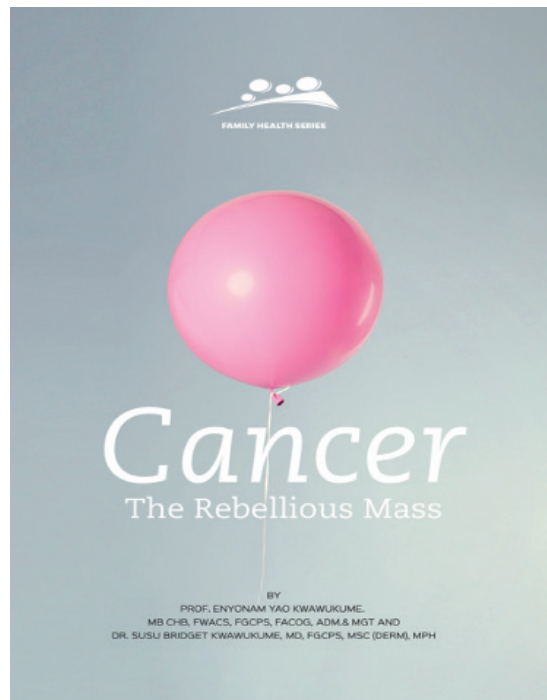
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BOOK REFLECTION

Cancer, The Rebellious Mass

By Prof. Enyonam Yao and Dr. Susu Bridget Kwawukume



CANCER is noted for its abnormal growth and it can be described as a tumour which has “rebelled” and starts multiplying abnormally in the body. If the process is not diagnosed and treated quickly, it could result in suffering, pain and eventual death. There are various types of cancer of the body. They could occur in the mouth, throat, intestines lungs, skin, prostate in men and the gynaecological cancers that affect the womb and its attachments in women. Though both men and women have breasts, the female breasts develop cancers more often than the male breasts.

Causes of cancer

The process that lead to cancer, the treatment and the cure have long been known but the causes of cancer and why it occurs is largely unknown. It is known that the body grows, makes new cells and renews broken down cells. It is also true that the body cells could repair themselves with new ones and or replace dead cells. This is why in times of injury or accidents, the body repairs the skin perfectly and hardly do you see one layer of the skin growing over another. This happens because the body has its own ways of mechanisms that limit the growth of abnormal cells. In terms of cancer cells, they grow and cause damage without “obeying” the natural process. In its advanced stage, it cannot be restricted. In short, these are abnormal cells from tumours that compete with normal cells and take over the command nature of the body. Some of these tumours are not dangerous and could easily be removed, while others could kill quickly. Our lifestyle and the environment predispose us to various cancers. Exposure to industrial agents or chemicals, found in our homes and work places, increases the risk of cancer. Smoking is the number one known cause of lung cancer so the best way to prevent it is to refrain from smoking.

Warning signs of cancer

Cancer can affect any part of the body and any change in bowel or bladder habits should raise suspicion. If over some time you start having diarrhoea or diarrhoea alternating with constipation, then you should tell your doctor to advice. Other times cancer could present itself as a sore that does not heal. Some signs of cancer of the female reproductive organs could be abnormal bleeding or offensive discharge. A hard lump or mass in the breast should be treated with seriousness. In fact, any hard lump in any part of your body could be cancer. Some people could have difficulty in swallowing, suffer from indigestion or might develop nagging cough and later develop hoarseness of voice. Since it is relatively easy to manage the early stages of cancer, we need to know the ways in which it is spread and be aware of the warning signs to prevent it from spreading to other areas of the body.

Potential benefits of screening

In screening, you do not have to wait and see a mass on the body before acting. Screening is done for normal people who do not have any complaints. The advantages are numerous, including detection of early cancer. It also helps to treat patients quickly and would certainly reduce hospitalization. It is not always the case that abnormal findings are detected. Many times, the results are within normal limits and you will be reassured and have the self-satisfaction that things are normal. Cost effective use of healthcare resources could benefit the country and the best doctor is oneself.

Treatment

The cure for advance cancer is difficult and survival depends on how early the disease is diagnosed. You might be operated on or given special drugs but the best approach to lung cancer is prevention by quitting smoking. There have been a lot of discussions on smoking and lung cancer and it is hoped that individuals would accept a change and refrain from smoking. Gone are the days when smoking was associated with affluent standard of living. Cancers are more common in the elderly but early detection through screening and timely intervention have the potential for complete cure and better quality of life.

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