POSTGRADUATE MEDICAL JOURNAL OF GHANA

GHANA COLLEGE OF PHYSICIANS & SURGEONS

PRO VITA SCIENTIA

Vol. 6 No. 2 ISSN: 2026-6790 September 2017

GHANA COLLEGE OF PHYSICIANS & SURGEONS

Postgraduate Medical Journal of Ghana

Journal of the Ghana College of Physicians and Surgeons

All correspondence in connection with the journal should be addressed to:

The Editor-in-Chief
Postgraduate Medical Journal of Ghana
P. O. Box MB 429
Accra, Ghana
Tel: 233-302-238650/230703
Fax: 233-302-256727
E-mail: pmjg@gcps.edu.gh
Web: pmjg@gcps.edu.gh/journal

EDITORIAL

OPERATIVE LAPAROSCOPY

Although laparoscopy has been practiced globally for over 100 years, the practice of operative laparoscopy (laparoscopic surgery) in its true sense has been in practice for only a few decades. The first laparoscopic cholecystectomy was performed in 1985 and started the operative laparoscopic revolution. Prior to this, however, the German gynaecologist Kurt Semm is credited with performing laparoscopic appendicectomy in 1981.

Laparoscopy has thrived with the improvement in technology. From the initial possibility of fibreoptics that made it possible to transfer images to a monitor and tree hands to operate, there have been refinements in image technology, and other accessories including robotics and telemedicine that have made the possibilities.

Developing countries have lagged behind in the practice of laparoscopy for various reasons, the prime one being cost. Acquiring the basic equipment for laparoscopic surgery is usually the first hurdle. The cost of maintenance of equipment in the face of inconstant and fluctuating power supply, and cost of consumables are also mitigating problems to deal with. Some centres in Ghana and other African countries are making a very modest effort at catching up by employing laparoscopic surgery and other endoscopic techniques. There are many advantages of laparoscopy (including shorter hospital stay and return to normalcy, less pain and better cosmetic outcome) and our patients should not be denied these advantages with the excuse that we are poor. Many of the rich in our countries travel abroad to have these operations anyway.

In this edition, surgeons from one of the leading hospitals in Ghana describe their modified laparoscopic approach to appendicectomy, the commonest general surgical emergency operation. This is commendable. To be relevant in a fast-changing world in which we lag so far behind, we have to not only be prepared to move with the times; we must be innovative and relevant, we must address our peculiar problems, as the authors have done by considering cost reduction and the problem of keloids in their method of laparoscopic appendicectomy.

Joe-Nat A Clegg-Lamptey
School of Medicine and Dentistry
University of Ghana

ORIGINAL ARTICLES

CALCIUM SUPPLEMENTATION FOR THE PREVENTION OF PREGNANCY INDUCED HYPERTENSION/PREECLAMPSIA

Omonua KI[1], Akaba GO[1], Isah AY[1,] Offiong RA[2], Ekele BA[1]

[1]College of Health Sciences, Department of Obstetrics and Gynaecology, University of Abuja Teaching Hospital, Abuja, Nigeria, [2]Department of Obstetrics and Gynaecology, University of Abuja Teaching Hospital, Abuja, Nigeria

Abstract

Background: Pregnancy induced hypertension (PIH) and preeclampsia (PE) contribute significantly to maternal and perinatal morbidity and mortality. The role of calcium supplementation towards preventing PIH/PE however remains unclear.

Objective: To assess the efficacy of calcium supplementation in prevention of PIH and PE.

Materials and methods: An open label, randomized controlled trial conducted at the antenatal clinic of University of Abuja Teaching Hospital between July 2014 and June 2015. A total of 484 nulliparous women 16 weeks or less gestation and with normal blood pressures were randomly assigned to either receive 1200mg of calcium tablet daily (N=242) or not to receive calcium tablets (N=242) from 16weeks until delivery. Primary outcome measure was development of PIH or PE and secondary outcome measure was preterm birth.

Results: The incidence of PIH was 7.7% among the intervention group compared to 13.7% in the control, p=0.039 and calcium supplementation reduced the risk of PIH (RR=0.56 (95% CI: 0.32-0.98)), but not PE. It also prolonged the duration of pregnancy in women who developed PIH (p=0.02). Incidence of preeclampsia was not significant, RR-0.56 (95% CI: 0.21-1.52) so also was the incidence of preterm delivery between the two groups (RR-0.65 (95% CI: 0.32-1.31)). No serious maternal side effects of treatment were recorded.

Conclusion: Calcium supplementation during pregnancy reduced the risk of PIH and thus may have a role in the prevention of PIH amongst nulliparous women. Its role in the absolute prevention of PE was not demonstrated in this study.

Key Words: Calcium supplementation, pregnancy induced hypertension, preeclampsia, preterm delivery, Nigeria.

Introduction

The hypertensive disorders of pregnancy (pre-existing hypertension, gestational hypertension, and preeclampsia) remain important causes of maternal and perinatal morbidity and mortality, especially in low and middle-income countries[1]

Preeclampsia is a multi-systemic disorder with a poorly understood aetiology, pathogenesis and pathophysiology. However, recently it has been postulated that it is a two-stage disease with an imbalance between angiogenic and anti-antigenic factors[2]. Its pathogenesis is also suggested to be related to disturbances in placentation at the beginning of pregnancy, followed by generalized inflammation and progressive endothelial damage[3]. Although previous systematic reviews on the role of calcium supplementation in pregnancy had suggested a beneficial effect towards preventing pregnancy induced hypertension and preecampsia[4,5,6] its routine use in pregnancy has only recently been recommended by WHO for pregnant women in areas with low dietary calcium intake and especially in those at high risk of developing pre-eclampsia[7]. Studies from Nigeria suggests that the dietary intake of calcium by pregnant and non-pregnant populations are low[8,9,10]. The local application of the results of the aforementioned systematic reviews as well as implementation of the WHO recommendation is limited by the non-existence of supporting evidences or studies from African obstetric populations apart from Egypt and South Africa. This research gap formed the basis of this study. Information obtained from this study would be beneficial towards policy change as regards implementation or further evaluation of the WHO recommendation on calcium supplementation in pregnancy in Nigeria and other developing countries in Africa.

Corresponding Author: **Dr Kate. I. Omonua**
College of Health Sciences, Department of Obstetrics and Gynaecology, University of Abuja Teaching Hospital, Abuja, Nigeria
Tel. No.: +2347034665935 / +2348181893355
Email Address: kateodogwu@yahoo.com
Conflict of Interest: None Declared

Materials and Methods

This was an open label randomized controlled trial to assess the efficacy of calcium supplementation in the prevention of pregnancy induced hypertension/ preeclampsia in nulliparous women. The study was conducted at the Department of Obstetrics and Gynaecology of University of Abuja Teaching Hospital, Abuja, Nigeria between June 2014 and July

2015.Healthy nulliparous women at gestational ages of 16 weeks or less and with blood pressures less than 140/ 90 mm Hg were enrolled into the study. Exclusion criteria included patients with blood pressure ≥140 and/or 90 mm Hg at first antenatal visit, history of diabetes mellitus, chronic hypertension, hyperparathyroidism, renal calculi or renal disease, twin gestation, report of frequent use of calcium supplements or antacids and refusal to give consent. Random numbers were computer generated and allocation concealed by use of sequentially numbered, opaque, sealed envelopes. The eligible women were randomly assigned into the treatment arm or control arm of the study. Those in the intervention arm received 1.2 g of elemental calcium daily. They were instructed to take 2 tablets (600mg) in the morning and 2 tablets (600mg) in the evening in addition to all other standard treatment (haematinics). Those in the control group received all other standard treatment except calcium supplementation. Ingestion of the tablets was only to commence from after the 13th week of gestation and until delivery, diagnosis of preeclampsia and/or eclampsia, or suspicion of urolithiasis. Once preeclampsia or eclampsia occurred, the patient was treated as per the hospitals standard protocol. Other information obtained included gestational age which was calculated based on best available estimate; the women's recollection of the date of their last menstrual period or earliest ultrasound scan estimate where they were not sure of their last menstrual period, age, weight and blood pressure. Surveillance for hypertension and proteinuria was conducted using standardized measurements of blood pressure and urinary protein excretion at scheduled clinic visits, during the hospitalization for delivery, and reviews of the medical records until 24 hours postpartum. Blood pressure was recorded with a mercury sphygmomanometer with the subject seated for ≥5 minutes with the cuff at the level of the heart on the right arm. Diastolic blood pressure was determined by using the fifth Korotkoff sound unless a measurement was zero, in which case the fourth sound was used. Voided urine was collected for the measurement of protein by dipstick and proteinuria of 1+ (300 mg per liter) confirmed by testing a clean-catch, midstream sample. The women returned all unused tablets at every study visit and at the time of hospitalization for delivery. Compliance was then computed by dividing the number of used tablets by the total number of prescribed tablets. The primary outcome was the development of pregnancy induced hypertension /preeclampsia while secondary outcomes included preterm delivery (<37 weeks of gestation), Caesarean section, maternal admission to intensive care unit, severe preeclampsia, placental abruption, HELLP syndrome, death of mother, low birth weight, admission in the neonatal intensive care unit and perinatal death. The sample size of each arm of the study was calculated using the formula for randomized controlled trials. A study sample of 484 women was therefore estimated to have a 90% probability of detecting differences in the development of Pregnancy Induced hypertension /Preeclampsia at p=0.05. All women were initially included in the group to which they were assigned but those lost to follow up were however not included in the final analysis. Data was analyzed using Statistical Package for Social Science (SPSS version 20). Comparison of outcomes was performed in groups with risk ratio and at 95% CI. Tests of associations for categorical variables were done using Chi square or Fisher's exact test while student's t-test was used for continuous variables. Poisson's regression analysis was used to adjust for potential cofounders which included age and body weight.

Ethical Considerations

Ethical clearance for this study was obtained from the Research and Ethics Committee of the University of Abuja Teaching Hospital.

Results

Results

Data were unavailable for 9 women (3.7%) in the calcium group and 23 women (9.5%) in the control group. This was due to mid trimester miscarriages in 8 women (1.7%) and failure to deliver in the hospital facility with loss of contact in 23 women (5.0%) and death in one woman (0.4%) (Figure1).

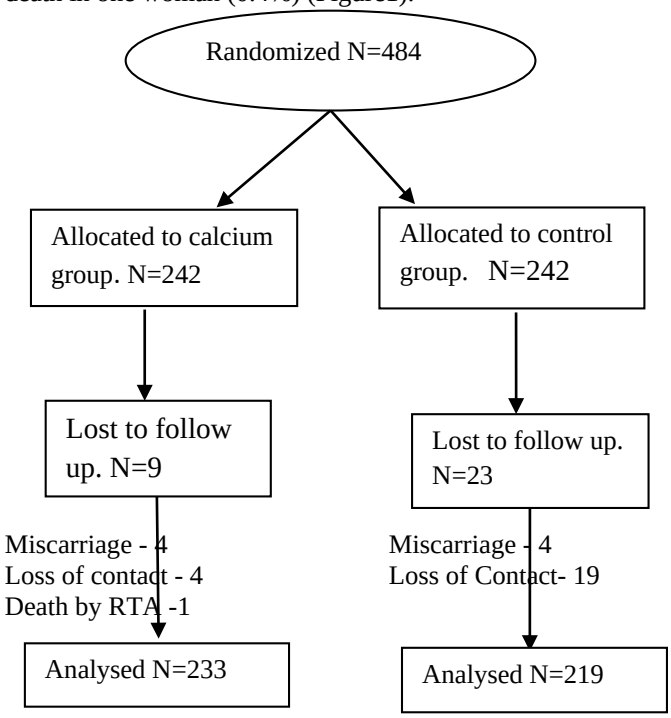

Figure 1: Trial Profile

Table 1: Characteristics of Women in the treatment and control groups at commencement of the study

Characteristic	Calcium (n=242)	Control (n=242)	P value
Maternal age (years)*	27.6(4.4)	27.8 (4.3)	0.626
Weight at booking *	67.9(11.0%)	68.1(12.9%)	0.859
Blood pressure at entry* Systolic (mmHg) Diastolic (mmHg)	 109.2(9.5) 66.5 (7.3)	 109.0(11.5) 66.9(9.3)	 0.840 0.610

*Values as mean (SD) ** Values as number (%) of women;

Table 2. Effect of calcium supplementation on incidences and severity of pregnancy induced hypertension and preeclampsia in the intervention and control groups.

Hypertensive disease At any stage of pregnancy*	Calcium n=233	Control n=219	Relative risk	95%CI	P Value
PIH	18 (7.7)	30(13.7)	0.56	0.32-0.98	0.039
Mild	10(4.3)	24(11.0)	0.39	0.19-0.80	0.010
Severe	8 (3.4)	6 (2.7)	1.25	0.44-3.55	0.671
Preeclampsia	6 (2.6)	10 (4.6)	0.56	0.21-1.52	0.259
Mild	2 (0.9)	2 (0.9)	0.94	0.13-6.62	0.950
Severe	4 (1.7)	8 (3.7)	0.47	0.14-1.54	0.212
Overall incidence of PIH and PE	24(10.3)	40(18.3)	0.56	0.35-0.90	0.017

Values are as number (%) of women; PIH = pregnancy-induced hypertension; PE=preeclampsia CI = confidence interval

Table 3: Obstetric Outcomes

Outcome	Calcium n=233	Control n=219	Relative risk	95%CI	P Value
Gestational age at delivery <37 weeks >37 weeks	 12 (5.2) 221(94.8)	 18(8.2) 201(91.8)	 0.65 1.02	 0.32-1.31 0.89-1.17	 0.220 0.808
Mode of delivery Vaginal Instrumental vaginal delivery Caesarean section	 162(69.5) - 71(30.5)	 163(74.4) - 56 (25.6)	 0.91 1.15	 0.77-1.07 0.84-1.56	 0.254 0.385
Induction of labor Abruptio placentae	32 (13.7) 4 (1.7)	18 (8.2) - -	1.59 8.46	0.92-2.80 0.45-156.26	0.094 0.151

Values as number (%) of women;

Compliance with supplementation was 60.4%, with 44(18.8%) women stopping the trial medication during the antenatal period. The most frequent reason given was that of abnormal taste (12.9%) and side effects like nausea and vomiting (6.0%). For those that did not deliver in our facility, delivery information was obtained via phone interview and consequently, information on Apgar scoring in this group of patients was missed. Table 1 shows the baseline characteristics of the participants. The mean age of the study participants was 27.7± 4.4 years and there was no statistically significant difference between the mean ages of the two groups (27.6 vs. 27.8 years, P=0.626). Other baseline characteristics at the time of entry into the study, including the mean systolic and diastolic blood pressures did not show significant difference between the two groups. The overall incidence of pregnancy induced hypertension (PIH) was 10.6% with incidence rate of 7.7% and 13.7% in the intervention and control group respectively, RR=0.56(95% CI: 0.32-0.98). The overall incidence of pre-eclampsia was 3.5%, 2.6% in the intervention group and 4.6% in the control group, RR=0.56(95% CI: 0.21-1.52). The overall rate of hypertensive disorders of pregnancy was 14.2%; 10.3% in the intervention group and 18.3% in the control group, RR=0.56 (95% CI: 0.35-0.90), these are shown in table 2. After adjusting for maternal age and weight, there was still a significant difference in occurrence of PIH in the control group RR=0.67 (95% CI: 1.07-3.85), P=0.030, and the lack of significance in occurrence of preeclampsia among the two groups was maintained, RR=0.37(95% CI: 0.20-1.66), P=0.318. The mean pregnancy duration when hypertension was detected was similar in the two groups. It was 35.89±4.47 weeks in the intervention group and 35.78±2.59 weeks in the control group (P=0.91). Also, the mean duration of gestation at delivery was similar in the two groups (Calcium: 39.1±2.3 weeks Vs Control: 39.1±1.8weeks, P=1.000). Table 3 describes the obstetric performance of the participants and shows that even though the risk of preterm delivery was reduced by 35% in the calcium group, this was not statistically significant RR - 0.65 (95% CI: 0.32-1.31). Also, no significant difference was seen in rates of induction of labour and mode of delivery in both groups. Four cases of placental abruption were recorded in the intervention group and this also was not statistically significant RR - 8.462 (95% CI: 0.46-156.26). Two of the cases that had placental abruption were associated with severe preeclampsia while the other two had normal blood pressure. There was no record of other complications like HELLP syndrome, renal failure or maternal death. There were also no complaints of renal colic or haematuria in the treatment group. Amongst the participants who had calcium supplementation and developed preeclampsia, there was a statistically significant lower birth weight when compared with women in the same group who did not develop preeclampsia (Normal blood pressure: 3.24±0.33 Vs Preeclampsia: 2.77±0.45, P=0.033). This was however not so for those who developed PIH amongst the subpopulation of calcium supplement group. When the gestational ages at delivery was considered amongst women who developed either preeclampsia or PIH in the two groups, those with PIH in the intervention group had a statistically significant higher mean age at delivery than those in the control group (39.27±1.26 Vs38.25±1.44; P=0.017). (Table 4)

Table 4: Comparison of characteristics of pre-eclampsia/PIH women with normotensive women in groups.

Variable	**Calcium group (n=233)**					**Control group (n=219)**				
	Normal	**Pre-eclampsia**	**P-value**	**PIH**	**P Value**	**Normal**	**Pre-eclampsia**	**P-value**	**PIH**	**P Value**
All deliveries										
No. of participants (%)	**209(89.7)**	**6(2.6)**	-	**18(7.7)**	-	**179(81.7)**	**10(4.6)**	-	**30(13.7)**	-
Gestational* age at delivery, wk	**39.08±2.32 24-42**	**36.67±1.37 35-38**	**0.012**	**39.27±1.26 38-42**	**0.146**	**39.35±1.48 34-42**	**35.2±2.62 32-39**	**0.0001**	**38.25±1.44 36-41**	**0.0002**
Birth* weight, kg	**3.24±0.53 1.3-4.6**	**2.77±0.45 2.3-3.3**	**0.033**	**3.37±0.55 2.3-4.5**	**0.321**	**3.15±0.37 2.1-4.5**	**2.5±0.98 1.6-4.1**	**0.0001**	**3.32±0.76 2.8-5.0**	**0.0545**

Risk reduction for admission into the SCBU was significantly lower in the intervention group compared to the controls, (0.9% in calcium group and 5.5% in control group, RR-0.164 (95% CI: 0.04-0.72) (Table 5)
.

Table 5: Perinatal Outcomes

Outcome	Calcium n=233	Control n=219	Relative risk	95%CI	P Value
Birth weight(kg)*	3.2±0.6	3.1±0.5			0.055
<2.5kg**	12(5.2)	12(5.5)	0.94	0.43-2.06	0.882
≥2.5kg**	221(94.8)	207(94.5)	1.002	0.86-1.15	0.979
IUGR**	4(0.02)	1(0.005)	1.26	0.63-3.15	0.373
Apgar score <7 at 1min*$	18(9.9)	16(10.3)	0.968	0.51-1.84	0.920
Apgar score <7 at 5min*$	4(2.2)	4(2.6)	0.860	0.22-3.38	0.829
Admission into SCBU**	2(0.9)	12(5.5)	0.164	0.04-0.72	0.006
Still birth **	4((1.5)	8(3.7)	0.479	0.15-1.5	0.213
Early Neonatal deaths **	4(1.7)	6(2.7)	0.633	0.18-2.2	0.470

*Values as mean (SD); **Values as number (%); $total for calcium=182, total for control=156;
SCBU- Special Care Baby Unit

There were 22 perinatal deaths. Eight were in the intervention and 14 in the control group. Only 2 cases in each group were associated with a hypertensive disorder of pregnancy (severe preeclampsia). Two cases of still birth were due to intrauterine fetal death of unknown etiology prior to term and two others were due to placental abruption in normotensive women. The remaining 14 cases (10 Early Neonatal Death and 4 stillbirths) were due to severe birth asphyxia following complications of labour and these were seen mostly in those who delivered elsewhere.

Discussion

The study demonstrated that supplementation with 1.2g calcium given daily to primigravidae from 16 weeks gestation was associated with a reduced risk of pregnancy induced hypertension (PIH) by 44%. This result is comparable to findings from a meta-analysis of studies from only developing countries that showed calcium supplementation during pregnancy was associated with a significant reduction of 45% in risk of pregnancy induced hypertension [RR- 0.55; 95 % confidence interval (CI) 0.36-0.85][6]. This benefit however was seen in the development of preeclampsia.
The incidence of preeclampsia in this study was unaffected by the administration of calcium supplementation. This finding was not consistent with such outcome measure in two previous studies with similar methods[11,12]. An Australian study[11] administered 1.8g of calcium to 456 nulliparous women from 20 weeks while another study carried out in India[12] administered 2g of calcium to 552 primigravidae from 12-25 weeks. Even though these aforementioned trials were carried out in populations with high and low baseline calcium intakes respectively, they found that calcium supplementation significantly reduced the risk of pre-eclampsia. While the Indian study did not analyze for PIH, the Australian study reported that there was no effect on the incidence of PIH, contrary to our finding. The reduction in the risk of preeclampsia by calcium supplementation of at least 1g was further corroborated by findings from a systematic review in the Cochrane database[5] Among the women who developed PIH in this study, calcium supplementation was associated with improved duration of pregnancy as development of PIH was of late onset. A possible explanation for this pattern observed may be based on the hypothesis that early and late onset preeclampsia are two disease entities that might develop from divergent hemodynamics (low cardiac output(CO)-high total vascular resistance(TVR) for early, and high CO-low TVR for late PE)80. This could be linked to the mode of action of calcium supplementation which reduces smooth muscle contractility[13]. On the other hand, it could be that the finding is reflective of reports of some Nigerian studies which reported that late onset pregnancy induced hypertension accounts for most cases of hypertension in pregnancy and that early onset cases (presenting at or before 32 completed weeks of gestation) are relatively rare compared to Caucasian populations[14, 15].
It has also been suggested that calcium supplementation might also reduce the incidence of preterm deliveries, cesarean deliveries, births of infants small for their gestational ages, and perinatal deaths[16]. These beneficial consequences would be due in part to the prevention of preeclampsia and pregnancy induced

hypertension but could theoretically also result from direct effects of calcium on uterine smooth muscle to reduce contractility and prevent preterm labor[17]. In our study however, there were no differences seen in the rate of preterm delivery, low birth weight babies or perinatal death. Possible reasons for this outcome may have been the fact that the sample size was not large enough to produce effects with a low incidence rates but this may not hold true as similar results were obtained in the large trials carried out by WHO[18] and Belizan[19]. Paradoxically, positive results were obtained in the studies in India[12] and Austrailia[11]. These studies recruited 552 and 456 women respectively and found a significant risk reduction in preterm delivery by as much as 44.9% and 56% respectively. The low rates of adverse perinatal outcome which was not influenced by calcium supplementation may also be partly explained by the fact that late-onset PE (after 34 weeks) is mostly associated with normal or slight increased uterine resistance index, a low rate of fetal involvement, and more favorable perinatal outcomes[20].

The "non blinded" nature of the study due to the unavailability of placebo tablets is a possible limitation as this could have introduced some element of bias in favour of the intervention group. This was however overcome by ensuring uniformity in baseline characteristics which was achieved by recruitment of healthy nulliparous women prior to 16weeks gestation. This methodology was characteristic of various trial[11,12,18,19].

Regarding the implications for current pregnancy care, the findings of this study, together with the recommendation by WHO provide support for a policy of offering calcium supplementation to all nulliparous women during pregnancy. From the updated systematic review data using the baseline risk of hypertension and preeclampsia, the number of women needed to treat to prevent 1 woman from experiencing hypertension is 24 (95% CI 16-46) and to prevent preeclampsia 42 (95% CI 30-71) 5. This is similar to 16 and 50 obtained from this study respectively.

Conclusion

In conclusion, daily supplementation with 1.2 grams of calcium during pregnancy significantly reduced the risk of pregnancy induced hypertension in nulliparous women living in our environment. The treatment did not result in significantly improved obstetric and neonatal outcomes. Further large, well designed, and appropriately funded trials are needed to clarify the impact of calcium supplementation on major maternal and fetal morbidity and mortality, especially in developing countries.

Acknowledgements

The authors acknowledge the women who participated in the study, staff of the antenatal clinic and labour wards of our facility for their cooperation and steadfastness. We also acknowledge the management of the hospital for the permission granted to us.

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DISCLOSING MEDICAL ERRORS TO PATIENTS: OVERCOMING THE CHALLENGE IN CLINICAL COMMUNICATION

Awindaogo FR
Osler Medical Limited, Osu Accra

Abstract

Summary: Ethical and professional guidelines obligate doctors to disclose medical errors to patients when they occur. But very few doctors are divulging their own errors, especially in a very paternalistic doctor-patient relationship witnessed in sub-Saharan Africa where the prevalence of medical errors is unknown due to absence of error reporting and disclosing mechanisms. Doctors are not disclosing their errors because of perceived consequences when they do and the lack of disclosure skills that is not taught at all stages of the educational system including the postgraduate level. However, patients want to know and be told when things go wrong.

This article looks at the barriers to disclosure of medical errors, the benefits of disclosure for both the doctor and patient, and how doctors can begin disclosing errors based on current literature**.**

Key Words: Disclosure, Medical Error, Communication

Introduction

Good communication in medicine is an essential clinical skill. It is a core requirement for effective practice, fostering trust and openness between the physician and the patient[1]. Both the doctor and patient benefit when good communication exists between them[2]. The patient is healthier, more satisfied with the care received and more compliant with management plans[3–5]. Good clinical communication can sometimes be a daunting task in some situations. One challenging aspect of clinical communication is disclosing medical errors to patients and their families[6]. Disclosure of medical errors is an ethical and professional obligation and ethical guidelines worldwide enjoin healthcare professionals to disclose medical errors[7–13]. Yet, a significant number of physicians are not open and honest when mistakes happen [12,14,15]. The prevalence of medical errors and reporting in sub-Saharan Africa is unknown as there are no mechanisms for reporting and disclosing such errors[15,16]. Prevalence of medical errors is estimated to be high in resource limited settings where the vulnerability to medical errors is increased[7]. A largely paternalistic doctor-patient relationship in sub-Saharan Africa makes disclosure of mistakes exceptional[18,19].

Corresponding Author: D**r. Felix Razak Awindaogo**
Osler Medical Ltd
P. O. Box OS 1934, Osu, Accra
Tel. No.: +233 24 4778 007
Email Address: fawindaogo@yahoo.com
Conflict of Interest: None Declared

When medical errors occur, good and timely clinical communication is critical. How can doctors overcome this challenge of disclosing their errors considering the general absence of reporting mechanisms and training on how to communicate errors when they occur?

Methods

Barriers to disclosure

Many barriers to disclosure have been identified with fear of the consequences that may ensue after disclosure of harm being a leading inhibitory factor to disclosure[20–25]. The potential consequences of disclosure are legal action, decrease in trust and confidence, emotional reaction by patient and family, punitive measures by managers, blame by colleagues and, loss of job and privileges[25,26]. Other barriers to disclosure are lack of disclosure skills and physician personal beliefs that the patient would not want to know about the error, disclosure is unnecessary and the patient would not understand the error[23,27,28]. How Should Physicians Disclose Medical Errors? The processes of disclosing medical errors to patients can be a harrowing experience for most physicians, especially where no formal training in disclosure mechanism exist. Being an ethical and legal requirement, most physicians find themselves in a dilemma; between the devil and the deep blue sea. Though many innovative disclosure programs have been developed by institutions around the world each disclosure is unique[12,27,29–31]. Disclosure is not a one-time event (Figure 1); however, the process of medical error disclosure can be categorized broadly as follows:

i. planning the disclosure

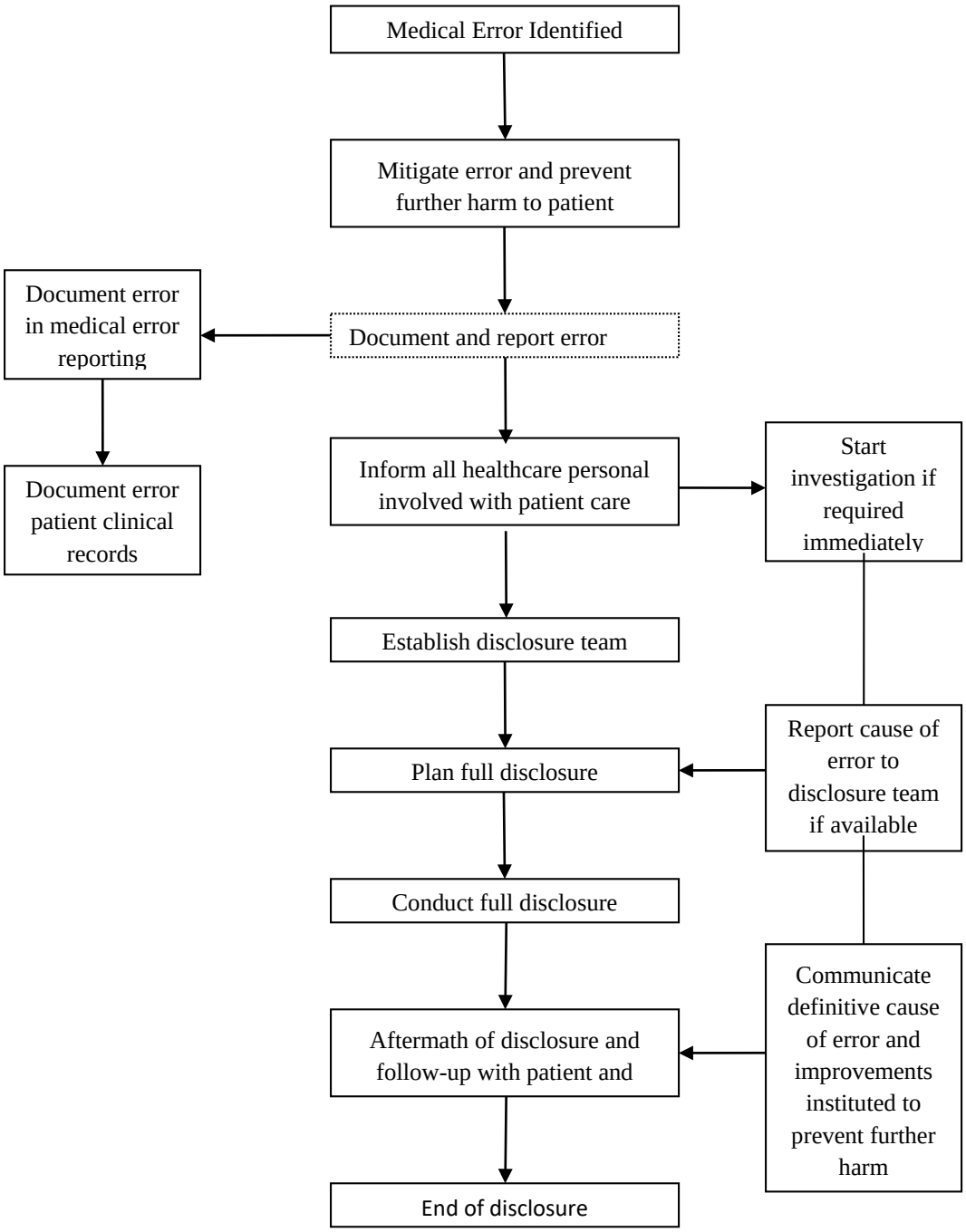

Fig 1: Algorithm for reporting and Disclosure of Medical Errors

ii. conducting the disclosure
iii. aftermath of the disclosure

Planning the disclosure

The process of planning a disclosure begins immediately an error is identified. Though patients desire full disclosure at the earliest convenience, it is important that the process is thoroughly planned [29,32,33]. Immediately an error is identified, it should be documented and urgent appropriate treatment administered to mitigate the error and prevent further harm to the patient[8]. All health care personnel involved in the event are notified and an investigation started if appropriate[34]. In planning a full disclosure, planners must determine who would lead the disclosure, who would be participating, what will be disclosed, when and where disclosure will occur. When errors occur, the attending physician or consultant bears the burden of disclosure and leads the disclosure process[35]. In situation where there is no consultant the most senior doctor bears the burden of disclosure. Nurses, trainees and other allied professionals may participate in the disclosure process[7,36–39]. Patients want to know what error occurred, how it happened, why it happened and steps taken to prevent recurrences of similar errors[20,40–42]. The disclosing physician must organise his/her

thoughts and anticipate responses and questions from patient and family[33]. Timing of the disclosure is critical[43]. Whilst most guidelines and policies suggest informing patients and family within 24 hours of knowledge that the error occurred, it should take place when the patient is stable and in the right frame of mind[20,36,39]. However, when a medical error results in the death of a patient the family must be notified immediately and given all the emotional and psychological support they need. An expedited investigative and full disclosure process is recommended to provide early closure to the bereaved family. The disclosure meeting should take place in a quiet, private setting that ensures confidentiality**.**

Conducting the disclosure

Initiating the disclosure

The lead clinician or consultant initiates the disclosure by introducing him/herself and everyone else representing the healthcare institution, the family is also politely asked to do likewise. The physician proceeds with an expression of sympathy and compassion for the circumstances.

Full disclosure

Disclosure must take into account the patient's personal, social religious and cultural background[7]. The Harvard Teaching Institutions' "When Things Go Wrong" has outlined four essential steps to full disclosure[9].

- Tell the patient and family what happened
- Take responsibility
- Apologize
- Explain what will be done to prevent future events

The disclosing physician tells the patient and family what happened in a clear and simple language avoiding medical jargons. He or she must also refrain from being defensive, speculative and laying blame[23]. The lead physician makes a clear statement of responsibility to the patient and family, even though he/she might not have committed the error and proceeds to render a formal apology with show of genuine remorse[9]. It is also noteworthy to state that whenever an obvious error occurs, the primary care giver must apologize and show genuine remorse before and during disclosure proceedings. Apologizing is an essential aspect of taking responsibility and it preserves the therapeutic relationship between the doctor and patient. Apologies heal both the patient and provider[9,23,44]. The patient is informed about measures implemented to prevent harm to other patients in future and concludes the meeting by asking if anyone still has questions or some clarifications. Informing patients about measures implemented to prevent such errors in future offers some reprieve to their suffering, knowing others will not experience their suffering[23].

Closing the disclosure

As indicated earlier disclosure is an on-going process, and not a single event. Patients and family must be informed about plans for follow-ups and updates of new information as they emerge. A contact person for follow-up by the patient is then introduced to the patient and channels of communication also made available[45].

Results

Aftermath of the disclosure

This stage of disclosure occurs after the definitive cause of the error and improvements made to prevent harm to other patients. The disclosure team communicates the cause of the medical error to the patient and makes known improvements instituted[46].

Benefits of Disclosure

The doctor and patient benefit when medical errors are disclosed, even though the opposite might seem to be the case for both parties especially for the doctor. Foremost is the trust of the public in the institution of the doctor. When doctors disclose their errors the public trust in medicine is bolstered because the patient's wellbeing is seen to be preserved over narrow and selfish professional interests. This leads to the development of more trust and an open relationship between the doctor and their patients and family[36]. The physician also upholds his ethical duty to tell the truth hence, boosting his or her self-esteem and restoration of self-respect [27].

Clinicians also develop disclosure skills and become less anxious about disclosing their errors when they occur. Aside from error disclosure skills, routine clinical skills, safety skills and clinical knowledge is enhanced due to institutional improvements and policy implementation subsequent to investigations and audits that happen when errors are discovered. Disclosures programmes particularly from US institutions have laid bare the tremendous benefits due to disclosure of medical errors. Disclosures have led to reductions in malpractice claims and legal action against healthcare professionals and institutions with attendant benefits of improved clinical care and patient safety resulting in lesser errors and patient injuries [36,47,48]. The healing and coping process for both the doctor and patient is augmented when telling the truth, both become liberated allowing healing to occur with the patient knowing what went wrong and satisfied that it will not happen to another patient. Improving Statistics of Medical Errors in Sub-Sahara Africa The absence of medical error reporting mechanisms and databases in healthcare institutions in sub-Saharan Africa has contributed largely to the under-reporting of medical errors[16,17]. This continues to undermine quality improvement and patient safety, hence the need

for healthcare institutions to urgently develop and implement medical error reporting and disclosure mechanisms that are voluntary, non-punitive and ensure confidentiality. The Minimal Information Model for reporting patient safety incidents proposed by the World Health Organization (WHO) may be adapted by institutions. The model is easy to use and looks at the core elements of any reporting system (Table 1)[49].

Table 1: Minimal Information Model for Patient Safety Data Categories

Data Categories of the Minimal Information Model	
Incident identification	
• Patient	*Sex, age*
• Time	*Date and time of day*
• Location	*Physical setting error occurred*
• Agent (s)	*Product, device, person,*
Incident type	*Describes incident*
Incident outcomes	*Impact to patient and institution*
Resulting actions	*Disclosure, ameliorating or preventive actions*
Reporter	*Person who collects and writes about the incident*

An improved and reliable statistics on medical errors in the sub-region will in the long run improve the quality of care and patient safety.

Conclusion

Disclosing a medical error yields several benefits for both the patient and doctor and more importantly, it is an ethical and a professional obligation to the patient. Doctors must make a determined effort to learn how to disclose medical errors and fulfil their ethical obligation to patients by making disclosing of errors a routine habit. This will provide a learning platform for acquiring the skills and dissolve the barriers that make it difficult to be open when errors occur.

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EMERGENCY EAR, NOSE AND THROAT ADMISSIONS IN NORTHERN GHANA

Adjeso T[1, 2], Damah MC[2], Murphy JP[2]
[1]Department of Eye, Ear, Nose and Throat, School of Medicine and Health Sciences, University for Development Studies, Tamale, Ghana. [2]Ear, Nose and Throat Unit, Tamale Teaching Hospital

Abstract

Background: Ear, nose and throat (ENT) emergencies are common in the north of Ghana; however, there are no published reports. We conducted a retrospective study of ENT emergencies at the ENT Unit of the Tamale Teaching Hospital (TTH).
Methods: This was a four-year review of patients admitted for emergency care at the ENT Unit of the Tamale Teaching Hospital between January 2013 and December 2016. Analyzed parameters included age, sex, diagnosis and outcome of treatment.
Results: A total of 390 patients were admitted for ENT emergency treatment during this period. Thirty-eight patients were excluded on account of incomplete information with 352 patients included in the final analysis. The sex distributions of patients were 209 males and 143 females with a male to female ratio of 1.46:1. The age range was 6 months to 81 years with a mean age of 27.2 ± 21.2 (median age of 25.5) years. Peak age incidence was in 0-10 age group. The most common indications for ENT emergency admissions were maxillofacial injuries (22.7%), foreign body ingestion (17.9%), deep neck (multi-)space abscesses (14.5%) and upper airway obstruction (8.2%). Fifteen patients (4.7%) admitted for emergency care died.
Conclusion: The most common indications for ENT emergency admissions from our study were throat related conditions and maxillofacial injuries that were treated successfully in 89.4% cases.

Key Words: Ear, Nose, Throat, Emergency, Tamale

Introduction

The Tamale Teaching Hospital is the third largest teaching hospital in Ghana located in the northern part of the country and affiliated to the University for Development Studies (UDS). The ENT Unit serves as a referral center for hospitals within the three Northern Regions of Ghana. Ear, nose and throat (ENT) emergencies are common in clinical practice in the northern part of Ghana[1]. Early diagnosis and treatment of these emergencies would reduce morbidity and mortality[2]. Kitcher et al, in their study, found foreign bodies in the esophagus, epistaxis, throat infections and stridor to be the commonest ENT emergency admissions at Korle-Bu Teaching Hospital. They reported a 2.7% mortality mainly from epistaxis and deep neck abscess[1].
Adedeji and colleagues in Osun state, Nigeria, noted that epistaxis, nasal or facial trauma, pharyngo-esophageal foreign bodies and upper airway obstruction were the commonest otorhinolaryngological emergency admissions[3]. In rural India, Yojana et al, also observed from their study that maxillofacial trauma accounted for a majority of the admissions and this was followed by ENT foreign bodies with five deaths from non-ENT causes[4]. This study was conducted to determine the causes and distribution of ear, nose and throat emergency admissions in the northern part of Ghana at the ENT Unit of the Tamale Teaching Hospital. The data obtained in this study will form the baseline for future studies with regards to ENT condition.

Corresponding Author: **Theophilus Adjeso**
Department of Eye, Ear, Nose and Throat, School of Medicine and Health Sciences, University for Development Studies, Tamale, Ghana
Tel. Number: +233-206300796
Email Address: tadjeso@uds.edu.gh
Conflict of Interest: None Declared

Methods

This was a retrospective descriptive study of patients admitted for emergency care in the ENT Unit of the Tamale Teaching Hospital (TTH), the only tertiary referral center located in the Northern Region of Ghana, from January 2013 to December 2016. TTH has a bed capacity of 480 and provides specialist care for the three northern regions with a population of approximately 5 million people. The ENT Unit has three ENT surgeons responsible for patient care. Patients were admitted for emergency care via the Accident and Emergency Department, Paediatric Emergency Unit, general Out-Patient Department (OPD) as well as the ENT OPD clinic. The clinical records of these patients were studied with respect to the age, sex, diagnosis and outcome of emergency treatment. Excluded from this study were patients admitted for emergency care for terminal cancer, elective surgery and those with incomplete information. The data obtained was extracted from the Admission and Death book of the ENT ward and statistical analysis of means, median and standard deviation was done using SPSS software version 20.0 (Chicago, IBM 2010)

Results

A total of 390 patients were admitted for ENT emergency treatment during the period. Thirty-eight (38) patients were excluded on account of incomplete information with 352 patients included in the final analysis. The sex distributions of patients were 209 males (59.4%) with a male to female ratio of 1.46:1. The age range was 6 months to 81 years with a mean age of 27.2 ± 21.2(median age of 25.5) years. The peak incidence was in the 0-10 age group.

Table 1: Age group and sex distribution of patients with ENT and maxillofacial emergencies.

Age groups	Male	Female	Frequency	Percentage (%)
0-10 years	57	49	106	30.1
11-20 years	28	12	40	11.4
21-30 years	30	35	65	18.5
31-40 years	36	18	54	15.3
41-50 years	26	6	32	9.1
51-60 years	13	12	25	7.1
61-70 years	13	2	15	4.3
71-80 years	5	9	14	4.0
81-90 years	1	0	1	0.3
Total	**209**	**143**	**352**	**100**

The most common indications for the ENT emergency admissions were maxillofacial injuries (22.7%), esophageal foreign bodies (17.9%), deep neck (multi-) space abscesses (14.5%), upper airway obstruction (8.2%) and foreign body aspiration (7.7%).

Table 2a: Indications for emergency ENT admissions

Diagnosis	Frequency	Percentage (%)
Ear		
Ear foreign body	3	0.9
Acute mastoiditis	2	0.6
Total	**5**	**1.5**
Nose/Nasopharynx		
Epistaxis	24	6.8
Acute Rhinosinusitis	4	1.1
Nasal foreign body	3	0.9
Nasopharyngeal foreign body	1	0.3
Total	**32**	**9.1**

Table 2b: Indications for emergency ENT admissions

Diagnosis	Frequency	Percentage (%)
Throat		
Foreign body ingestion	63	17.9
Deep neck (multi-)space abscesses	51	14.5
Upper airway obstruction	29	8.2
Ludwig's angina	27	7.7
Foreign body aspiration	27	7.7
Retropharyngeal abscess	13	3.7
Peritonsillar abscess	7	2.0
Acute tonsillitis	5	1.4
Cut throat injury	3	0.9
Buccal space abscess	1	0.3
Anterior neck abscess	1	0.3
Submandibular abscess	1	0.3
Ulcerative Pharyngitis	1	0.3
Total	**229**	**65.1**
Head and Neck		
Maxillofacial injuries	80	22.7
Neck trauma	5	1.4
Total	**85**	**24.1**
0thers		
Facial burns	1	0.3
Total	**1**	**0.3**
Grand total (table 2a + table 2b)	**352**	**100**

Three hundred and fifteen (89.4%) of the patients were discharged home after successful surgical and medical treatment. The mortality rate in this retrospective study was 4.3%. Twenty-two (22) patients were referred for advanced treatment not readily available in TTH.

Table 3: Outcome of treatment

Treatment Outcome	Frequency	Percentage (%)
Discharged	315	89.4
Referrals	22	6.3
Deaths	15	4.3
Total	**352**	**100**

Discussion

In this study, more males had ENT emergencies than females. The male to female ratio was 1.46:1. This was observed to be consistent with that reported in other studies[1,3,5]. Children in their first decade of life were found to be the most commonly admitted age group for emergency ENT care similar to findings by other series[1,6]. This is because children in this age group are constantly exploring their immediate environment hence exposing them to various injuries.

In contrast some authors, found that a majority of their patients were between the third and fourth decades of life[3,7]. Throat-related conditions and maxillofacial injuries were the commonest indications for emergency ENT admissions to the ENT Unit. Foreign body ingestion was the most common throat condition in our study and this has been reported by other authors[1,3–5]. However, in comparison to a similar study done in Accra, Ghana, our study found maxillofacial injuries (such as facial lacerations, orbital floor fractures, maxillary fractures and mandibular fractures) as one of the common indications for ENT emergency admissions[1]. This was as a result of the absence of maxillofacial surgeons in TTH; thus the ENT team saw such patients. The maxillofacial injuries in present study were due mainly to motorcycle accidents as a result of poor law enforcement that allows motorbike riders not to wear crash helmets when riding. In the study by Andrade et al[8], they found ear-related diseases as their most common indication for emergency admissions in Sao Paolo, Brazil, while we found throat-related diseases were the most common reasons for admission in our environment. This was because our ear-related diseases were mainly treated on OPD basis. Secondly the difference could be due to the cultural practices in our area such as the use of herbal concoction to treat throat and dental infection and the strong belief that abscesses should not be managed with injection otherwise it would lead to the death of the individual. Cut throat injuries in this study were few compared to findings by other authors. They were mainly due to suicidal attempts in patient with known psychiatric illness[9,10]. The deaths in the study was mainly due to sepsis and mediastinitis from deep neck abscesses and was found to be higher compared to that found by Kitcher and colleagues[1]. This was due, mainly to late presentation (because the patients would usually report to the traditional herbalist first), high illiteracy rate and wrong cultural beliefs. The retrospective nature of our study with its inherent problem of missing data from incomplete information is a limitation. Furthermore, the effect of missing data on the size and case distribution of our study is well noted.

Conclusion

The epidemiology of ENT emergencies in our hospital has widened to include maxillofacial injuries. Thus, the ENT surgeon in these surroundings has to be adept at also efficiently managing maxillofacial emergencies in other to save lives, as can be inferred from our paper. The result is that we were able to manage the most common ENT throat-related conditions in addition to the maxillofacial injuries that reported to TTH and so achieved a very high success rate of treatment of these patients.

Acknowledgements

We wish to thank Prof. Francis Abantanga, Dean of SMHS/UDS, Rev Edmund Browne, MD, and Issaka Adamu, MD, for agreeing to read our manuscript and making useful comments and suggestions. We also thank Mr. Kwasi Nkayi for helping with data collection and finally, we wish to express our sincere gratitude to all the ENT nurses for their assistance in caring for these patients.

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FACTORS ASSOCIATED WITH ANTENATAL STEROID UPTAKE IN MOTHERS AT RISK OF PRETERM BIRTH AT A TEACHING HOSPITAL IN GHANA

Sackey AH[1], Tagoe LG[2], Oppong SA[3]

[1]Department of Child Health, School of Medicine and Dentistry, College of Health Sciences; [2]Children's Block, Korle Bu Teaching Hospital; [3]Department of Obstetrics and Gynaecology, School of Medicine and Dentistry, College of Health Sciences.

Abstract

Background: This study was performed to determine the factors associated with antenatal corticosteroid (ACS) use in pregnant women at risk of preterm birth at the Korle-Bu Teaching hospital (KBTH) in Accra.

***Method*:** A descriptive cross-sectional study.

Subjects and outcome measures - Mothers who should have received antenatal steroids were identified by the admission of their preterm infants to the neonatal unit at KBTH. Maternal ACS status was determined, and the characteristics of women who received ACS were compared with those who did not.

Results: There were 284 eligible admissions during the study period of 6 months, of which 43% (121 mothers) were studied due to administrative and logistical constraints. Out of these 121 mothers, 92 (76%) had received antenatal corticosteroids. Mothers with primary and secondary education were less likely to receive antenatal corticosteroid (OR 0.240, 95% CI 0.058-0.984), (OR 0.211, 95% CI 0.050-0.897) respectively, compared to those with tertiary level education. Mothers who delivered at other hospitals outside KBTH were also less likely to receive ACS (OR 0.195, 95% CI 0.070-0.545). Women who had caesarean delivery were more likely to receive antenatal corticosteroid compared to those with vaginal delivery (OR 4.378 95% CI 1.690-11.346). In this cohort, there was no association between antenatal corticosteroid use and maternal age, maternal medical condition, fetal gender or previous preterm delivery.

Conclusion: ACS use in KBTH is low but similar to other low-income countries. Low educational attainment and delivery outside the tertiary facility are factors associated with low use of ACS.

Key Words: Antenatal, steroids, preterm, birth

Introduction

Antenatal corticosteroids (ACS) accelerate maturation of fetal type 2 pneumocytes and, in conjunction with level 2 neonatal intensive care, reduce the severity of respiratory distress syndrome (RDS), intraventricular hemorrhage (IVH) and necrotizing enterocolitis (NEC), as well as mortality from these conditions[1,2]. Despite the known benefit of ACS, its use in clinical practice is still limited[3]. The uptake of ACS varies between and within countries. Uptake is high in high resource areas and variable in low resource countries, ranging from 16 to 91%3. The factors associated with uptake of ACS have been reported to include maternal educational attainment, timing of birth and maternal complications[4]. Short hospitalization before delivery was associated with lowered chance of receiving ACS, while premature rupture of membranes and antepartum maternal transfer were associated with ACS administration[5]. The use of ACS is established as a relatively low-cost and effective method of reducing preterm morbidity and mortality[6]. It is recommended that a course of ACS should be given to all mothers before delivery between 24 weeks to 34 weeks gestation unless the risk to the mother or fetus outweighs the benefit (chorioamnionitis, acute fetal distress, and acute massive antepartum haemorrhage)[7]. The course is IM Dexamethasone 6mg 12 hourly for 4 doses, or where available, Betamethasone 12mg IM, repeated 24 hours later. This study was performed to determine the factors associated with antenatal corticosteroid (ACS) use in pregnant women at risk of preterm birth at the Korle-Bu Teaching hospital (KBTH) in Accra**.**

Corresponding Author: **Dr. Adziri H. Sackey**, Department of Child Health, School of Medicine and Dentistry, College of Health Sciences
P O Box 4236, Accra
Tel. Number: +233 541725324
Email Address: sackey@sky.com
Conflict of Interest: None Declared

Methods

This was a descriptive cross-sectional study conducted at the Neonatal Intensive Care Unit (NICU) of the Korle-Bu Teaching Hospital. The audit was performed in 3 phases: from January to March 2015, from December 2015 to January 2016 and in April 2016.

Based on guidelines in the KBTH Department of Obstetrics and Gynaecology manual, a course of ACS should be given to all mothers before delivery between 24 weeks to 34 weeks gestation unless the risk to the mother or fetus outweighs the benefit. During the periods of the study, women who should have received antenatal steroids were identified by the admission of their preterm infants to the neonatal unit at KBTH. Maternal ACS status was determined by reviewing case notes of mothers and babies and completion of a

questionnaire. The characteristics of women who who did not. Data was extracted with Microsoft Excel spreadsheet and analysed with Social Science Statistics Online Statistical calculators. Ethical review was not considered essential, as this was an audit type study, primarily involving case note reviews with no interventions or deviations from the usual clinical care of participants.

Results

During the periods of data collection, there were a total of 284 eligible admissions, of which 43% (121 mothers) were studied due to administrative and logistical constraints. Out of these 121 mothers, 92 (76%) had received antenatal corticosteroids.

Table 1: Characteristics of mothers who received ACS compared to those who did not

	Received ACS (n=92)	Did not receive ACS (n=29)	Odds ratio (95% CI)
Maternal age			
≤20yrs	3 (3.3%)	4 (13.8%)	0.241 (0.049-1.180)
21-35yrs	56 (60.9%)	18 (62.1%)	Ref
>35yrs	28 (30.4%)	4 (13.8%)	2.250 (0.695-7.283)
Not documented	5 (5.4%)	3 10.3%)	-
Level of education			
None	18 (19.6%)	5 (17.2%)	0.337 (0.072-1.580)
Basic	23 (25.0%)	9 (31.0%)	0.240 (0.058-0.984)
Secondary	18 (19.6%)	8 (27.6%)	0.211 (0.050-0.897)
Tertiary	32 (34.8%)	3 (10.3%)	Ref
Not documented	1 (1.1%)	4 (13.8%)	-
Mode of delivery			
Vaginal delivery	37 (40.2%)	21 (72.4%)	Ref
Caesarean section	54 (58.7%)	7 (24.1%)	4.378 (1.690-11.346)
Not documented	1 (1.1%)	1 (3.4%)	-
Maternal medical history			
Hypertension	30 (32.6%)	5 (17.2%)	2.049 (0.665-6.307)
Preterm PROM	11 (12.0%)	7 (24.1%)	0.537 (0.174-1.653)
APH	3 (3.3%)	1 (3.4%)	1.024 (0.098-10.667)
Asthma	1 (1.1%)	1 (3.4%)	0.341 (0.020-5.829)
Sickle cell disease	2 (2.2%)	1 (3.4%)	0.683 (0.057-8.122)
Others	4 (4.3%)	0 (0%)	-
Nil	41 (44.6%)	14 (48.3%)	Ref
Gender of infant			
Male	46 (50.0%)	14 (48.3%)	1.071 (0.465-2.470)
Female	46 (50.0%)	15(51.7%)	Ref
Place of delivery			
KBTH	82 (89.1%)	16 (55.2%)	Ref
Other hospitals	10 (10.9%)	10 (34.5%)	0.195 (0.070-0.545)
Home	0 (0%)	3 (10.3%)	-
Previous preterm delivery			
Yes	4 (4.3%)	3 (10.3%)	Ref
No	88 (95.7%)	24 (82.8%)	2.750 (0.576-13.133)
Not documented	0 (0%)	2 (6.9%)	-

shows the characteristics of mothers who received ACS compared with those who did not. The majority of the mothers, over 60%, in both groups were aged 21 to 35 years. Regarding educational attainment, the largest proportion (34.8%) in the ACS group had completed tertiary education, whilst the largest proportion in the non-ACS group had only basic education (31.8%). In nearly half of both groups, there was no underlying medical condition that necessitated the preterm delivery. Hypertensive disorders were the commonest condition underlying preterm delivery, contributing 32.6%, in the ACS group, and second commonest, forming 17.0%, in those without ACS. More than half (58.7%) of the ACS group were delivered by caesarean section, compared to 24% of the non-ACS group. More than two-thirds (72.4%) of mothers who did not receive ACS delivered vaginally. There were 18 cases of preterm premature rupture of membranes (PPROM) of whom 61% received ACS. Results from multinomial logistic regression model showed that mothers with primary and secondary education were less likely to receive antenatal corticosteroid (OR 0.240, 95% CI 0.058-0.984), (OR 0.211, 95% CI 0.050-0.897) respectively. Mothers who delivered at other hospitals

outside KBTH were also less likely to receive ACS (OR 0.195 95% CI 0.070-0.545) Women who had caesarean delivery were more likely to receive antenatal corticosteroid compared to those with vaginal delivery (OR 4.378 95% CI 1.690-11.346). There was a trend towards lower ACS use in mothers younger than 20 years but this did not reach statistical significance. Maternal medical condition, fetal gender and previous preterm delivery did not predict antenatal corticosteroid use in this cohort.

Discussion

This is the first published report on the factors associated with use of ACS in women at risk of preterm birth before 34 weeks in our facility, and as far we can ascertain, in Ghana. The overall uptake of ACS in this study was relatively low at 76%, similar to reports from other low and middle-income countries[3,8,9,10]. In the WHO Multicountry Survey of Maternal and Newborn Health (WHOMCS), of the women who delivered at 26–34 weeks gestation, 52% received antenatal corticosteroids[3]. It was a prospective, cross-sectional, facility-based survey of deliveries in 2010 and 2011 from 29 countries of all income levels in Africa, Asia, Latin America and the Middle East. They found no difference in ACS use between spontaneous preterm birth and provider-initiated preterm birth. The odds of receiving antenatal corticosteroids were significantly raised in nulliparous women and in caesarean deliveries. Women with pyelonephritis had raised odds of antenatal corticosteroid receipt, as did those pregnant with twins and higher-order multiple pregnancies. The odds of antenatal corticosteroid use were lower in women younger than 20 years and women with only 1–6 years of education. In our study, women who received ACS had higher educational attainment, compared to those not receiving ACS. Similar findings were reported in a multi-country survey in South East Asia[10]. The association between educational attainment and health status is well known, and may be mediated through greater income and social networks, as well as a better understanding of health issues and a healthier lifestyle[11]. We found that women who received ACS were more likely to have delivered at the tertiary facility (KBTH), compared to those not in receipt of ACS. Profit et al reported similar findings in California[12]. Lee et al reported, in a study from California of preterms born between 2005 and 2007, an overall uptake of 77%; risk factors for low uptake were mothers who were Hispanic, younger than 20 years, received no antenatal care, delivered vaginal delivery or whose baby had fetal distress. The factors associated with higher ACS uptake were premature rupture of membranes, multiple gestation and delivery in hospitals participating in quality improvement programs. They recommended that quality improvement initiatives to improve antenatal steroid administration should target specific high-risk groups[13]. In China, Xi et al reported an overall ACS uptake of 68.1% in a study of 232 women delivering after 27–34 weeks gestation; teenage girls were less likely to receive ACS than women aged 20–35 years[14]. In our setting, the involvement of patients in clinical decision-making regarding the use of ACS in anticipated preterm delivery before 34 weeks is unknown. In a New Zealand study of patient attitudes and beliefs towards use of ACS and clinical practice guidelines, the following features were found to be important enablers for the uptake of ACS: patients who are optimistic about ACS use, strong knowledge about why ACS is being offered, high resilience about pregnancy, and confidence in decision-making after being provided with information about ACS[15]. Conversely, difficulty in understanding information provided by health workers, and time constraints faced by patients and health workers, were identified as important barriers to uptake of ACS[11]. In KBTH, considerable emphasis is placed on ACS administration in the management of anticipated preterm delivery before 34 weeks, but in other health facilities in Accra, the level of emphasis is unknown but is likely to be lower. This may partly be attributed to lack of national guidelines on the use of ACS in anticipated preterm delivery, as well as the absence of specialist obstetricians in many delivery facilities. This latter issue could be addressed by task shifting as recommended by the World Health Organisation[16]. Task shifting addresses deficits in human resources for health by optimization of the roles and tasks of a range of health-care providers in order to deliver interventions through the existing health workforce. Other possible explanations for the facility-based difference in uptake could be local management practices that affect staff motivation and availability of dexamethasone or betamethasone. For instance, Smith et al found that low initial rates of ACS use were related to limited authority for administration by midwives and to the limited availability of dexamethasone on the maternity unit[9]. They reported that it was feasible to rapidly increase coverage of ACS for women at risk of preterm birth using a short technical update followed by a monthly audit and feedback schedule; there were also concomitant improvements in routine recording of gestational age and in completeness of documentation. They speculated that regular audit and feedback of ACS data was a more significant influence than the provision of updated technical information. In our study, women who received ACS were more likely to deliver by caesarean section, similar to a report from South East Asia[10]. They also reported that ACS use was more likely in women who had postpartum haemorrhage and pyrexia, factors not explored in this study.

Conclusion

ACS use in KBTH is low but similar to other low and middle-income countries. Low educational

attainment and delivery outside the tertiary facility are major factors associated with low use of ACS. Areas for further research include the determination of factors that cause low uptake of ACS especially in non-tertiary institutions and how these factors can best be modified.

Limitations

This study is limited by its small study population. Women who received ACS but delivered after 34 weeks gestation, or whose babies were stillborn or did not survive long enough to be admitted to NICU, were not included in this study. As a result, the uptake of ACS may be higher than we found.

Acknowledgements

Paediatric and Obstetrics residents attached to the NICU, particularly Drs Mustapha, Insaidoo, and Ozoya who retrieved and reviewed case-notes of mothers and their babies, and completed questionnaires.

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PATTERN OF SEMINAL FLUID PARAMETERS AND THEIR CLINICAL CORRELATES AMONGST INFERTILE MEN IN THE NIGER-DELTA REGION OF NIGERIA

Ngwu M[1], Omo-Aghoja LO[2], Adeyinka AT[3]

[1] Department of Obstetrics and Gynecology, Central Hospital, Benin City, Nigeria; [2]Department of Obstetrics and Gynecology, Faculty of Clinical Medicine, College of Health Sciences, Delta State University, Abraka, Nigeria; [3]Department of Obstetrics and Gynecology, Delta State University Teaching Hospital, Oghara, Nigeria.

Abstract

Background: Infertility is a foremost reproductive health problem globally, with sub-Saharan Africa nations most affected. The male contributions to this burden have not been properly documented in this environment

Methods: This was a cross-sectional study conducted in Central Hospital Benin City, involving 355 male partners of women with infertility. Specific clinical information was extracted and two semen analyses were conducted two weeks apart.

Results: The mean duration of infertility was 4.5 years (SD 2.17), and secondary infertility was the commonest (82.3%). Over half (59.7%) were of low socioeconomic status. Over two-thirds (66.5%) had seminal fluid abnormality; and Oligospermia was the commonest (22.8%). About two-fifth took alcohol regularly (43.9%), had previous history of urethral discharge (39.4%), or of testicular pain (42.8%). About One-fifth had a past history of mumps-orchitis (20.3%), or smoked cigarette (22.3%). Less than a tenth had varicocele (8.8%), or undescended testes (8.5%); while more than one-tenth reported use of Cimetidine (12.4%), herniorrhaphy (14.7%), scrotal surgery (15.8%), or sexual dysfunction (14.6%). There were significantly more participants with sexual dysfunction, herniorrhaphy, scrotal surgery, undescended testes; mumps orchitis; testicular pains; varicocele; history of purulent urethral discharge; tobacco smoking; alcohol consumption; and use of Cimetidine who have abnormal seminal fluid parameters. However on multivariate logistic regression analysis, history of urethral discharge, undescended testes, and Cimetidine use had negative correlation with abnormal semen parameters.

Conclusion: The prevalence of male factor infertility in our setting was high with significant association between male infertility and wide range of clinical and psychosocial problems.

Key Words: Pattern, Seminal Fluid, Parameters, Clinical Correlates, Infertile Men

Introduction

Infertility is a foremost medical problem with profound psychological, social, cultural, and religious dimensions. When couples are unable to achieve pregnancy after a year of regular, unprotected sexual intercourse, they are regarded as been infertile[1,2]. Male fertility encompasses the production and maturation of spermatozoa, arousal, erection and, ejaculation, and fertilization. Male infertility will occur if there is impairment at any level of this cascade of events. The ultimate hallmark of male fertility is the ability to produce functionally competent spermatozoa to fertilize the ovum[3,4]. True prevalence of infertility is largely unknown as population studies are rarely available[5]. Global prevalence is 10-20% [1,2] but regional variation exists, with the developing countries worse affected[1]. A prevalence of 20-45% has been documented in Nigeria[2, 6]. An infertility belt has been described that stretches from West Africa through Central and East Africa, and encompassing many developing countries including Nigeria[2]. This belt coincides with areas with high prevalence of sexually transmitted infections. Infertility exerts social and psychological miseries on affected couples, especially in the African communities [1,7-10]. It constitutes much of the work load in the gynaecologic out- patient clinics[11]. Unlike infertility in the females, male infertility has been less extensively investigated in Africans because male factor was earlier regarded as a relatively uncommon cause of infertility. It is now recognized that abnormalities in the male contributes significantly to infertility, accounting for up to 70% of etiological factors in a study conducted in Nigeria[12]

Since male infertility centers on the production of functionally viable spermatozoa[4], diagnosis has traditionally been based on the conventional semen profile defined by the WHO[13, 14], and this incorporates the volume of the ejaculate, and the concentration, motility& morphological appearances of spermatozoa. In the 4th edition (1999) of WHO semen parameters, normal volume was accepted as >1.5 mLs; normal

Corresponding Author: **Prof. L. Omo-Aghoja**
Department of Obstetrics and Gynecology,
Delta State University, Abraka, Nigeria
Tel. Number: +234 (0)8039377043
Email Address: Eguono_2000@yahoo.com
Conflict of Interest: None Declared

sperm concentration >20 million/mL; oligozoospermia as 5-20 million/mL and severe oligozoospermia as less than 5 million/mL. Motility was described as normal if >50% of spermatozoa were progressively motile within 60 minutes of ejaculation. Sperm morphology describes the number of normal spermatozoa with an ovoid head, stainable acrosome and a normal mid-piece and tail. Presence of >14% normal forms is regarded as normal. Although a fifth revision of normal criteria that is based on lower reference limits (5^{th} percentile of normal of normal population) was released by the WHO in 2010, the earlier version is still widely in used. The WHO range of "normal values" is not evidence-based, either in terms of their diagnostic values, or their relationship to the fertile population[15].A significant proportion of men with normal criteria of semen qualities will be infertile because of defects in sperm function while a number of men with abnormal semen qualities will have normal sperm function and achieve fertility[15]. Many couples with 'unexplained' infertility can be shown to have defective sperm function when appropriate evaluations are conducted. Very few studies on the epidemiology of male infertility have used functional as opposed to descriptive diagnostic criteria[15].In addition, marked inter-ejaculate variability is a major problem in the assessment of human semen and many aspects of the profile are subjective with evidence of inconsistencies between laboratories[16]. There is evidence of secular decline in seminal fluid parameters over the past 50 years with a consequent increase in incidence of male infertility[17].This decline has been found to correlate with sexually transmitted infections, exposure to environmental toxicants, cigarette smoking, genetic factors, radiation, drugs, occupational hazards, trauma, among others. The relative contribution of these factors varies from one region to another; and their correlation with abnormal sperm parameters needed to be properly evaluated and documented in the African settings for obvious reasons. It is against this backdrop that this study was conceptualized to evaluate the pattern of seminal fluid parameters amongst male partners of women with infertility; and to determine the clinical correlates of male infertility in Benin City.

Methods

This was a cross-sectional study conducted in the Department of Obstetrics and Gynaecology, Central Hospital Benin City. Consecutively presenting male partners of women presenting with infertility who consented to participate in the study were enrolled. Patients who found the method of sperm collection objectionable, had chronic medical conditions such as diabetes mellitus, renal or liver diseases, were on hormonal drugs, or had been previously investigated and treated for infertility were excluded from the study. The sample size of 355 was determined using the formula by D.W Taylor18 based on local infertility prevalence rate of 30%, and a10% attrition rate.A detailed history was taken and physical examination carried out on all participants. Specific clinical information that was extracted included history of herniorrhaphy, varicocele, purulent urethral discharge, undescended testis, drug use, cigarette smoking, alcohol intake, and sexual dysfunction. Thereafter, two semen analyses were conducted on each participant two weeks apart. Those with consistent results using the 1999 WHO criteria13were included in the study.

Specimen Collection, Delivery, and Analysis

Semen sample were collected in the department's collection room by masturbation into a sterile wide-mouthed plastic container after a minimum of 3 to 5 days of ejaculatory sexual abstinence, and received & analysed by the laboratory personnel within 15 minutes of collection. Sperm Motility Test was conducted by placing a drop of the sperm cells suspension on a clean grease-free slide covered with a cover slip and examined. A total of 100 spermatozoa were counted and the percentage of motility recorded. To determine the Sperm Count, a 1:10 dilution of the sperm suspension was made in physiological saline and a capillary tube was used in collecting a portion and charged into Neubauer haemocytometer. The cells in the appropriate ruled areas of the counting chamber were counted and recorded. Sperm Viability Test was conducted by mixing one drop (10 - 15µl) of 0.5% eosin with one drop of semen on a slide, and examined 2 minutes later using x10 objective microscope to focus the specimen and the x40 to count the percentage of viable and non-viable spermatozoa. In assessing sperm count and morphology, a thin smear of the liquefied well mixed semen was made on a clean grease-free slide and fixed with 95% ethanol for 5-10 minutes and then allowed to air dry. The smear was washed with sodium bicarbonate formation to remove any mucus that may be present. It was then rinsed several times, and stained with dilute carbolfuchsin (1 in 20) and allowed to stain for 3 minutes followed by washing with water. Dilute (1 in 20) loeflers methylene blue was used to counterstain the smear for 2 minutes. It was then washed with water, drained and allowed to air dry. Using the x100 objective, 100 cells were counted and the percentage showing normal morphorlogy and the percentage that appears abnormal was recorded. Sample was also examined for appearance, liquefaction, viscosity, pH and cellular elements other than spermatozoa. Appropriate treatment and counseling were offered to all participants in line with the local fertility treatment practices. Approval for the study was obtained from the Ethics and Research Committee of Central Hospital Benin City.

Data management and analysis

Information was extracted using a data collection sheet designed for the purpose. The data was coded and analysed using computer using Statistical Package for Social Sciences (SPSS) version 21.0. This consisted of

initial univariate and bivariates analyses, and then multivariate logistic regression analysis to identify the clinical correlates and independent risk factor of male infertility. Test of statistical significance was based on 95% confidence interval and p <0.05 using chi-square test with fisher exact correction where applicable.

Results

A total of 355 male subjected participated in the study.

Table 1 shows the socio-demographic characteristics of the participants

Table 1: Socio-demographic characteristics of male partners of women with Infertility

	N	%
Age group (yrs)*		
<25	12	3.4
25 – 35	170	47.9
>35	173	48.7
Duration of Infertility (yrs)#		
< 2	12	3.4
≥ 2	343	96.6
Duration of Marriage§		
Less than 2yrs	11	3.1
2yrs and above	344	96.9
Social Status		
Low	212	59.7
Middle	95	26.8
High	48	13.5
Educational Level		
No formal education	0	0
Primary	42	11.8
Secondary	174	49
Tertiary	139	39.2
Location of residence		
Rural	65	18.3
Urban	290	81.7
Marital Status		
Monogamy	326	91.8
Polygamy	29	8.2
BMI		
Underweight	2	0.6
Normal weight	99	27.9
Overweight	201	56.6
Obesity	53	14.9
Subset of Infertility		
Primary	63	17.7
Secondary	292	82.3

**=>Mean age = 34.98 (SD 4.67); Median age = 35.00; Range = 24-46.*
 # =>Mean duration = 4.50 (SD 2.17); Median duration = 4.0; Range 1-12.
§=> Mean duration = 4.52 (2.17); Median duration = 4.10; Range = 1-12

The mean age of the subjects was 34.98 years (SD 4.67). Majority (96.6%) of them were 25 years and above. The mean duration of infertility was 4.5 years (SD 2.17), and this was ≥2 years in almost all (96.6%) cases. More than half (59.7%) of the subjects were of low socioeconomic status; but all of them had at least a primary school education, with upto two fifth (39.2%) attaining tertiary level of education. Most of the participants (81.7%) dwell in the urban. All the subjects were married, mostly (91.8%) in a monogamous family setting; the mean duration of marriage was 4.52 years (SD 2.17). Secondary infertility was the commonest (82.3%). Only 27.9% of the subject were of normal weight (BMI 18.5-24.9kg/m2), most others were overweight or obese [(BMI 25-29.9kg/m2) (56.6%) and (BMI > 30kg/m2) (14.9%)].

Table 2: Prevalence of abnormal semen parameters among male partners of women with Infertility

Semen parameters	Frequency	Percent
Normal	119	33.5
Abnormal	236	66.5
Total	355	100.0

Table 2 shows the pattern of semen fluid analysis. Of the 355 male partners, 236 (66.5%) had at least one form of seminal fluid abnormality.

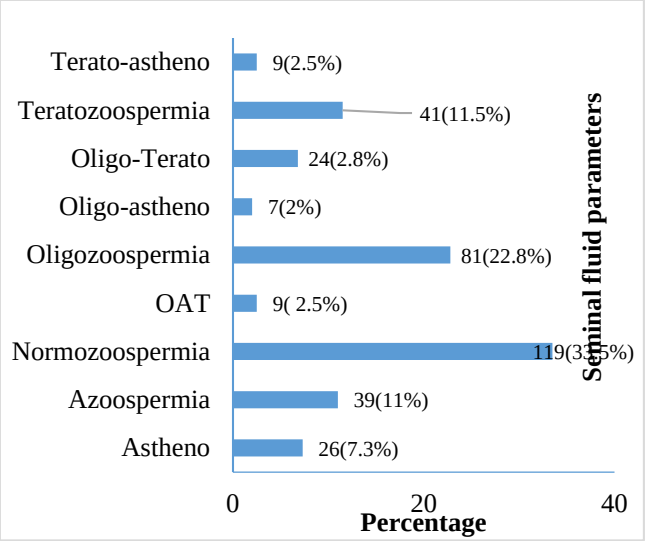

Fig. 1: Pattern of Semen parameters among male partners of women with Infertility

Figure 1 shows the pattern of seminal fluid analysis. Oligospermia was the commonest (22.8%), followed by azoospermia (11.0%); teratozoospermia (11.5%), and asthenozoospermia (7.3%). The mixed abnormalities were oligo-teratozoospermia (6.8%); oligo-asthenozoospermia(2.0%),oligo-asteno-teratozoospermia (OAT syndrome) (2.5%), and terato-asthenozoospermia(2.5%)

Table 3: Clinical characteristics of male partners of women with Infertility

Clinical Factor	Positive		Negative		Total
	N	%	N	%	
Sexual Dysfunction	52	14.6	303	85.4	355
Herniorraphy	53	14.7	302	85.3	355
Scrotal surgery	56	15.8	299	84.2	355
Undescended Testes	30	8.5	325	91.5	355
Mumps-orchitis	72	20.3	283	79.7	355
Pain in the testes	152	42.8	203	57.2	355
Varicocoele	31	8.8	323	91.2	355
Urethral discharge	140	39.4	215	60.6	355
Cigarette smoking	79	22.3	276	77.7	355
Alcohol use	156	43.9	199	56.1	355
Cimetidine Use	44	12.4	311	87.6	355

Table 4: Correlates between clinical characteristics and abnormal semen parameters in male partners of women with Infertility

Clinical Characteristics	Seminal Analysis				
	Normal	Abnormal	*P*-value	OR	95% C.I for OR
Sexual Dysfunction					
Yes	6(11.5)	46(88.5)	**0.000**	**4.56**	**1.89 - 11.02**
No	113(37.3)	190(62.7)			
Herniorraphy			**0.000**	**5.7**	**2.20 – 14.75**
Yes	5(9.6)	47(90.4)			
No	114(37.7)	188(62.3)			
Scrotal surgery					
Yes	8(14.3)	48(85.7)	**0.000**	**3.54**	**1.62 – 7.76**
No	111(37.1)	188(62.9)			
Undescended Testes					
Yes	1(3.3)	29(96.7)	**0.000**	**16.53**	**2.23 – 122.92**
No	118(36.3)	207(63.7)			
Mump orchitis					
Yes	10(13.9)	62(86.1)	**0.000**	**3.88**	**1.91 – 7.90**
No	109(38.5)	174(61.5)			
Pain in the testes					
Yes	17(11.2)	135(88.8)	**0.000**	**8.02**	**4.52 – 14.25**
No	102(50.2)	101(49.8)			
Varicocele					
Present	3(9.7)	28(90.3)	**0.003**	**5.21**	**1.55 – 17.49**
Absent	116(35.8)	208(64.2)			
Urethral discharge					
Yes	12(8.6)	128(91.4)	**0.000**	**10.57**	**5.52 – 20.23**
No	107(49.8)	108(50.2)			
Cigarette Smoking					
Yes	9(11.4)	70(88.6)	**0.000**	**5.15**	**2.47 – 10.75**
No	110(39.9)	166(60.1)			
Alcohol Consumption					
Yes	24(15.4)	132(84.6)	**0.000**	**5.02**	**3.00 – 8.42**
No	95(47.7)	104(52.3)			
Cimetidine Usage					
Yes	4(9.1)	40(90.9)	**0.000**	**5.87**	**2.05 – 16.82**
No	115(37.0)	196(63.0)			

Table 3 shows the clinical characteristics of the participants. About two-fifth takes alcohol regularly (43.9%), had previous history of urethral discharge (39.4%), or of testicular pain (42.8%). About One-fifth had a past history of mumps-orchitis (20.3%), or smoked cigarette (22. 3%).Less than a tenth had varicocele (8.8%), or undescended testes (8.5%); while a little more than one-tenth reported haven taken Cimetidine (12.4%), had herniorrhaphy (14.7%), scrotal surgery (15.8%), or sexual dysfunction (14.6%).

Table 4 shows the correlation between the clinical characteristics and abnormal seminal fluid. Notably, there were statistically significantly more participants with sexual dysfunction (88.5%) (p = 0.000; OR 4.56, CI 1.89-11.02), herniorrhaphy (90.4%) (p= 0.000; OR 5.7, CI 2.20-14.75), scrotal surgery (85.7%) (p = 0.000; OR 3.54, CI 1.62-7.76), undescended testes (96.7%) (p = 0.000; OR 16.53, CI 2.23-122.92); mumps orchitis (86.1%) (p = 0.000; OR 3.88, CI 1.91-7.90); testicular pains (88.8%) (p = 0.000; OR 8.03; CI 4.52-14.25); varicocele (90.3%) (p = 0.003; OR 5.21. CI 1.55-17.49); history of purulent urethral discharge (91.4%) (p = 0.000; OR 10.57, CI 5.52-20.23); tobacco smoking (88.6%) (P= 0.000; OR 5.15, CI 2.47-10.75); alcohol consumption (84.6%) (p = 0.000; OR 5.02, CI 3.00-8,42); and taking of cimetidine (90.9%) (p = 0.000; OR 5.87, CI 2.05-16.82) who have abnormal seminal fluid parameters than participants who did not have any of these clinical pathologies. However, on multivariate logistic regression analysis of these clinical correlates of male infertility (table 5), history of urethral discharge, undescended testes, and Cimetidine use maintained negative correlation with abnormal semen parameters.

Table 5: Multivariate logistic regression of the clinical correlates abnormal semen parameters

Clinical Correlates	*P*-value	OR	95% C.I. for OR
Mump orchitis	0.056	0.217	0.045-1.041
Urethral discharge	0.000	0.068	0.017-0.277
Scrotal surgery	0.196	3.008	0.566-15.988
Undescended testes	0.016	0.073	0.009-0.617
Cimetidine use	0.009	0.212	0.066-0.684
Smoking cigarette	0.154	0.489	0.183-1.307
Alcohol	0.093	0.537	0.260-1.109
Testicular pain	0.150	2.744	0.694-10.847

Discussion

Infertility is a common reproductive health problem globally, worse in sub-Saharan Africa nations. The male contributions to the burden of infertility, and the various clinical correlate of this problem in this environment needed to be properly documented. In this study, the participants were male partners of women with infertility, and were mostly above 25 years of age. Although mostly of low socio-economic brackets, they all had at least primary school education, most of them lived in the urban areas of the state, and they were mostly overweight or obese. They had been married for a mean duration of 4 ½ years and majority had been regarded as having infertility for at least 2 years, mostly of the secondary category. This demographic profile is consistent with other local documentations. This study demonstrated at least one abnormality in semen parameters in more than two-third (66.5%) of the participants. This high prevalence of male factor infertility is similar to findings from other parts of Nigeria 19-21, 24. This calls attention to the heavy contribution of male partners to the overall burden of infertility, and the need to put this information in the public domains to tackle the misconceptions on male contributions to infertility. Various disorders of semen parameters were noted among the participants. Oligozoospermia alone (22.8%) was the most common semen disorder. This is similar to the findings in Ile-Ife[22], Abakaliki[23] and Kano[24]. Other semen abnormalities noted in the study were comparable to findings of earlier studies in Kano[24] and Benin City[25].

In this study, selected clinical risk factors of male infertility and their association with seminal fluid parameters were examined to establish correlates. Abnormal semen parameter was significantly more common in those with sexual dysfunction and indeed the subjects with sexual dysfunction had greater than four odds of having abnormal seminal fluid parameters. In this study erectile disorder was the main form of sexual dysfunction noted. Other investigators had noted similar relationship in men with sexual dysfunction resulting from spinal cord injury[26]. Having undergone herniorrhaphy was significantly associated with 6-fold chances of having abnormal semen parameters. This finding is consistent with similar studies in Orlu, Imo State[27].Herniorrhaphy may result in iatrogenic damage to the vas deferens leading to its total or partial occlusion, or the immunologic activation of anti-sperm antibodies resulting in semen abnormalities. Likewise, scrotal surgery was more than three-fold associated with abnormal semen parameters. Reports[28] indicates that scrotal and groin surgeries like hydrocelectomy and orchidopexy as well as trauma can lead to testicular injury and subsequently testicular atrophy, or disruption of the blood-testis barrier with activation of anti-sperm antibody production[28]. There was a seventeen-fold odds of abnormal semen parameters in male with undescended testes. Previous reports have indicated that undescended testes are the most common identifiable cause of primary testicular disease[28]. The pathogenetic mechanism of spermatogenic damage in maldescent of the testes remains unclear. It has been suggested that the increased temperature to which the intra-abdominal testes is exposed and the increased likelihood of testicular trauma or torsion in this position might be responsible. There was also a fourfold odds of abnormal semen parameters in male with history of mumps-ochitis. Existing data suggest that fertility is usually unaffected if orchitis occurs before puberty, but in cases of post-pubertal orchitis, the tunica albugenia forms a barrier against edema, and the subsequent rise in intra testicular pressure leads to pressure – induced testicular atrophy leading to male infertility[29]. In this study, there were eight folds odds of finding abnormal semen parameters in males with history of testicular pains. The exact mechanism of abnormal semen parameters in testicular pain remains

unclear. However, a past or ongoing infection in the testes and adjourning genital structures could be the link. Infections are known to have a direct damaging effect on the seminiferous tubules and vas deferens resulting in blockade[29-31]. Some males with huge varicocele have also reported dragging pain in the testes of the affected side[32].The potential role of varicocele in the causation of male infertility remains controversial, with findings both in support and not in support of any causal relationships[32-37]. It is usually an incidental finding during evaluation for infertility. Surveys have shown a prevalence of 5 – 20% in the general population and 10 – 40% among the infertile males. In this study, participants with varicocele have fivefold odds of having abnormal semen parameters[32-37]. This finding is similar to result of earlier workers in Benin City[38]. Purulent urethral discharge as a surrogate for sexually transmitted infections was found to have tenfold odds of being associated with abnormal semen parameters. Various organisms have been implicated as causes of sexually transmitted infections, in particular chlamydia trachomatis and Neisseria gonorrhea. The primary site of male Chlamydia infection is the penile urethra; with subsequent retrograde infection of the epididymis and testis[30]. Infection may lead to canalicular system damage, testicular atrophy and obstructive azoospermia. Infection is postulated to affect sperm motility; DNA fragmentation rate formulate of antisperm antibodies and have direct cytotoxic effect in spermatozoa[30,31].

Selected social habits were also evaluated to assess their potential contribution to male infertility. There was a statistically significant higher prevalence of abnormal semen parameters among those that smoked cigarette and took alcohol compared to males who did not indulge in these social habits. Various reports have demonstrated negative impact of cigarette smoking on human semen parameters, with direct correlation with the number of cigarette sticks smoked per day. Cigarette smoking in male affects every system involved in the reproductive process. Spermatozoa from smokers have been found to have reduced fertilizing capacity and the resultant embryos display lower implantation rates[33,34]. Although alcohol is widely used, its impact on male reproductive potential is still controversial. However, studies have shown that it has negative impacts both on semen parameters and sexual function[35]. It has been reported to affect the male reproductive system from the hypothalamus, the anterior pituitary gland to the testes[33,34]. Some common prescription drugs are known to negatively affect semen parameters. In this study, many participants reported the use of Cimetidine for the treatment of peptic ulcer disease. It was noted that male partners who used Cimetidine had six-fold odds of having abnormal semen parameters. In the multivariate logistic regression analysis, only urethra discharge, undescended testes and cimetidine-use remained statistically significant but with odds less than unity. The reason for these apparent protective odds for abnormal semen profile is not clear, but underscores the need for conduct of analytical study design to explore each of these risk factors. Scrotal surgery and testicular pain maintained positive association, these were however not statistically significant, and the confidence interval of the threefold odds recorded also crossed unity suggesting none effects.

Conclusion

The prevalence of male factor infertility in our setting was high. There was significant association between male infertility as defined by abnormal semen parameters and wide range of clinical and psychosocial problems. A multicenter analytical study will establish the cause-effects relationship of these correlates and male infertility in Nigeria, and open up new pivots for male fertility preventive programs and policies.

Authors' Contributions

All three authors ME, LOO and ATA were involved in conceptualization and drafting of the study protocol as well as in all stages of the conduct of the study, data management and analysis and in the writing of the manuscript. All authors have read and approved the final version of the manuscript, and agree with the order of presentation of the authors.

Acknowledgements

We wish to thank Prof. Francis Abantanga, Dean of SMHS/UDS, Rev Edmund Browne, MD, and Issaka Adamu, MD, for agreeing to read our manuscript and making useful comments and suggestions. We also thank Mr. Kwasi Nkayi for helping with data collection and finally, we wish to express our sincere gratitude to all the ENT nurses for their assistance in caring for these patients.

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PERSONAL AND BEHAVIOURAL CHARACTERISTICS AND RISK OF HIV TRANSMISSION AMONG MEN AND WOMEN IN AN URBAN FISHING SETTING IN GHANA

Yawson AE[1], Yeboah OA[2], Yawson AO[3], Yamson P[1], Yorke E[4], Boima V[4], Ayisi AS[6], Dornoo BT[6], Lartey M[4]

[1]Department of Community Health, University of Ghana Medical School, College of Health Sciences. Korle-Bu, Accra, Ghana; [2]Department of Obstetrics and Gynaecology, Korle-Bu Teaching Hospital, Korle-Bu, Accra, Ghana; [3]Department of Anaesthesia Korle-Bu Teaching Hospital, Korle-Bu, Accra, Ghana; [4]Department of Medicine and Therapeutics, University of Ghana School of Medicine and Dentistry, College of Health Sciences. Korle-Bu, Accra, Ghana; [6] National AIDS/STI Control Programme, Public Health Division, Ghana Health Service, Accra, Ghana

Abstract

Background: HIV surveillance surveys are designed to track trends in HIV and AIDS related knowledge, attitudes and behaviours in sub-populations at particular risk of infection and link the behaviour to biological surveillance. This survey determined personal characteristics, high risk sexual behaviours and HIV perception and testing experience among men and women in an urban fishing community in Ghana.

Methods: A cross-sectional community survey was conducted in 2013 among men and women in two fishing communities (Chorkor and James Town) in Accra. In all, 554 subjects (≥18 years) were involved, 264 in Chorkor and 290 in James Town. Data on personal and behavioural characteristics, high risk sexual behaviours, HIV perception and testing experience among men and women were collected with a structured questionnaire. Descriptive statistics and Chi square test were used for the analysis at 95% significant level, using SPSS version 21.

Results: Of 554 subjects, 329 (59.4%) were females, and median age was 32 years. A higher proportion of women had no formal education, relatively more men were employed and earned statistically significant higher monthly income than women (72.2% vs. 65.9%, p< 0.001). More working men were involved in itinerant occupations compared to women (46.1% vs. 22%; p< 0.001). Half of all respondents have had sexual intercourse less than a month prior to survey, however, only less than a third 153 (28.5%) used condom during the last intercourse. High risk HIV sexual behaviour was more common in younger age groups (> 30 years), those living with partners, those with low education, those currently employed, and those without health insurance. It was also higher in those who did not perceive themselves as being at risk of HIV, have never tested for HIV and who were not members of any social groups or clubs.

Conclusion: The survey indicated important personnel and behavioural characteristics that are very important for programme planning and control. Targeted health promotion messages, behaviour change communication, and increased engagement with communities and groups are necessary to capture vulnerable men and women in high risk settings. Behavioural surveillance surveys should be considered essential component of national control efforts.

Key Words: Behavioural Surveillance Survey, Sexual Risk Behaviour, Urban Community, Ghana

Introduction

The 2013 HIV prevalence in Ghana was 1.30% in the adult population and 1.9% among pregnant women aged 15-49 years[1]. In Ghana, there is a higher HIV prevalence in urban sites compared to rural sites, as is true in other parts of Africa and also among at-risk groups (commercial sex workers and clients at STI clinics)[1,2]. The National AIDS/STI Control Programme (NACP) of Ghana Health Service (GHS) has been the lead agency in the health sector response to HIV and AIDS in Ghana[3]. The programme has been involved in behaviour change communication programmes, HIV testing and counselling, provision of antiretroviral therapy, prevention of mother-to-child transmission of HIV, early infant diagnosis of HIV, prevention and management of STIs including condom use, blood and blood products safety, advocacy and research3. Generation and estimation of HIV prevalence data for programme activities and planning in Ghana are done using United Nations Programme on AIDS (UNAIDS)/ World Health Organization (WHO) recommended methods[1,4,5]. The determination of HIV prevalence is primarily based on sentinel surveillance among pregnant women attending Antenatal Care (ANC) clinics which has been conducted annually since 1992 and a national population based survey that includes HIV testing within the Demographic and Health Surveys[1]. The method used to calibrate the HIV sentinel survey data is based on the Estimation and

Corresponding Author: **Yawson AE**
Department of Community Health, School of Public Health, College of Health Sciences, University of Ghana,
Tel. Number: +233 244 662711
Email Address: aeyawson@yahoo.com
Conflict of Interest: None Declared

Projection Package (EPP) software of the UNAIDS[1, 4,5]. The HIV sentinel survey though very useful is limited to only biological methods of assessment6. The WHO and UNAIDS have promoted the adoption of second generation HIV surveillance as a strategy for addressing limitations of the first-generation procedure such as HIV sentinel surveys[1]. The second-generation HIV surveillance is designed to track trends in HIV and AIDS related knowledge, attitudes and behaviours in sub-populations at particular risk of infection and link the behaviour to biological surveillance so as to enhance the explanatory power of biological surveillance[6]. Results of these surveys provide evidence of national HIV programme performance and impacts, and highlight persistent problem areas. In addition, they identify specific behaviours in need of change and the appropriate interventions for priority populations[6]. The goal of this analysis was to determine personal characteristics, high risk sexual behaviours and HIV perception and testing experience among men and women in two densely populated youthful urban communities in the coastal part of Accra, Ghana. It was to identify specific behaviours in need of change in line with national efforts to combat HIV infection among this priority population.

Methods

Survey design

This was a cross-sectional community survey conducted over a four-week period in September-October 2013 in an urban fishing setting in Accra, Ghana.

Survey site

The survey was conducted in Chorkor in the Ablekuma South Sub-metropolitan area and James Town in the Ashiedu Keteke Sub-metropolitan area of Accra, Ghana. These urban fishing settings are in the southern part of Accra, the capital city of Ghana and are characterized by high population densities, large transitory and large youthful populations[7].

Survey Population and sample size

The survey population were males and females 18 years and above in the communities. Subjects were selected from households within the communities who consented to be part of the survey. The appropriate sample size for the survey was determined by the estimated proportion of community members ever tested for HIV (level of willingness to test), desired level of confidence of 95% and acceptable margin of error of 5%. The Ghana Demographic and Health Survey of 2008, found that 21% of females and 14% of males (aged 15-49 years) have ever been tested for HIV[7,8] A 20% willingness to test for HIV among community members was used to estimate the minimum sample size. Accounting for contingencies - non-response, refusals and incomplete information, the minimum sample size was 520 (260 in each community). In all, 554 subjects were involved, 264 in Chorkor and 290 in James Town.

Sampling Methods

The survey employed the modified World Health Organization (WHO) cluster sampling method to select eligible subjects.

Each neighbourhood was segmented into four clusters by natural/geographical boundaries. A cluster was chosen by a simple random sampling technique and all eligible subjects within households who consented were included. Houses in the two communities have standard house numbering systems, and households within a house were numbered serially. If more than one household existed within a house, then the first household interviewed was designated as (house number/ 001), the second household interviewed was designated as (house number/ 002), and serially if there were more eligible households within the same house. All households within a selected cluster were eligible for inclusion. One adult member of each household within a house was interviewed, and this continued until the sample size was obtained. The field workers were educated thoroughly on how to assign the codes to households in the two communities.

Data collection instruments

Data collection tool for the study was a structured questionnaire. Data collected included; demographic and socioeconomic characteristics and personal sexual behavioural characteristics. The questionnaire was pre-tested at Bukom, a neighbourhood in the Ashiedu-Keteke Sub-metropolitan area of Accra with similar characteristics to the two communities surveyed.

Data Handling

All data was treated with a high level of confidentiality. Unique identifiers and codes were employed to de-personify the participants and were used for computer-based data entry. In all cases, study forms, completed questionnaire and other survey documentations were kept securely locked. Computerized records of the survey were kept in locked files. These documents were accessible to the principal investigator only.

Data analysis

Outcome measures of interest among the demographic and socioeconomic factors, personal sexual behavioural characteristics, perceived risk for HIV and testing experience were analyzed using descriptive statistics (e.g. proportions, frequencies, ratios). Significant differences in categorical outcome measures were analyzed using Chi square test, at the 95% significant level and p-value< 0.05. SPSS version 21 was used for the analysis. Engagement in casual sex was used as the dependent variable for high risk HIV behaviour and was assessed per demographic, socioeconomic and personal characteristics of community members. In this survey a regular partner was someone the respondent was in a relationship with or felt committed to above anyone else while a casual partner was someone the respondent did not feel committed to or did not know very well.

Ethical issues

Ethical clearance was obtained from the University of Ghana Medical School Ethical and Protocol Review Committee (MS-Et/M.11-P.5.8/2011-2012) and Brown University Institutional Review Board (#1301000744). Trained interviewers administered the questionnaire in the local language of members of the community. Participants in the survey were made to sign a written informed consent form and a waiver of written consent for those participants who were illiterate was obtained.

Results

Overall, 554 subjects were involved in the survey, 225 males and 329 females, with a male to female ratio of 1:1.5. The overall median age was 32 years (34years among males and 30 years among females) as shown in Table1.

Table 1: Age and sex characteristics of subjects in the urban fishing setting, Accra, Ghana

Age groups (years)	Sex		Total (%)
	Male (%)	Female (%)	
<20	43 (19.1)	56 (17)	99 (17.9)
21-30	72 (32)	134(40.7)	206(37.2)
31-40	56 (24.9)	63 (19.1)	119 21.4)
41-50	30 (13.3)	39 (11.9)	69 (12.5)
51-60	15 (6.7)	24 (7.3)	39 (7)
> 60	9 (4)	13 (4)	22 (4)
Total	225 (100)	329 (100)	554 (100)

Most respondents (men and women) had primary to secondary level education, however relatively higher proportion of women had no formal education as shown in Table 2. Nineteen (3.4%) of the 554 respondents had University/ tertiary level education. Seventy-eight (34.7%) of men and 147 (44.7%) of women were married. However, close to a third of men 73 (32.4%) and a quarter of women 83 (25.2%) were single. Majority of men and women in the communities were Christians, and were mostly Ga / Ga Dangme by ethnicity. Relatively more men were employed than women (72.2% vs. 65.9%, although the difference was not statistically significant). Among the working group, men earned significantly higher monthly income than women as indicated in Table 2. More working men were involved in activities which took them outside the community more often compared to women (46.1% vs. 22%; $p< 0.001$). Less than half of both men and women in the community had health insurance. More men belonged to social clubs in the communities compared to women (36.9% vs. 24.6%).

Table 2: Basic demographic and socioeconomic characteristics of members of the urban fishing setting in Ghana.

Characteristic	Male (%)	Female (%)	Total (%)	Chi Square (P- value)
Educational Level				
No Formal Education	16(7.1)	39(11.8)	55(10)	
Primary	55(24.4)	92(62.6)	147(26.5)	
Middle/JHS	62(27.6)	107(32.5)	169(30.5)	
Secondary/High School	63 (28)	63(19.1)	126(22.7)	
University/ College	10 (4.4)	9 (2.7)	19 (3.4)	
Vocational/ Commercial/ Technical	19 (8.4)	19 (5.8)	38 (6.9)	
Total	225(100)	329(100)	554 (100)	
Marital status				
Married	78(34.7)	147(44.7)	225(40.6)	
Divorced	11 (4.9)	5 (1.5)	16 (2.9)	
Widowed	3 (1.3)	10 (3)	13 (2.3)	
Separated	19 (8.4)	33 (10)	52 (9.4)	
Cohabitating	33(14.7)	42 (12.8)	75 (13.5)	
Single	73(32.4)	83 (25.2)	156(28.2)	
Others	8 (3.6)	9 (2.7)	17 (3.1)	
Total	225(100)	329 (100)	554(100)	

Continuation of Table 2: Basic demographic and socioeconomic characteristics of members of the urban fishing setting in Ghana.

Characteristic	Male (%)	Female (%)	Total (%)	Chi Square (P- value)
Religion				
Christian	191 (85.3)	297 (90.3)	488 (88.2)	
Muslim	13 (5.8)	16 (4.9)	29 (5.2)	
Traditional	3 (0.9)	1 (0.3)	3 (0.5)	
No Religion	18 (8)	15 (4.6)	33 (6)	
Total	225 (100)	329 (100)	554 (100)	
Ethnicity				
Ga/ Dangme	167 (74.2)	244 (74.2)	411 (74.2)	
Akan	40 (17.8)	60 (18.2)	100 (18.1)	
Ewe	10 (4.4)	11 (3.3)	21 (3.8)	
Guan	2 (0.9)	3 (0.9)	5 (0.9)	
Mole/Dagbani	5 (2.2)	10 (3.0)	15 (2.7)	
Others	1 (0.4)	1 (0.3)	2 (0.4)	
Total	225 (100)	329 (100)	554 (100)	
Employment Status				
Employed	162 (72.2)	217 (65.9)	379 (68.4)	
Unemployed	63 (27.8)	112 (34.1)	175 (31.6)	2.20 (0.136)
Total	225 (100)	329 (100)	554 (100)	
Total Monthly income (Ghana cedis)*				
<100 (<$51.3)	40 (28)	76 (37.9)	116 (33.8)	
Between 100 and 200 ($51.3-$102.6)	51 (35.7)	72 (35.5)	123 (35.5)	**13.91 (0.008)**
Between 200 and 500 ($102.6 $256.6)	34 (23.8)	48 (23.6)	82 (23.7)	
Between 500 and 1000 ($256.6 $512.8)	14 (9.8)	4 (2)	18 (5.2)	
> 1000 (>$512.8)	4 (2.8)	2 (1)	6 (1.7)	
Total	143 (100)	202 (100)	345 (100)	
Occupation or daily activities involve travelling outside Accra				
Yes	75 (46.1)	48 (22)	122 (31.8)	**24.54 (0.001)**
No	87 (53.9)	169 (78)	257 (68.2)	
Total	162 (100)	217 (100)	379 (100)	
Have Health Insurance				
Yes	100 (44.4)	152 (46.2)	252 (45.5)	0.17 (0.684)
No	125 (55.6)	177 (53.8)	302 (54.5)	
Total	225 (100)	329 (100)	554 (100)	
Member of a social club in community				
Yes	83 (36.9)	81 (24.6)	164 (29.6)	
No	142 (63.1)	248 (75.4)	390 (70.4)	**9.65 (0.002)**
Total	225 (100)	329 (100)	554 (100)	

*** The currency exchange rate at time of data collection was $1= GHc 1.95**

In all, half of all respondents have had sexual intercourse less than a month prior to the survey relatively higher among the females (176; 53.5% vs. 103; 45.8%) i.e. most respondents were sexually active. However, only less than a third of respondents 153 (28.5%) used condom during the last intercourse, slightly higher among males (80; 35.6% vs. 73 21.5%) as shown in Table 3. Overall, close to a third of all respondents had two or more sexual partners within the last 12 months as shown in Table 3. Men had a relatively higher proportion than the women (34.7% vs. 24.3%). More women have had only one sexual partner in the last 12 months compared to men (157; 47.7% vs. 96; 42.7%). More men had two or more regular sexual partners over the past 12 months compared to women, this difference in number of sexual partners between

the sexes was statistically significant (P = 0.003) as demonstrated in Table 3. A slightly higher proportion of men had engaged in casual sexual behaviour over the last 12 months compared to women (35.1% vs. 31.2%), this gender difference was statistically not significant. In addition, close to a third of both men and women have had sex in exchange for money or favour in last 12 months, 161 (29.2%), slightly higher among the women (97; 29.5% vs. 64; 28.3%). In addition, a relatively higher proportion of women have had sex more than once in exchange for money or favour in last 12 months (28.2% vs. 25.9%). Regarding HIV risk and testing, relatively higher proportion of men perceived themselves as being at risk of HIV (40.4% vs. 35.9%) and yet a significantly higher proportion of women had ever tested for HIV compared to men (42.2% vs. 28.6%, P= 0.001).

Table 3: Sexual risk behaviours and HIV risk perception among men and women of the urban fishing setting in Ghana

Characteristic	Male (%)	Female (%)	Total (%)	Chi square *(p-value)
Last time of sexual intercourse				
< 1 month	103 (45.8)	176 (53.5)	279 (50.4)	
Between 1 and 3 months	32 (14.2)	52 (15.8)	84 (15.2)	
Between 3 and 6 months	26 (11.6)	20 (6.1)	46 (8.3)	**20.91 (0.004)**
Between 6 and 12 months	12 (5.3)	9 (2.7)	21 (3.8)	
> 12 months	12 (4.9)	27 (8.2)	39 (6.9)	
Others (not applicable)	40 (17.7)	45 (13.7)	85 (15.4)	
Total	225 (100)	329 (100)	554 (100)	
Used condom during last intercourse				
Yes	80 (35.6)	73 (21.5)	153 (28.5)	**16.22 (0.001)**
Total	225 (100)	329 (100)	554 (100)	
Number of sexual partners in last 12 months				
None	51 (22.7)	92 (28)	143 (25.8)	
1	96 (42.7)	157 (47.7)	253 (45.7)	
2	42 (18.7)	45 (13.7)	87 (15.7)	12.25 (0.060)
3	13 (5.8)	19 (5.8)	32 (5.8)	
4 or more	23 (10.2)	16 (4.8)	39 (7)	
Total	225 (100)	329 (100)	554 (100)	
Number of regular partners in last 12 months				
None	50 (22.2)	90 (27.4)	140 (25.3)	
1	131 (58.2)	211 (64.1)	342 (61.7)	
2	35 (15.6)	21 (6.4)	56 (10.1)	**18.16 (0.003)**
3	4 (1.8)	6 (1.8)	10 (1.8)	
4 or more	5 (2.2)	1 (0.3)	4 (1.1)	
Total	225 (100)	329 (100)	554 (100)	
Number of casual sex partners in last 12 months				
None	146 (64.9)	226 (68.7)	372 (67.1)	
1	29 (12.9)	61 (18.5)	90 (16.2)	
2	22 (9.8)	20 (6.1)	42 (7.6)	10.57 (0.067)
3	14 (6.2)	12 (3.6)	26 (4.7)	
4 or more	14 (6.2)	10 (3)	24 (4.3)	
Total	225 (100)	329 (100)	554 (100)	

p-value is for engagement in casual sex or otherwise and not by sex

Continuation of Table 3: Sexual risk behaviours and HIV risk perception among men and women of the urban fishing setting in Ghana

Characteristic	Male (%)	Female (%)	Total (%)	Chi square *(p-value)
Number of partners you had sex with in exchange for money or favour in last 12 months				
None	161 (71.6)	232 (70.5)	393 (70.9)	
1	31 (13.8)	58 (17.6)	89 (16.1)	
2	12 (5.3)	14 (4.3)	26 (4.7)	3.34 (0.765)
3	10 (4.4)	13 (4)	23 (4.2)	
4 or more	11 (4.8)	12 (3.6)	23 (4.2)	
Total	225 (100)	329 (100)	554 (100)	
Number of times you had sex in exchange for money or favour in last 12 months				
None	167 (74.2)	236 (71.7)	403 (72.7)	
1	24 (10.7)	44 (13.3)	68 (12.3)	
2	13 (5.8)	19 (5.8)	32 (5.8)	
3	5 (2.2)	8 (2.4)	13 (2.3)	4.06 (0.669)
4 or more	16 (7.2)	22 (6.7)	38 (6.9)	
Total	225 (100)	329 (100)	554 (100)	
Do you perceive yourself as being at risk of acquiring HIV?				
Yes	91 (40.4)	118 (35.9)	209 (37.7)	
No	134 (59.6)	211 (64.1)	345 (62.3)	3.38 (0.275)
Total	225 (100)	329 (100)	554 (100)	
Ever Tested for HIV				
Yes	64 (28.6)	139 (42.2)	203 (36.7)	
No	161 (71.4)	190 (57.8)	351 (63.3)	**10.73 (0.001)**
Total	225 (100)	329 (100)	554 (100)	

p-value is for engagement in casual sex or otherwise and not by sex

Table 4: High Risk sexual behaviour and personal characteristics of members of the urban fishing community

Characteristic	High Risk sexual behaviour - casual sex in past 12 months		Total (%)	Chi Square (P- value)
	No	Yes		
Age				
<20 years	60 (15.9)	40 (22.7)	100 (18.1)	
21-30 years	112 (29.8)	90 (51.1)	202 (36.7)	
31-40 years	95 (25.3)	25 (14.2)	120 (21.7)	**39.6 (0.001)**
41-50 years	57 (15.1)	12 (6.8)	69 (12.4)	
51-60 years	34 (8.9)	6 (3.4)	40 (7.1)	
> 60 years	20 (5.1)	3 (1.7)	23 (4.0)	
Total	378 (100)	176 (100)	554 (100)	
Educational level				
No formal education	31 (8.1)	24 (13.1)	55 (9.5)	
Low education (Primary/JSS/Middle school)	222 (59.3)	92 (51.7)	314 (57.0)	5.00 (0.08)
High education (Secondary/Vocational /Technical)	122 (32.6)	63 (35.2)	185 (33.5)	
Total	375 (100)	179 (100)	554 (100)	
Employment status				
Employed	234 (61.6)	105 (60.3)	339 (61.2)	
Unemployed	146 (38.4)	69 (39.7)	215 (38.8)	1.31 (0.25)
Total	380 (100)	174 (100)	554 (100)	

Continuation of Table 4: High Risk sexual behaviour and personal characteristics of members of the urban fishing community

Characteristic	High Risk sexual behaviour - casual sex in past 12 months		Total (%)	Chi Square (P- value)
	No	Yes		
Marital Status				
Living with partner	205 (54.6)	93 (52.3)	295 (53.8)	0.25 (0.614)
Living without partner	170 (45.4)	86 (47.7)	253 (46.2)	
Total	375 (100)	179 (100)	554 (100)	
Religion				
Christian	321 (85.1)	161 (91.0)	482 (87.0)	
Muslim	22 (5.8)	7 (4.0)	29 (5.2)	4.32 (0.365)
No Religion	26 (6.9))	6 (3.4)	32 (5.8)	
Traditional/ Other	8 (2.1)	3 (1.7)	11 (2.0)	
Total	377 (100)	177 (100)	554 (100)	
Health Insurance status				
Yes	185 (48.9)	69 (39.2)	254 (45.8)	**4.55 (0.033)**
No	193 (51.1)	107 (60.8)	300 (54.2)	
Total	378 (100)	176 (100)	554 (100)	
Member of a social club in community				
Yes	119 (31.2)	47 (26.7)	166 (29.7)	
No	259 (68.8)	129 (73.3)	388 (70.3)	1.15 (0.284)
Total	378 (100)	176 (100)	554 (100)	
Ever tested for HIV				
Yes	165 (43.7)	40 (22.7)	205 (36.9)	
No	213 (56.3)	136 (77.3)	349 (63.1)	**22.47 (0.001)**
Total	378 (100)	176 (100)	554 (100)	
Ever tested for HIV with past 12 months				
Yes	79 (48.2)	17 (42.5)	96 (47.1)	
No	85 (51.8)	24 (57.5)	109 (52.9)	0.42 (0.519)
Total	164 (100)	41 (100)	205 (100)	
Perceives oneself as being at risk of acquiring HIV				
Yes	130 (34.1)	80 (45.5)	210 (37.8)	
No	248 (65.9)	96 (54.5)	344 (62.2)	**6.52 (0.011)**
Total	378 (100)	176 (100)	554 (100)	

High risk sexual behaviour (engagement in casual sex in the past 12 months) was more common in the more younger age groups (30 years or less) and this was statistically significant, P = 0.001. Casual sexual encounters were more common (although not statistically significant) in those who were living with partners, those with low education (Primary/JSS/Middle school completed or less), and those currently employed as indicated in Table 4.

Interestingly, high risk sexual behaviour was significantly more common in those without health insurance (P = 0.033), significantly higher among community members who did not perceive themselves as being at risk of HIV (P = 0.011), as well as among those who have never tested for HIV (P = 0.001) nor tested for HIV in the past 12 months. In addition, men and women who were not members of a social club in their community had higher proportion of those who engaged in casual sexual behaviours.

Discussion

The WHO and UNAIDS have promoted the adoption of second generation HIV surveillance designed to track trends in HIV and AIDS related knowledge, attitudes and behaviours in sub-populations at particular risk of infection and link the behaviour to biological surveillance, which is currently the method used for assessing HIV prevalence and trend of the epidemic in Ghana[5,6].The population involved in this survey were young, overall median age was 32 years (34 years among males; 30 years among females) which reflects the population most at risk of HIV in Ghana1. Not surprisingly, the survey identified a higher proportion of women to have no formal education, relatively more men were employed than women and that among the working group men earned statistically significant higher monthly income than women. These socio-demographic characteristics of the urban fishing setting is directly in sync with that of the national population as indicated by the Ghana

Demographic and Health Survey and the Ghana Living Standards Survey[8,9]. Interestingly more working men were involved in activities which took them outside the community more often compared to women, and this has significance for HIV risk behaviours, testing experience and service provision. Studies have indicated that itinerant nature and frequent male mobility may require special HIV testing and service provision avenues[10, 11, 12]. In addition, previous research in Ghana have indicated that community based testing programmes (i.e. Know Your Status KYS) seem to be more attractive for men[7, 11]. Its disassociation from the health facility makes it easier for men to access services without being seen as weak or sick which is consistent with traditional masculinity ideology that usually cast men as being invulnerable to disease and not needing health care[13]. The national control programme needs to consider the iterant nature of male professions in such high risk communities and structure and situate male focused HIV testing programmes in male-dominated occupations. In addition, developing routine HIV testing in the casualty and emergency units, inpatient wards and general outpatient departments of health facilities may improve the capture of men[7,14]. In all, half of all respondents have had sexual intercourse less than a month prior to the survey, however, only less than a third of these used condom during the last intercourse. It is always difficult to assess condom use (both male and female) vis a vis the number of condoms distributed in the population. Actual usage is demonstrated through behavioural surveillance surveys[6] and it is essential that such surveillance surveys be conducted in high risk population groups and communities so as to identify specific behaviours in need of change in line with national efforts to combat HIV infection among these priority population groups. Though men exhibited high sexual risk behaviours, and relatively higher proportion of men perceived themselves as being at risk of HIV , yet a significantly lesser proportion of men had ever put this risk perception to test by tested for HIV compared to women (28.6% vs. 42.2%, P= 0.001). These differences in perception and testing experience provide a tool for developing gender focused health promotion messages in high risk population groups and communities in the country. Community engagement and increased health and behaviour change communication by the Ghana Health Service through the NACP and other agencies involved in HIV and AIDS activities in Ghana, is imperative[7]. Community engagement and working through organized groups (men and women support groups and clubs) in these settings may be helpful. This survey showed higher proportion of community members who engaged in casual sexual behaviours were men and women who were not members of any social group or club in their community. It is instructive to note that a relatively higher proportion of women have had sex in exchange for money or favour more than once in the previous 12 months.

This demonstrates increased vulnerabilities and gender differences in risk of HIV due to socioeconomic disparities in these urban fishing settings in Ghana. Anarfi and colleagues have demonstrated similar findings in some communities in Ghana over a decade ago[15]. They demonstrated that itinerant trading is a major economic activity for women in West Africa. Itinerant women traders appear highly vulnerable, as women and as highly mobile people and are usually exploited for the sexual gratification of the men with whom they come into contact[15]. In fishing settings such as that for the current study, 'transactional sex' has been documented[16]. It occurs when women who a regular customers of particular fishermen need to provide sexual gratification to these men to ensure continued supply of fish for their trading activities[16]. The attempt to reduce the spread of HIV and AIDS through education has to target not only itinerant men but to include itinerant women traders as well, at the points of transaction and within high risk communities. The survey has also provided important personal and behavioural characteristics that should inform and offer targets points for national control strategies in high risk communities. High risk sexual behaviour (engagement in casual sex in the previous 12 months) was more common in the more younger age groups (30 years or less), in those who were living with partners, those with low education (Primary/JSS/Middle school completed or less) , and those currently employed. A potential explanation for these observations may be that those with less education may be less aware of the risk of HIV and that those currently employed may have the wherewithal to pay for casual sex. Counter intuitively, we found in these communities that those living with their partners had engaged in casual sexual encounters more often in previous 12 months compared to those living without partners. Could it be that those in relationships and living with partners use it as a cover to engage in casual sexual activities or that they have more financial responsibilities and are compelled to solicit for money through any means? This observation warrants in depth qualitative assessment in such high risk communities. Another intriguing observation was that, high risk sexual behaviour was significantly more common in those without health insurance (P = 0.033), among community members who did not perceive themselves as being at risk of HIV (P = 0.011), and among those who have never tested for HIV (P = 0.001) nor tested for HIV in the previous 12 months. These findings are critical and demonstrate that community members who are less health conscious and perceive themselves as invulnerable may need to be targeted specifically in the fight against HIV transmission. Behaviour change communication strategies and targeted health promotion activities in priority populations are imperative.

Limitation

Assessment of willingness to test and testing experience and casual sexual activities were based on subjective recall and responses from the subjects. Some respondents' way have over stated or understated their sexual behaviour due to sociocultural and religious belief systems. The survey had no objective way of validating the veracity of information provided by respondents. This was beyond the scope of the survey, however the authors believe the information provide useful pointers in the strategic planning for national control efforts.

Acknowledgement

We are thankful to all respondents and interviewers in the two fishing communities (Chorkor and James Town) and the field supervisors who made this survey possible. Financial support was provided by the USAID, HED and the UG-Brown University AIDS Academic Partnership through: Award # AEG-A-00-05-00007. The Department of Community Health, School of Public Health, College of Health Sciences, University of Ghana, Accra, Ghana contributed training facilities and storage of materials

Conclusion

This community based surveillance indicated important personnel and behavioural characteristics that is very important for programme planning and control. High risk HIV sexual behaviour was common among men and women in the urban fishing communities. It was more common in younger age groups (30 years or less), those living with partners, those with low education, those currently employed, and those without health insurance. In addition, it was higher in community members who did not perceive themselves as being at risk of HIV, those who have never tested for HIV nor tested for HIV in previous 12 months and those who were not members of any social groups or clubs. Targeted health promotion messages and behaviour change communication, increased engagement with communities and with men and women community groups as well as deployment of community and health facility based HIV testing and service avenues are necessary to capture vulnerable men and women in such high risk population groups. Behavioural surveillance surveys in high risk population groups should be considered essential component of national control efforts to identify specific behaviours in need of change to combat HIV infection in Ghana

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PHLEBOTOMY BY HOUSE OFFICERS

Adzamli[1] I, Tettey M[2], Sagoe J[3], Amoako J[4], Dzefi-Tettey k[5], Mohammed S[6]

[1]National Cardiothoracic Center, KBTH, Korle Bu, Accra, [2]School of Medicine and Dentistry, University of Ghana, Accra; [3]Plot 65/67 Oko Kotey Link, East Legon Accra; [4]Department of Surgery, Korle-Bu Teaching Hospital; [5]Department of Radiology, Korle-Bu Teaching Hospital; [6]Department of Surgery, School of Medicine and Dentistry, University of Ghana, Accra

Abstract

Background: Phlebotomy is a highly complex technique, requiring knowledge and skill to perform. In advanced societies, all phlebotomists undergo a well-structured training with certification**.**

Objective: This study examines the practice of phlebotomy by house-officers (HO) in Korle-Bu Teaching Hospital, as part of expediency in health service delivery.

Methodology: Self-administered questionnaires were obtained from 54 Ghanaian trained HOs (out of a total of 85 HOs) from four main departments of the Korle-Bu Teaching Hospital in December 2010. Data obtained were analysed statistically using SPSS (Version 12; SPSS Inc, Chicago, IL, USA) programme.

Results: There were 54 HOs who had worked for a minimum of six months. Thirty-five (64.5%) of them felt that venesection was not their job description.

Forty-nine (90.2%) received no formal training and 40 (74.1%) received informal training in phlebotomy during Medical School. Thirty 32 (59.3%) used the dorsum of the hand as the main site for venesection and 25 (46.5%) did not know avoidable sites during venesection. Fifty-three (98.1%) did not check for allergies to antiseptics and adhesives before performing venesection. Thirty-seven (68.5%) did not know the names of all the additives in the various sample bottles and 29 (53.7%) did not understand the colour coding of the sample bottles. In addition, 34 (63.0%) did not know the blood volume required for all the various tests. Twenty-nine (53.7%) did not know that laboratory results of analytes were affected by patient's posture.

Conclusion: Training in the Medical School does not adequately prepare the House Officer to carry out phlebotomy competently and efficiently.

Key Words: Phlebotomy, Training, Certification, House Officer, Medical School

Introduction

Phlebotomy is a Greek derived word which means the act or practice of drawing blood for diagnostic or therapeutic purposes[1,2], and venesection is the process of entering the vein. Phlebotomy is a complex process thus it requires knowledge and skill to perform. Laboratory test results obtained from blood samples drawn form an integral part of the medical decision-making process and therefore strongly influences medical diagnoses and therapies[3]. To obtain a reliable test result, calls for the phlebotomist to attain standardized level of competency. Every discipline requires standardized formal education by either licensure or certification. Certification sets a standard of demonstrated competency. Certification is evidence that an individual has mastered the skills required to perform in a specific technical area; in this case, phlebotomy. Phlebotomy is a highly complex technique, requiring knowledge and skill to perform. The blood samples for investigations must be properly obtained from the appropriate vessel, in the accurate quantity, using the requisite tubes and at the appropriate time, for optimal results. Any error in the blood sample obtained can affect the result and the devastating effect on patient management cannot be overemphasized. In the performance of venesection therefore, the phlebotomist must have the requisite knowledge of proper venesection procedures. Like any other technical/medical training, phlebotomy training can be obtained as a 4-year bachelor's degree or a 2-year associate's degree[4]. There is also phlebotomy certificate training which takes only 15 weeks to complete[4]. Here, the candidate is required to work at least 200 hours in a clinical setting and is trained in different ways and skills in order to competently perform venesection on a patient. In Ghana, there is no formalised training in phlebotomy for medical students in the two major medical training institutions, namely the University of Ghana School of Medicine and Dentistry (UGSMD), and the School of Medical Sciences (SMS), Kwame Nkrumah University of Science and Technology. Venesection is therefore informally learned during clinical rotations or internship. Over the years, House Officers (HOs) in the Teaching Hospitals who are the least experienced among doctors have been tasked with the duty of phlebotomy for in-patients for various investigations. Lack of appropriate training may result in improper

Corresponding Author: **Innocent Adzamli**
National Cardiothoracic Center, KBTH, Korle Bu, Accra
Email Address: iadzamli@gmail.com
Conflict of Interest: None Declared

specimen collection, which can lead to serious complications including misdiagnosis. Without the appropriate training, locating and using suitable veins for obtaining blood samples can be an arduous task. Due to ignorance, some of these HOs puncture any visible vein and some of these veins, which may be useful to save the life of the patient in future are destroyed. Phlebotomy is more than just the venipuncture technique. It involves standard operating procedures, the designs of blood drawing stations, bio-safety mechanisms, patient safety, language and attitude of the phlebotomist. With the requisite training therefore, our HOs could be equipped with these essential competences of phlebotomy. A well-trained phlebotomist, aside the essential competence and engendering accuracy in diagnosis, has an economic advantage. A review of the literature showed that only 13% of errors in laboratory results are analytical in nature whereas 56% occur during pre-analytical phase (collection, processing and transportation)[5-7]. Pre-analytical errors have financial implications on laboratory budgets due to the cost of repeated collection and re-testing. Thus, a well-trained phlebotomist can serve as a huge saving on laboratory budget. A well-trained phlebotomist also contributes to the efficiency and reputation of any laboratory. The lowest possible turnaround time (TAT) for analysis is the key to success for any laboratory[8]. Trained phlebotomist HOs can perform their task efficiently; this in turn, lowers the TAT. Thus, proper training of personnel who perform phlebotomy procedures remains crucial as institutions look to improve patient care and to decrease blood collection errors. In most developed countries like the United States and Australia[1] phlebotomists are trained professionals. The students learn in detail human anatomy, needle technique, creating patient rapport, medical safety, good record keeping and other courses which teach them how the blood cells are affected by diseases and infections[4]. Additionally, they go through academic as well as hands on training on handling several medical equipment, including containers for collecting bio-hazardous-spill kits, dermal puncture devices, syringes of various sizes, vacuum tubes, blood culture bottles, bandages and tape, tourniquets, locking arm rests etc[4]. The students also learn how to do cardiopulmonary resuscitation to be applied when needed in their duty. In the light of these we sought to evaluate the knowledge of HOs in the performance of phlebotomy in Korle-Bu Teaching Hospital.

Methodology

The research was a cross-sectional study carried out in Korle-Bu Teaching Hospital (KBTH) among HOs undergoing their internship in General Surgery, Internal Medicine, Paediatrics, Obstetrics and Gynaecology departments in December 2010. All HOs in the above-mentioned Departments of the Hospital were eligible for inclusion i.e. the study adopted a process of total enumeration of all eligible participants. There was a total of 85 house officers; a research assistant distributed the questionnaires to all of them. Overall, 54 HOs returned completed self-administered questionnaires, giving a response rate of 64%. All participants provided informed consent. Distribution of the questionnaires was done at 9:00am and 54 completed forms were collected at 5:00PM for analysis. Data was entered into a Microsoft Access database and analyzed statistically using SPSS (Version 12; SPSS Inc, Chicago, IL, USA) programme. HOs who were not on duty on the day of the study were not part of the study. Ethical clearance was obtained from the Protocol and Ethics Committee of University of Ghana School of Medicine and Dentistry prior to commencement of the studies.

Results

There were 54 House Officer respondents. 38 (70%) were trained in University of Ghana School of Medicine and Dentistry (UGSMD) and 17 (30%) in Kwame Nkrumah University of Science and Technology School of Medical Sciences (KNUST-SMS). Forty-three (representing 79.6%) were within their first 6 months of House job, 9 (representing 16.7%) were within 6-12months while the rest two (3.7%) were within their second year. 35 (64.8%) of them said venesection was not their job while 16 (29.6%) of them stated that venesection was part of their job. 49 (90.7%) had no formal training in phlebotomy but 5 (9.3%) stated they had a formal training in performing phlebotomy. Forty (74.1%) admitted to having informal training in performing phlebotomy while the rest had no informal training. The stated sites used for venesection were: dorsum of the hand, 32 (59.2%), forearm, 3 (5.6%) and antecubital fossa, 19 (35.2%). The following factors were the determinants for the choice of venipuncture sites: ease of accessibility, 47 (47.5%); safety, 24 (24.3%); pain at the site, 13 (13.4%); type of diagnosis, 13 (13.4%) and 2 (2.0%) considered local condition of the site (ulcers and previous venesection points). Blood drawing techniques were: needle and syringe aspiration, 44 (62.0%); cannulation, 23 (32.4%) and vacuum tube 4 (5.6%). For knowledge on sample bottle additives, 17 (31.5%) knew the additives, 8 (14.0%) did not and 29 (53.7%) knew some of the additives. In addition, 25 (46.3%) understood the colour coding of the sample tubes while the rest 29 (53.7%) did not understand at all or understood some of the colour coding. In terms of blood volume to be collected for various tests, 20 (37.0%) knew the volume of blood to be taken for various tests while 12 (22.2%) did not. The rest 22 (40.8%) knew some of the volumes required. Thirty-five (64.8%) adequately mixed blood specimen after venesection while the rest did not mix at all. Tourniquet was stated to be kept for less than 2 minutes by 41 (75.9%) of the HOs while the rest 13 (24.1%) kept it for more than 2 minutes. Twenty-five

(46.3%) knew results of analytes were affected by postural changes while 29 (53.7%) did not. Twenty-nine (53.7%) knew avoidable areas during venesection while the rest 25 (46.3%) did not. Fifty-three (98.1%) did not check for allergies to antiseptics and adhesives before performing venesection while 1 (1.9%) did. For management of post venesection site, 44 (81.5%) applied pressure dressing, 8 (14.8%) applied pressure for haemostasis but no dressing and 2 (3.7%) gave no answer. For 18 (25.3%) of the HOs, patient cooperation was the main challenge during the procedure while for 34(47.9%) it was vessel invisibility and for the rest 19 (26.8%), it was unsuitable vessels. When difficulty was faced in getting blood samples, 62 (77.7%) of them would call for help either from a senior colleague or a Laboratory Technician. Five (9.3%) of them would perform a femoral tap while 5 (9.3%) would try until they obtain a sample.

Discussion

Our results have shown that many of the HOs do not perceive phlebotomy as one of their job descriptions. In terms of formal training in equipping them with the necessary skills to perform phlebotomy, we found that almost all 49 (90.7%) had no formal training in the Medical School. Nevertheless, 40 (74.1%) admitted having some informal training in phlebotomy but that was not adequate in making them perform phlebotomy with the requisite knowledge and standard. Phlebotomy is relatively new to most of these HOs and demand for qualified and certified technicians or phlebotomists have been growing over the last decade[4]. The training and certification of phlebotomists have therefore become imperative as their responsibilities continue to change with a high demand for professionalism in the discharge of their duties. Phlebotomy training and expertise is also required because the need for phlebotomy arises for all types of patients. Neonates and children require phlebotomy so do the elderly. Locating the veins, extracting blood without pain to the patient and analyzing it for the required purpose requires good amount of training and expertise[9]. Most of the house officers used the commonly recommended sites for venipuncture. The best veins for venipuncture are usually found in the antecubital fossa; cephalic/basilic or median basilic veins[10]. These vessels often satisfy the characteristics of a good vein for venipuncture; they should be bouncy, refill when depressed, large lumen, straight, soft, visible and well supported. Veins to avoid are those which are bruised, hard, mobile, thin or those near bony prominences. Our results showed that the dorsum of the hand was used by majority of the HOs. Other lesser used areas were the antecubital fossa and the femoral region. If these HOs were to have had a formal training in phlebotomy, the dorsum of the hand that has more tortuous, less supported and small veins may not have been the commonest site chosen for venipuncture. In addition, the dorsum of the hand has more nerve endings and therefore patients experience more pain and a greater discomfort during blood sampling. For most of the HOs, ease of blood vessel accessibility and patient safety were the overriding factors that determined the choice of the vessel for venipuncture. Pain at the site, type of diagnosis and local condition of the site of the vessels were also considered by a minority. Closed systems for blood sampling are preferable because they have proven to be safer than the open system[11]. The use of vacuum extraction tube systems as closed systems for blood collecting reduces the risk of direct exposure to blood and has made it easier to take multiple samples from a single venipuncture. That technique therefore reduces pain from likely multiple punctures from the other techniques. From our results only 4 (5.6%) of the HOs used the vacuum extraction tube method for blood sampling. Majority, 44 (62.0%) used the open needle aspiration method. The rest used another open system technique which is the cannulation method. That observation could be due to lack of formal training in the use of vacuum method. Another possible basis could be the unavailability of the vacuum tubes. An advantage of the vacuum tube system is that it avoids needle stick injury potential of the open syringe needle or cannulation technique during transfer of blood from syringe to the collection tubes. It is also faster and the system allows the draw of several tubes of blood by preventing leakage of blood as tubes are changed. The vacuum system also produces the best blood samples for analysis as the blood goes directly from the patient's vein into appropriate test tubes[12]. Although vacuum extraction systems are safer, more training and skills are required for their application[11]. Our study also revealed that the HOs have varying limited knowledge on the blood sample tubes in terms of additives and colour coding. Only 17 (31.5%) knew the names of the various additives in the sample tubes for basic haematological and biochemical tests. The rest either have partial or no knowledge about them. In terms of colour coding, only 25 (46.3%) understood it while the rest had knowledge on some or none at all. Knowledge on the colour coding of the stopper on each tube is paramount for the phlebotomist as it indicates presence or absence of an anticoagulant and also determines the order of draw of blood into the test tubes[13]. The draw of blood in the correct order avoids cross-contamination of additives between tubes which might affect accuracy of results[11]. For example, red code means no anticoagulant (for blood chemistries, viral serology/antibody test and Group and Cross-matching), light blue code tubes have sodium citrate (for clotting profile studies), purple code contains EDTA-ethylenediaminetetraacetic (for Full Blood and Reticulocyte Counts), green codes have heparin (used for blood chemistries using plasma), grey code contain potassium oxalate or sodium fluoride (for blood glucose, ethanol and lactic acid levels) and yellow contain sodium polyanethol sulfonate (for blood

culture and sensitivity) and acid citrate dextrose (for use in blood bank studies, HLA phenotyping, DNA and paternity testing). Thus, based on the United States Committee on Clinical Laboratory Standard Institute (CLSI) Consensus in 2003, the order of draw is as follows: sterile/blood culture yellow bottle, blue coagulation tubes, red non-additives tubes and last draw for additive tubes-green, purple, gray etc. in that order.

The knowledge of the HOs on quality control measures in terms of sample blood volume, duration of tourniquet application, mixing of blood samples obtained and effects of postural changes on test results was found to be unsatisfactory. For example, we observed that 63.0% of the respondents could not tell the volume of blood required for various tests. The volume of blood needed for laboratory analysis varies widely with the type of test being conducted[9]. Obtaining the accurate volume of blood for each tube is important to ensure that the proportion of blood to chemical additive is correct, otherwise, the test results may not be accurate or the specimen will be rejected and will need to be recollected[13]. The duration of tourniquet application before the blood sample is drawn has been a common source of pre-analytical laboratory errors[14]. As reported by many authors, tourniquet placement during venipuncture might provide alterations in the results of several biochemical analytes due to the prolonged stasis[15, 17]. Our results have shown that almost all the HOs applied the tourniquet for more than 1 minute. Ideally, the tourniquet should be in place no longer than one minute to prevent haemoconcentration. A prolonged tourniquet time may lead to haemoconcentration at the venipuncture site. Haemoconcentration can cause falsely elevated results for glucose, potassium, and protein-based analytes such as cholesterol[18]. It therefore follows that some of the results obtained by these HOs upon which clinical decisions were made might have been erroneous. More so, more than half the respondents admitted that they were unaware that postural changes affect some blood test results. Postural change during venous blood collection however is a major source of bias in biochemical testing. Lippi et al found plasma volume change of 3.4% from supine to sitting; 14.1% from supine to standing and 9.7% from sitting to standing and these led to significant bias in results of Full Blood Count and Chemistries when patient posture changes from supine to sitting and from sitting to standing[19]. Our study also showed that many of the HOs do not observe safety precautions during the venipuncture. From the results, 46.3% have no idea about avoidable or dangerous areas such as palmer surface of the wrist, bony areas and thumb and index finger during the venipuncture[20]. Almost all of them do not check for allergies to antiseptics and adhesives employed during the procedure. Failure to identify allergies may cause reactions that vary from minor to fatal in nature[20]. For safety issues regarding haemorrhage and sepsis, 81.5% do apply pressure dressing at the venipuncture site but 8(14.8%) do not apply any dressing exposing the patients to potential bleeding and sepsis. We have also found that though many of the HOs are able to take blood samples, they do face some challenges. These include vessel invisibility, uncooperative patients and thrombosed/fibrotic vessels. In such instances, most of them would resort to help from either senior colleagues or Laboratory Technicians as generally recommended in clinical practice.

Limitation

The main limitation of this study was the relatively low response rate of 64% among the HOs. This was due mainly to the limited time provided for completion of the questionnaire.

Conclusion

Our findings have demonstrated the inadequacies in the knowledge of the HOs in the performance of phlebotomy. The present training in the major medical schools in Ghana does not adequately prepare the HOs with the requisite skills and competences to carry out phlebotomy to meet standard operating protocols. There is therefore the need for an urgent review of the Medical School Curriculum or introduction of formal training of phlebotomy professionals for deployment in our hospitals.

Acknowledgement

The authors are very grateful to the Secretarial staff of the National Cardiothoracic Centre for their clerical assistance.

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AN OBSERVATIONAL REVIEW OF DETERMINANTS OF PERINATAL DEATHS IN KWAHU EAST, WEST AND SOUTH DISTRICTS

Brainard Ayisi Asare
Department of Public Health, Ghana College of Physicians and Surgeons, Accra, Ghana

Abstract

Background: Perinatal deaths, largely occurring in full-term pregnancy[1], are usually of unknown causes even with statutory routine autopsy performance[2]. Autopsies reveal causes in only 40%[4]. Data paucity remains a major challenge in developing countries[7].
Objective: The study aimed to identify determinants of perinatal deaths in three Kwahu Districts and assess their preventability.
Methodology: An observational study with an unmatched case control design using Health Facility-based data.
Results: Most perinatal deaths occurred at term. Mean gestational age at delivery was 37 and 38.8 weeks for cases and controls respectively. Cases were mainly rural residents with informal occupations and comparatively higher gravidity and parity. Controls had higher educational backgrounds. Factors associated with perinatal deaths were Rural residence, OR - 2.7 (95% CI = 2.02 - 3.6), grandmultiparity OR - 2.0 (95% CI = 1.3 - 3.2), mal presentation OR - 2.5 (95% CI = 1.4 - 4.4), Low Birth Weight OR - 2.3 (95% CI = 1.4 - 3.8), delayed second stage OR - 8.4 (95% CI = 2 - 27), Hypertensive disease OR - 3.0 (95% CI = 1.8 - 3.6), uterine rupture OR - 2.0 (95% CI = 1.8 - 2.1) and prematurity OR - 3.8 (95% CI = 2.7 - 5.3). Formal occupations OR - 0.4 (95% CI = 0.3 - 0.7), referrals OR - 0.6 (95% CI = 0.4 - 0.7), tertiary education OR - 0.3 (95% CI = 0.2 - 0.5) and adequate ANC OR - 0.5 (0.3 - 0.6) significantly reduced odds of deaths.
Conclusions: Perinatal deaths remain preventable with accessible quality ANC, delivery and postnatal services supported by comprehensive, sustainably funded surveillance. The Human Rights Based Approach to programming must be prioritized.

Key Words: Perinatal death, stillbirth, early neonatal death, classification, case control.

Introduction

Perinatal deaths i.e. fetal deaths after 28 completed gestational weeks to the first week of life[1] mainly occur in full-term pregnancy[1] due to largely unknown causes even with routine statutory autopsy performance[1]. Infrequently referred to as Sudden Antenatal Death Syndrome (SADS) [2], autopsies may establish causes in only 40%[3]. They are, in extant literature, largely attributed to bacterial infection, birth defects, chromosomal aberrations, growth retardation, intra-hepatic cholestasis of pregnancy, maternal diabetes, high blood pressure (including pre-eclampsia) etc [4].
Despite observed gradually declining rates in developing countries[5], data remains pauce[6] with overtly inefficient legal frameworks to prioritize accurate perinatal death registration[6]. Due to lack of prioritization for surveillance activities in many developing countries[5], studying historical trends remains arduous[7] with such regions still lacking maternity services for safe delivery and newborn car[6]. Non-registration of some deliveries in these Regions (where an estimated 98% i.e. 3.2 million of the global burden occurs) further exacerbates challenges to accurate estimations[8]. Rates in developed countries also continue to significantly decline[9]. Health facility-based data on Perinatal Death Audit Forms remains the only reliably available data source in Ghana. Prevalence of perinatal deaths in the Kwahu Districts in the north of Ghana's Eastern Region remains comparatively high i.e. 1.3 – 1.5%. This study therefore aimed to identify (1) patterns and distribution of risk factors, (2) strengths of association between identified risk factors and perinatal deaths and (3) assess perinatal death preventability.

Corresponding Author**: Brainard Ayisi Asare**
P. O. Box MP 243, Kwahu -Atibie
Tel. Number: 0240230036
Email Address: brainaradasare@gmail.com
Conflict of Interest: None Declared

Methods

The study is an observational study with an unmatched case control design carried out in three steps comprising (1) identification of cases of perinatal deaths from filled perinatal death audit forms, (2) identification of control observations (3) and analyses of acquired data. Cases comprised stillbirths, i.e. fetal death after 28 completed gestational weeks or Early Neonatal Death i.e. neonatal death within the first 7 days of life. Case finding was passive as all available perinatal death audit forms were duly audited at the facility level by facility audit teams. Controls comprised live births by vaginal delivery or cesarean section sampled at hospitals and sub district health facilities where deliveries are conducted, interviewed with structured, pre-tested questionnaires. To ensure efficient data capture, questionnaires were administered during mornings to facilitate capture of data on parturients with uncomplicated deliveries as

well since they are typically discharged after routine ward rounds by the doctors. ANC books and labor charts of participants were additionally a source document for verification of information acquired through interviews. Reproductive health units of hospitals were visited at least 2 times daily by trained assistants to administer questionnaires. Pregnant women yet to deliver were excluded as the study primarily aimed to investigate perinatal survival. To aide efficient resource management, midwives at Sub-district health facilities were trained to administer questionnaires to enable research assistants visit such facilities for data collection less frequently. Due to the unavailability of a globally utilized classification system for perinatal deaths[10, 11, 12], the study employed the third revision of the Perinatal Death Classification used by the Perinatal Society of Australia and New Zealand (PSANZ) classifications for Perinatal Death Classification and the accompanying Classification Guide (which provides a detailed description of the classification and case examples), first released in May 2003. This classification system aides identification of single most important factors preceding the chain of events resulting in death while the purpose of the PSANZ Neonatal Death Classification (PSANZ-NDC) is, in addition to the PSANZ-PDC, to identify the single most important factor in the neonatal period causing death. Perinatal deaths included in this study were classified to the nearest matching category on the PSANZ Perinatal Mortality Classification system.

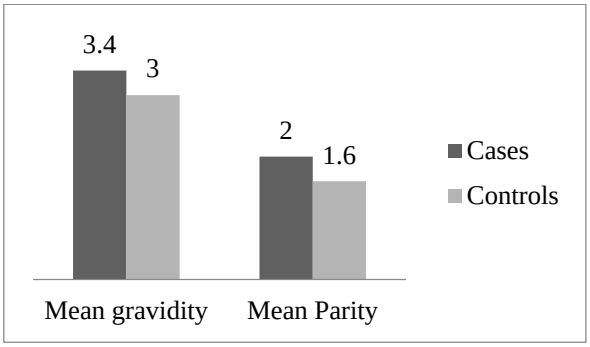
Results

A total of 394 cases and 399 controls were included in the study with prior assumptions that respondents not consenting to participation did not significantly differ from participants though such refusal was not encountered. Mean maternal age for cases and controls varied negligibly i.e. 28 and 27 for cases and controls respectively while mean gestational age (in weeks) at delivery was 37 for cases and 38.8 for controls. Mean birth weight was 2.6 kg and 3.07 kg for cases and controls respectively. At least 24.8% of controls and 18.5% of cases were in age group 21 – 25 years. Cases had a higher frequency of participants in the advanced maternal age category than controls i.e. 20% and 14% respectively. Controls, unlike cases were mainly urban residents and this pattern however varied among adolescents who had 21% resident in urban communities as compared with 16.6% of controls resident in rural communities. Occupation patterns (analyzed as formal and informal) suggested comparatively higher proportions of cases were engaged in informal occupations than controls. Analyses of participants' highest education attained suggested controls were of comparatively higher educational backgrounds than cases i.e. a higher proportion of controls were of Senior High School and tertiary educational backgrounds. See table 1.

Table 1: Area of Residence, Occupation Types and Educational Backgrounds' of Participants

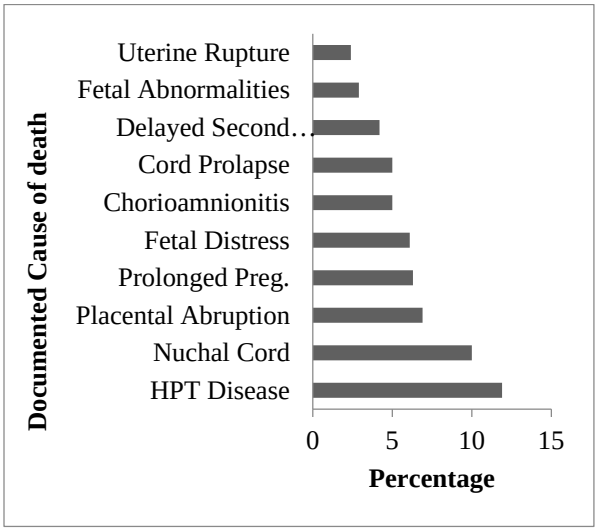
No.	Characteristic	Cases		Controls	
		N	(%)	N	(%)
Area of Residence					
1.	Urban Residence	153	39.0	252	63.3
2.	Rural Residence	239	61.0	146	36.7
Occupation (Formal and Informal)					
1.	Formal	30	7.7	65	16.3
2.	Informal	362	92.3	333	83.7
Education (Highest Education Attained)					
1.	Nil education	35	8.9	24	6.1
2.	Primary	94	24	55	14.1
3.	JHS	217	55.4	217	55.5
4.	SHS	30	7.7	40	10.2
5.	Tertiary	16	4.1	55	14.1

Mean gravidity and parity were comparatively higher for cases than controls. See graph 01.



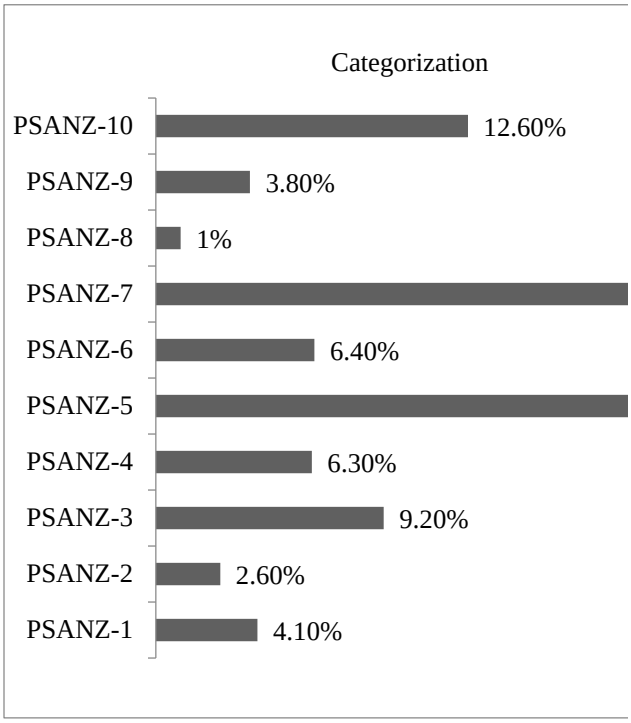
Graph 1: Mean Gravity and Mean Parity Patterns of cases and controls

Cesarean section delivery rates were higher among cases than controls while majority of perinatal deaths occurred in full term pregnancy – 83%. The leading causes of death included hypertensive disease in pregnancy, placental abruption, prolonged pregnancy, fetal distress, chorioamnionitis, cord prolapse, delayed second stage, fetal abnormalities and uterine rupture. About 62.5% of perinatal deaths for which no cause of death was established were macerated while 26.7% were fresh still births. About 61.4% of perinatal deaths of unknown cause occurred in women with purportedly unremarkable ANC i.e. no risk factor identified as suggested by relevant records.



Graph 2: Top ten Perinatal Death Causes among Cases and Controls

Analyses of categorized causes of death by PSANZ-PDC and PSANZ-NDC categorization indicated that perinatal deaths were largely due to PSANZ-7 factors i.e. hypoxic peripartum death (typically infants of >28 weeks gestation or >800g birth weight) with intrapartum complications - uterine rupture, cord prolapse, shoulder dystocia etc. Second in this series were PSANZ-5 factors which include Maternal Conditions e.g. diabetes/gestational diabetes, maternal sepsis, obstetric cholestasis and other specified maternal conditions.



Graph 3: Causes of Perinatal Deaths in the Three Kwahu Districts by PSANZ

Bivariate analyses suggested rural residents were about 3 times as likely to have perinatal deaths as urban residents OR – 2.7 (95% CI = 2.02 - 3.6). Formal occupations reduced odds of perinatal deaths by 60% OR - 0.4 (95% CI = 0.3 - 0.7). A tertiary educational background reduced odds of perinatal deaths by 70%, OR – 0.3 (95% CI = 0.2 - 0.5). Grandmultiparity was associated with significantly increased odds of perinatal deaths, OR – 2.0 (95% CI = 1.3 - 3.2). Adequate ANC attendance i.e. upwards of 4 attendances and identification of obstetric risk factors at ANC reduced odds of death OR – 0.5 (95% CI = 0.3 - 0.6) and OR – 0.7 (95% CI = 0.5 - 0.9) respectively. Mal presentation at delivery, operationally defined non-cephalic presentation in this study, significantly increased odds of perinatal deaths, OR – 2.5 (95% CI = 1.4 - 4.4). The increased perinatal death odds with mal presentation was however not amenable to adequate ANC attendance OR – 2.4 (95% CI = 1.3-4.3). Low Birth Weight (i.e. 2.4 kg or less) increased odds of perinatal deaths OR – 2.3 (95% CI = 1.4 - 3.8). Other specific conditions and states significantly associated with perinatal deaths include fetal abnormalities, delayed second stage, fetal distress, pregnancy induced hypertension, malaria and ante partum hemorrhage. Anemia in pregnancy OR – 0.06 (95% CI = 0.02 – 0.2), birth asphyxia OR – 0.1 (95% CI = 0.04 - 0.3), fetal macrosomia OR - 0.2 (95% CI = 0.05 - 0.6) and Bad Obstetric History (BOH) significantly reduced odds of perinatal deaths on the contrary. Preterm birth significantly increased odds of perinatal deaths OR – 3.8 (95% CI = 2.7 - 5.3) while. Cesarean delivery for APH did not reduce Odds of perinatal deaths OR – 4.1 (95% CI = 1.4 - 12.8). Cesarean delivery for previous cesarean delivery significantly reduced odds of perinatal deaths OR – 0.17 (95% CI = 0.04 - 0.55) while odds of perinatal deaths was also reduced by cesarean section for suspected fetal macrosomia, OR – 0.2 (95% CI = 0.06 - 0.07).

Specific factors classified in accordance with PSANZ-PDC and PSANZ-NDC specifications, increasing odds of perinatal deaths included PSANZ-2 OR – 11.2 (95% CI = 3.4 - 37), PSANZ-3 OR – 2.9 (95% CI = 1.7 - 4.9), PSANZ-4 OR – 4.8 (95% CI = 2.4 - 9.3), PSANZ-6 OR – 11.5 (95% CI = 4.5 - 29), PSANZ-7 OR – 1.8 (95% CI = 1.3 - 2.4), PSANZ-9 OR – 2.8 (95% CI = 2 - 4) and PSANZ-10 OR – 17 (95% CI = 8 - 34). PSANZ-5, characterized by maternal conditions, however significantly reduced odds of perinatal deaths. Rural residence, adjusted for age groups with intervals of 5 indicated that, rural residents aged 21-25 years were 6 times as likely to have perinatal death as rural residents of other age categories OR – 6 (95% CI = 3.1-11.8). Woolf's test (chi square test for differing odds ratios) of 0.0062 significantly suggested effect modification, indicating the stratum specific odds Ratios differed significantly. Rural residents for whom an obstetric risk factor was identified during ANC had reduced but still significant odds of perinatal deaths

OR – 1.9 (95% CI = 1.2-2.9) and OR – 3.6 (95% CI = 2.3-5.5) respectively. Woolf's test was significant at 0.03. Rural residents with formal occupations had 50% reduced odds of perinatal deaths, Adjusted OR – 0.5 (95% CI = 0.3-0.8). Being referred to another health facility confounded the relationship between rural residence and perinatal deaths, Crude OR – 2.8 (95% CI = 2.1-3.7), and Adjusted OR – 3.2 (95% CI = 2.3-4.4). Rural residents had increased odds to be referred to the next level of care OR – 1.9 (95% CI = 1.4 - 2.6). Rural residents exposed to herbal medicines were about twice as likely to have perinatal deaths as those who did not OR – 1.8 (95% CI = 1.13-3.1). Formal occupation was associated with significantly reduced odds of perinatal deaths for clients who had upwards of Senior High School educational background, OR – 0.3 (95% CI = 0.16-0.5) - Woolf's test being significant at 0.006. The protective exposure identified with formal occupation lost significance with exposure to herbal medicines. Multivariate analyses using unconditional logistic regression bore credence to significance of associations between perinatal deaths and rural residence, informal occupations and inadequate ANC attendance.

Discussion

Live births were mainly experienced by women 21-25 years old while perinatal deaths mainly characterized obstetric outcomes for women 15-20 years and upwards. Advanced maternal age of upwards of 35 years was importantly linked to adverse perinatal outcomes while higher mean gestational age above 39 weeks was importantly linked to improved perinatal survival. Adolescent fertility remains high albeit not significantly associated with perinatal deaths. Birth weight below 2.5 kg was importantly linked to unfavorable perinatal outcomes. Advanced maternal age (set at 35 years for purposes of this study) largely characterized women who experienced perinatal deaths with such participants being mainly rural residents. Associations of rural residence with bad perinatal outcomes warrants more research to investigate specific factors increasing odds of perinatal death. Findings suggesting comparatively higher CS deliveries among perinatal deaths should be interpreted within the context of obstetric complications that necessitated the CS delivery and the severity of these complications thereof. They may otherwise erroneously link CS to adverse obstetric outcomes. Occurrence of majority (83%) of perinatal deaths in full term pregnancy suggests need for intensified fetal health surveillance beyond establishment of viability. Perinatal deaths of unknown causes, following ANC otherwise deemed unremarkable, implicate doubtful quality of ANC services particularly at peripheral health facilities (i.e. Health centers, CHPS etc.) Formal occupations (inextricably linked to education, socio-economic status, residence etc) generally reduced odds of death and also reduced odds of death for rural residents. Upwards of SHS educational background improved perinatal survival while high mean gravidity and parity did not improve perinatal survival. Prematurity, whose causes were beyond the scope of this review, importantly predicted perinatal deaths. Hypertensive disease in pregnancy was a leading cause of poor perinatal survival. The observed high prevalence of nuchal cords is likely attributable to tendencies to record such details only when perinatal outcomes are poor. Placental abruptions, consistent with normal expectations, significantly increased mortality. Other conditions among the leading 10 causes of perinatal deaths were prolonged pregnancy, fetal distress, chorioamnionitis, cord prolapse, delayed second stage, fetal abnormalities and uterine rupture. Other important causes were mal presentation, malaria, and ante partum hemorrhage. Cesarean delivery for APH marginally reduced odds of deaths suggesting immediate appropriate interventions with enhanced access to CEmONC and BEmONC may avert more perinatal deaths. Maternal anemia, birth asphyxia, fetal macrosomia, and Bad Obstetric History (BOH) reduced odd of perinatal death implying measures aimed to address these factors successfully facilitate their timely detection and intervention. Upwards of 4 ANC visits reduced odds of perinatal death. Perinatal deaths attributable to hypertensive disease in pregnancy were notably not amenable to adequate ANC attendance. Referral services, whose quality and reliability need further investigation by state, comprise an essential component in the continuum of Clinical Care. This service was associated with reduced odds of perinatal deaths. Referral Services, currently a primary responsibility of the Emergency Ambulance Service (EAS) face challenges that include: (1) cash payments of Ghc 200.00 or USD 50.00 payable by beneficiary (2) delays in arrival at emergency sites and (3) frequent break downs of service vehicles. Inappropriate modes of transportation therefore however prevail in the face above challenges. Meaningful analyses of exposure to herbal medicinal preparations remain difficult on account of the following:

(1) Establishment of history of exposure to herbal medicines may only be necessitated by adverse perinatal outcomes,

(2) paucity of evidence-base studies confirming fetotoxicity, teratogenicity etc of specific constituents,

(3) unestablished temporal relationships of such preparations (i.e. exposure meaningfully preceding outcome),

(4) differential reporting by clients based on perinatal outcomes

(5) and concealment of exposure status due to knowledge of health worker disapproval of use. While some herbal medicines may indeed be harmful, others may only comprise impotent combinations of selected green plants best serving as placebos. In the capacity of placebos, they may negatively impact health seeking attitudes contributing to delays in seeking appropriate

interventions other than being independently sufficient predictors of adverse general health outcomes. Indeed, audit teams all too soon drift away from the beauty of the scientific process of thought once herbal medicine is mentioned leaving a frontier of possible causes unexplored. This however, does not confer upon us a freedom to ignore the knowledge we already have, or to postpone the actions that it appears to demand….an approach recommended by Sir Austin Bradford Hill. Herbal medicine use should be continuously discouraged.

Conclusion

Patterns and Distribution of Risk Factors

Maternal age of 20 to 35 years and birth weight above 2.5 kg are important for improving perinatal survival. Perinatal deaths were more prevalent among rural residents and less prevalent among women with formal occupations. Education and fertility control remain importantly linked to favorable reproductive health outcomes. Leading causes of perinatal death comprised hypertensive disease in pregnancy, placental abruption, prolonged pregnancy, fetal distress, chorioamnionitis, cord prolapse, delayed second stage, fetal abnormalities and uterine rupture. Establishment of causes of death remains difficult and sometimes beyond the capacity of some health institutions exacerbated by overt information paucity and unavailability relevant experts.

Association between Identified Risk Factors and Perinatal Deaths. Rural residence, informal occupations, low educational background, grandmultiparity, inadequate ANC attendance, failure to identify ANC risk factors i.e. poor ANC quality, mal presentation, prematurity, low birth weight, fetal abnormalities, delayed second stage, fetal distress, hypertensive disease in pregnancy, malaria, ante partum hemorrhage, and a host of unknown factors (unestablished during mortality audit) significantly increased odds of perinatal deaths. Anemia in pregnancy, birth asphyxia, fetal macrosomia, previous cesarean section and Bad Obstetric History (BOH) reduced odds of mortality suggesting success of measures rolled out for timely identification and intervention. Preventability of Perinatal Mortality in a Resource Constrained Setting Factors associated with perinatal mortality were largely preventable within the context and objectives of current program frameworks and initiatives e.g. ENC, BEmONC and CEmONC, FANC, EMTCT, MEBCI, etc. Prevention of perinatal deaths of known and unknown causes may only be achieved through improved access to quality ANC services and comprehensive diagnostics.

Recommendations

Perinatal deaths are largely amenable to timely identification of causative factors and predisposition to them, appropriate and adequate interventions, quality ANC at hospitals and peripheral health facilities and adequate skills and knowledge. Factors linked to perinatal deaths are directly or indirectly comprehensively addressed within the framework of various Human Rights Instruments as basic human rights (ensuring accountability, participation and inclusion, indivisibility and interdependence and equality and non-discrimination). Globally increasing emphasis on the Human Rights-Based Approach to Development prioritizes recognition of eminent inadequacies of consistently unsuccessful needs-based or service-delivery approaches to national development. Failures of the latter are premised on inherent lack of sensitivity to needs of rights holders by duty bearers. Evidence base suggests the combination of human rights, development and activism is more effective than any single approach to development in all sectors of state. This approach integrates norms, standards and principles of international human rights into entire processes of development programming, including plans, strategies and policies, creating greater awareness among governments and other relevant institutions of their obligations to fulfill, respect and protect human rights and to support and empower individuals and communities to claim their rights. Prioritization of comprehensive active Perinatal Death Surveillance (linked to active maternal death surveillance) will eliminate data paucity and reduce proportions of unreported deaths while fetal surveillance beyond fetal viability should be intensified. Availability of standardized nationally utilized classification systems (e.g. PSANZ-PDC and NDC) will be of immense clinical and public health benefit, enabling ease of audit, surveillance and research. Information, Education and Counseling for creation of awareness on recognition of perinatal beings as ‘human’ (and not one who only becomes human 7 days after birth) with rights enshrined in various human rights instruments should be a health promotional priority.

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NON-COMMUNICABLE DISEASE IN CHILDREN IN GHANA: HEALTH AND SOCIAL BURDEN OF CARE ON HOUSEHOLDS

Yawson A[1], Badasu DM[2], Atobra D[3], Anarfi J[2], Abuosi AA[4], Adzei FA[4]

[1]Department of Community Health, School of Public Health, College of Health Sciences, University of Ghana, Accra, Ghana; [2]Regional Institute for Population Studies, University of Ghana; [3]Institute of African Studies, University of Ghana; [4]Department of Public Administration and Health Services Management, University of Ghana Business School, Ghana.

Abstract

Background: Non-communicable diseases (NCDs) are on the increase among children. This paper determines the health and social burden of care imposed on households by NCDs among children in Ghana.

Methods: This was a cross-sectional study in three hospitals in Ghana, Ashanti, Greater Accra and Volta Regions. Interviewer administered structured questionnaire was used for data collection. Data was analyzed by proportions, ratios and chi square for association between categorical outcome measures (at 95% confidence level) using SPSS version 21.

Discusion: Burden of caregiving for children with NCDs rested heavily on women (169; 75.1%) and immediate family (176; 78.3%). Managing child's condition was expensive and created financial difficulties for households. In all 87.4% of households depended on the national health insurance scheme (NHIS) and 45.8% indicated NCDs in children was a burden. In addition, 47% of the caregivers said life was much better before they found out about child's ailment. Families had no financial support from extended families or communities/employers. Despite enormous challenges faced by households, there was no indication families suffered isolation or discrimination. ***Conclusion:*** National Health Insurance coverage of NCDs especially childhood cancers will reduce the burden of care on households. Improving access to care at regional/district levels for children with NCDs is imperative.

Key Words: non-communicable diseases, children, financial burden, Ghana

Introduction

Developing countries continue to bear a high burden of morbidity and mortality from infectious diseases while non-communicable diseases are increasing in prevalence[1,2]. In Ghana, global disease burden estimates by the World Health organization indicates NCDs and injuries account for 46% of the causes of morbidity and 40% of the causes of mortality[3].In Ghana, childhood cancers have been on the increase[4] and autopsy findings on mortalities in adolescents from the Korle-Bu Teaching Hospital (the largest tertiary care health facility in Ghana) showed NCDs contribute 41% of the deaths among adolescents[5]. The burden of care of family members who are ill has been shown to rest heavily on the immediate family especially women6, with impact on extended family[7,8,9]. Health insurance aims at improving access to health care8,10. Unfortunately, the national health insurance scheme of Ghana does not cover all NCDs in children; especially the childhood cancers[11] and therefore households of children with these NCDs are likely to suffer the impoverishing effect of the cost of health care. In addition, children with NCDs suffer negative health and social consequences, including time out of school, and social activities[12,13]. Households of children with NCDs may experience increased family tensions or frictions, social isolation and discrimination. In Ghana, social and cultural believes beliefs and attitudes influence how children with NCDs and congenital conditions may be availed for or denied treatment[14].The goal of this analysis is to determine the health, financial and social burden of care imposed on households by NCDs among children in Ghana and implications for health policy.

Corresponding Author: Alfred Yawson
Department of Community Health, School of Public Health, College of Health Science Room 46 Red Building, Korle-Bu, Accra, Ghana
Tel. Number: +233 244 662711/ 0302681648
Email Address: aeyawson@yahoo.com
Conflict of Interest: None Declared

Methods

Subjects and Methods

This was a cross-sectional study that collected data from care givers (≥18 years) of children with NCDs in three health facilities in different geographical regions of Ghana. Period of study was January, 2013.The study was conducted in the three major national hospitals; Korle-Bu Teaching Hospital, KBTH Komfo Anokye Teaching Hospital, KATH and Volta Regional Hospital, VRH. These referral centres receive cases of NCDs from all over the country and were purposively selected to reflect the health and social factors relating to care. Health facility interviews were conducted in these health facilities. Parent/care givers (≥18 years of age) of children (≤18 years of age) on admission during the study period in the Child Health Departments and the Sickle Cell Units of the Hospitals were enrolled.

An interviewer administered structured questionnaire was used for data collection. The field team in each Hospital consisted of two supervisors and 24 interviewers (made of senior research assistants and research assistants from University of Ghana). Information captured included sociodemographic characteristics, attitude to NCDs, coping mechanisms and financial burden of caregivers. Informed consent was obtained from parent/caregivers.

Data analysis

Descriptive statistics such as frequencies, proportions and ratios were used for outcome variables selected for analysis. Summary statistics including mean and median were used for measured variables. All quantitative data was analyzed with Statistical Package for the Social Sciences (SPSS) version 21.

In this analysis, primary care givers are persons responsible for the direct care (bathing, feeding, and administering medication) of the child with NCD, other support provided is considered secondary care.

Ethical issues

Ethical approval was obtained from the Institutional Review Board of Noguchi Memorial Institute for Medical Research (NMIMR), College of Health Sciences, University of Ghana (Federal Wide Assurance FWA 00001874, IRB 00001276, NMIMR-IRB CPN 014/12-13, IORG 0000908). Written informed consent was obtained from all the participants in the study.

Results

As shown in Table 1, a total of 225 parents/caregivers of children with NCDs were interviewed, 43.1% from KBTH, 41% from KATH and 15.1% from VRH. 75.1% were females and 24% males. Age range was 18-68 years with a median of 35 years. Overall, 81.9% were urban residents with some formal education, 86.5% were Christians, and 63.1% were married. Among caregivers, 55.6% were of the Akan ethnic group, while 75.1% were the biological parents.

In all, 149 children with NCDs were enrolled during the study as shown in Table 2.

Table 2 shows the basic characteristics of the 149 children with NCDs enrolled. 61.1% were males, while 59.1% were more than 5 years of age. The commonest NCD was sickle cell disease (26.2%) followed by congenital abnormality (17.4%).

Table 3 indicates that only 33.1% of parent/caregivers earned over three hundred Ghana cedis monthly while 12% had no regular monthly income. In all, 38% earned ≤GH 100 monthly, which translates into $1 /day (below the poverty line). Among caregivers, 87.4% were covered by the NHIS which was the main source of funding. Interestingly, only 1.2% had support from extended family and employers. Mean spending on each outpatient and inpatient hospital visit (besides transport and feeding) on the child's condition indicated that majority of caregivers spent GH₵ 20 or less.

Table 4 indicates 103 (45.8%) of caregivers agreed that the child's ailment has been a burden to the household, however regardless of the burden experienced, 187 (83.1%) indicated this has not increased family tensions or frictions, nor has it led to the family suffering social discrimination 207 (93.2). Overall, 176 (78.3%) of caregiver did not depend on other family members financially to manage child's illness.

Table 1: Socio-demographic characteristics of parent/caregivers (≥ 18 years) of children on admission with NCDs in the three Hospitals in Ghana.

Characteristics	***Frequency***	***Percentage***
Place of residence		
Urban	184	81.9
Rural	21	9.3
Peri Urban	20	8.8
Total	***225***	***100.0***
Educational level		
No education	17	7.7
Primary	27	11.8
Middle/JSS/JHS	69	30.5
Sec/SHS/Vocational Technical	42	18.6
Post-secondary/Polytechnic	30	13.2
University	41	18.2
Total	***225***	***100.0***

Continuation of Table 1: Socio-demographic characteristics of parent/caregivers (≥ 18 years) of children on admission with NCDs in the three Hospitals in Ghana.

Characteristics	Frequency	Percentage
Religion		
Charismatic/Pentecostal	93	41.3
Protestant(Anglican Methodist/Presbyterian/Baptist/Lutheran)	82	36.5
Moslem	27	12.0
Catholic	20	8.7
Traditional/spiritualist	3	1.4
Total	***225***	***100.0***
Ethnicity		
Akan	125	55.6
Ewe	40	17.8
Ga-Adangme	21	9.3
Mole-Dagbani	17	7.6
Other Ghanaian	22	9.8
Total	***225***	***100.0***
Marital status		
Currently married	140	63.1
Never Married	57	25.7
Widowed	12	5.4
Living together	7	3.2
Separated	4	1.4
Divorced	4	1.4
Total	***224***	***100.0***
Profession		
Trader, Businessman/woman	72	32.0
Professional/Technical	56	24.7
Artisan	32	14.2
Administrative/managerial	13	5.9
Agricultural animal husbandry/fishing/hunting	12	5.5
Homemaker	2	0.9
Other	38	17.0
Total	***225***	***100.0***
Relationship of caregiver to child with NCD		
Parent	169	75.1
Self(respondent)	26	11.6
Other relative	24	10.6
Other non-relative	6	2.6
Total	***225***	***100.0***
Type of care being provided to child with NCD		
Primary	196	87.1
Secondary	29	12.9
Total	***225***	***100.0***

Table 2: Age and sex characteristics of children on admission and types of NCDs reported to the three large Hospitals in Ghana

Characteristics	Age group			Total (%)
	Under 5 years (%)	5-9 years (%)	10 years and above (%)	
Sex				
Male	38 (62.3)	24 (58.5)	29 (61.7)	91(61.1)
Female	23 (37.7)	17 (41.5)	18 (38.3)	58 (38.9)
Total	**61 (100)**	**41 (100)**	**47 (100)**	**149 (100)**
Non-communicable disease				
Cancer	4 (7.0)	2 (5.0)	6 (11.5)	12 (8.1)
Diabetes	4 (7.0)	4 (10.0)	16 (30.8)	24 (16.1)
Sickle Cell Disease	11 (19.3)	16 (40.0)	12 (23.1)	39 (26.2)
Congenital Deformity	13(22.8)	4 (10.0)	9 (17.3)	26 (17.4)
Others	25 (43.9)	14 (35.0)	9 (17.3)	48 (32.2)
Total	**57 (100)**	**40 (100)**	**52 (100)**	**149 (100)**

Table 3: Financing NCDs in children by households or families in three health facilities in Ghana (N= 225)

Characteristic	Frequency	Percent
Level of income per month *(in GH₵)		
No regular income	27	12
< 50	23	10.2
50-100	35	15.7
101-300	65	28.9
>300	74	33.1
Total	225	100
Health insurance status of the child with an NCD		
Insured	197	87.4
Uninsured	28	12.6
Total	225	100
Source of income for treatment/management of child's condition		
Health insurance	174	77.5
Personal (immediate family)	48	21.3
Others (Extended family/relatives, Employer)	3	1.2
Total	225	100
Rating of how expensive it is to treat/manage child's condition		
High	135	60.2
Low	90	39.8
Total	225	100
Mean spending on each outpatient visit (besides transport and feeding) on the child's condition (in GH₵)		
0-20	130	57.8
21-50	38	16.9
51-100	31	13.9
101-300	14	6.0
>300	12	5.4
Total	225	100
Mean spending on each inpatient visit (besides transport and feeding) on the child's condition (in GH₵)		
0-20	108	47.8
21-50	47	20.9
51-100	22	9.7
101-300	25	11.2
>300	23	10.4
Total	225	100
Experience financial difficulties (cost of treatment and transportation) during child's hospitalization		
Yes	93	41.2
No	132	58.8
Total	225	100

*** The exchange rate prevailing at time of data collection was $1= GH₵ 1.95**

Table 4: Caring experiences of families of children with NCDs in the three health facilities in Ghana

	Effect on Family function	**Social burden on family**		**Financial burden on Family**
Parent/ care givers views	The ailment of my child is a burden (%)	Child's ailment has increased family tensions/ frictions (%)	Family has been discriminated against because of child's illness (%)	Caregiver depends on other family members financially to manage child's illness (%)
Disagreed	121(53.6)	187 (83.1)	207 (93.2)	176 (78.3)
Agreed	103(45.8)	31 (13.9)	15 (6.6)	46 (20.5)
Uncertain	1 (0.6)	7 (3.0)	3 (1.2)	3 (1.2)
Total (N=225)	**225**	**225**	**225**	**225**

Discussion

The burden of primary care for children with NCD's rests mostly on mothers, mostly married and resided in urban areas. Caregiving in households among households in Ghana rest heavily on women6. Non-communicable diseases in children impose financial burden on families considering that 38% of them earn less than $1 a day which by definition means poverty per the global World Bank definition. Caring for these children take caregivers away from work which reduces their income[6,7,8]. In addition, only 1.2% received financial support from extended family and employers. The sick child misses on school activities and time away from other social and personal developmental activities[13]. This is because financial burden for treating and managing children with NCDs rests almost entirely on the immediate family or household. This analysis shows support from extended family members, community or from employers is almost non-existent; the immediate family bears the entire burden of care. However, 87.4% are covered by the NHIS which reduces some of the financial burden. Unfortunately, the NHIS do does not cover all NCDs in children; especially the childhood cancers[11] and therefore households of children with these NCDs are likely to suffer the impoverishing effect of the cost of health care[12,13,15]. Indeed the cost of transportation, feeding and other personal cost to the family may not be covered by the insurance, the catastrophic and impoverishing effect of total cost of health care could be limited[10]. To improve care of NCD's, it is important that NHIS covers childhood cancers which accounted for 8.1% of the NCD's. Access to care for NCD's can be improved through in-service training for health workers for early detection and treatment. In addition, community sensitization and education are necessary component. Contrary to anthropological accounts on various ethnic groups in Ghana on attitudes towards children with non-communicable diseases[14], 91.6% indicated no social discrimination. Anthropological accounts on various ethnic groups in Ghana provide insight on attitude to children with NCDs and congenital conditions and how children may be availed for or denied treatment[14]. In some Ghanaian traditional societies, children with chronic diseases, congenital defects and similar conditions are considered as embodiment of "mischievous spirits that masquerade as normal children"[16]. In contrast, some anthropologists report that children with congenital deformities are considered as ancestors who are reincarnated and these therefore should be given special care to avoid any afflictions by ancestral spirits[14]. NCDs are perceived as afflictions by supernatural powers in traditional Ghanaian societies and by the traditional and faith-healing health systems[17,18,19] which thus influence the health seeking behaviours of families and household within the communities.

Limitations

Assessment of incomes and spending on health care was subjective and is likely some income and expenditure sources may not have been adequately captured. The analysis generally demonstrates that Ghanaian families suffer financial challenges in caring for and paying for health care of their children with NCDs.

Conclusion

The burden of care giving for children with NCDs rested mostly on women, immediate family or household. Treating or managing the child's condition creates financial difficulties for households. To improve care of NCD's, it is important that NHIS covers childhood cancers. It is essential to improve access to care for children with NCD's through in-service training for health workers for early detection and treatment.

Acknowledgement

We are grateful to all the children and caregivers of the children in the three health institutions where the survey was conducted. We are thankful to the authorities of the three health institutions (Korle-Bu Teaching Hospital, Komfo Anokye Teaching Hospital and The Volta Regional Hospital) and the Heads of the Clinical Units where the survey was conducted. Financial assistance for the survey was provided through a grant, (URF/5/LMG-002/2011-2012) from the Office of Research and Innovation for Development (ORID), of the University of Ghana, Legon, Accra, Ghana.

Competing Interests

The authors declare no competing interest. The views expressed in this paper are those of the authors. No official endorsement by the Ministry of Health or Ghana Health Service is intended or should be inferred.

Authors' Contributions

D Badasu, AE Yawson and D Atobra developed the concept, AE Yawson analyzed the survey data and wrote the first draft. AE Yawson, D Badasu, A Abuosi, J Anarfi and F A Adzei contributed to reviewing various sections of the first draft manuscript. All authors reviewed the final version of manuscript before submission.

Authors' Information

Dr. AE Yawson is a consultant public health physician and senior lecturer, Department of Community Health, University of Ghana Medical School, College of Health Sciences, Korle-Bu, Accra. Dr D Badasu is a Senior lecturer at the Regional Institute for Population Studies, University of Ghana, and JK Anarfi is a Professor at the Regional Institute for Population Studies, University of Ghana, Ghana. Dr. D Atobra is a lecturer at the Institute of African Studies, University of Ghana. Dr. A Abuosi and Dr. F A Adzei are lecturers of the Department of Public Administration and Health Services Management, University of Ghana Business School, Ghana.

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COMMUNITY INVOLVEMENT IN CHILD BIRTH: THE CASE OF WEST GONJA DISTRICT IN THE NORTHERN REGION OF GHANA

Der EM[1], Azure SE[2], Kumassey AM[3], Yakong V[4]

[1]Department of Pathology, School of Medicine and Health Sciences, University for Development Studies, Tamale Northern Region of Ghana;[2]Laribanga Health Centre, West Gonja District, Northern Region of Ghana; [3]Department of Obstetrics and Gynaecology, Tamale Teaching Hospital Northern Ghana; [4]Department of Midwifery, School of Allied Health Sciences, University for Development Studies, Tamale Northern Region of Ghana.

Abstract

Background: Most obstetric complications are preventable if adequate preparations are made to avoid delays during obstetrics emergencies. The aim of this study was to assess the level of community involvement in preventing complications to mother and new born during pregnancy and labour

Methods: A cross-sectional descriptive study was conducted in 6 health facilities selected through purposive sampling. A sample size of 210 women was obtained through convenience sampling using structured questionnaires. The data was analysed using SPSS software (version 23).

Discusion: The mean age of the respondents was 28.3 (SD=5.7). The great majority of the women have heard of danger signs of pregnancy (91.9%) and labour (76.2%). The common danger signs of pregnancy were Vomiting (26.0%), bleeding per vaginam (24.0%) and severe waist pain (21.1%). The common danger signs of labour were bleeding per vaginam (32.9%), big baby (23.8%) and retained placenta (11.0%). The major source of information on obstetrics danger signs was health care providers (91.0%) during antenatal visits. The first and second decisions makers during obstetrics emergencies were husbands (85.1%) and mother-in-laws (57.2%), only 2.5% of the respondents can act as the first decision makers. The common support systems available for obstetrics emergencies in descending order were; preparation of items for labour (28.6%), care taker at the hospital (19.4%), transportation to place of labour (14.4%) and choice of the place of labour (13.5%). Blood was commonly organized for women from the community with obstetric complications.

Conclusion: The study found that the respondents had very good knowledge of the danger signs of obstetrics emergencies. They have good community support systems for women in labour, but only very few of them can take their own decision during obstetrics emergencies.

Key Words: Birth preparedness, complications readiness, Decision maker, pregnancy, labour, obstetrics emergencies, West Gonja, District, Ghana

Introduction

Child birth brings joy to the immediate family and the community. This may however, be associated with complications. Studies have shown that every pregnant woman is at risk of obstetric complications and therefore effective planning and adequate preparation for child birth by pregnant women, their families and community members are required to address delays during emergencies and to prevent complications to the mother and the new born[1,2,3,4].

Pregnancy related complications cannot be reliably predicted hence, it is necessary to employ strategies to overcome such problems as they arise.

Certain forms of delays have been identified that are responsible for most of the maternal and neonatal mortalities that occur especially in developing countries[5] and the West Gonja District is not an exception.

The delays that were identified were delays in deciding to seek care, delays in reaching care and delays in receiving care[5]. The aim of this study was to assess the level of community involvement in preventing delays that will lead to complications to mother and new born during pregnancy and labour.

Corresponding Author**: Dr. Der Muonir Edmund**
Department of Pathology, School of Medicine and Health Sciences, University for Development Studies, Tamale Northern Region of Ghana
Tel: + 233(0)208709807
E-mail: maadelle@yahoo.com
Conflict of Interest: None declared

Methods

Study Design

The study was a community-based cross sectional descriptive study

Study Site

The study was conducted in all the six sub stations (health centres) within the West Gonja District in the northern region of Ghana.

Study Population

The study population was pregnant women and three months postpartum women.

Sample Size

The sample size of this study was calculated using Cochran's formula for estimation of single population proportion by the assumption of: p = 32% from proportion of pregnant women who delivered in health facilities in 2015 as reported by the District Health Directorate.

With an assumption of margin error 0.05 at 95% confidence level and 5% non-response rate, the sample size was 210.

$$N = \frac{t^2 \times p(1-p)}{m^2}$$

N= required sample size

t = confidence level at 95% (standard value of 1.96)

p = estimated proportion of women who know danger signs of pregnancy and childbirth

m = margin of error at 5% (standard value of 0.05)

The sample was 210, consisting 100 pregnant and 110 postpartum women

Sampling Techniques/Methods

The study was conducted in 11 communities in the six health facilities in the district. The selection of the individual respondents was done using purposive sampling procedure. The communities were: Kotito, Mempeasem, Mole, Laribanga, Busunu, Achubunyo, Soalepe, Boroto, Kabampe, Nabori and Tailorpe

Data Collection and Analysis

The data was collected by the use of structured questionnaires. The variables include socio-demographic characteristics, maternal knowledge on obstetric danger signs and symptoms and the complications. Data was also collected on community support systems available for obstetrics emergencies. Data was entered case by case into SPSS software (version 23) and analysed. The results were presented in frequency tables, bar charts and pie charts. P-values are determined using Chi square.

Availability of data and materials

The data used to write this manuscript will be made available on request.

Results

Socio-demographic Characteristics of respondents

A total of 210 respondents were interviewed, of which 100 (47.6%) were pregnant with 110 (52.2%) postpartum women. The age range of the respondents was 17- 46 years with a mean of 28.3 years (SD=5.7) and modal age group of 25 – 29 years (50.0%), figure 1.

Approximately, 65.7% of the respondents had no formal education. The great majority of the women were married (92.4%), table 1.

Approximately 71.2% were Muslims with 33.85 being Christians.

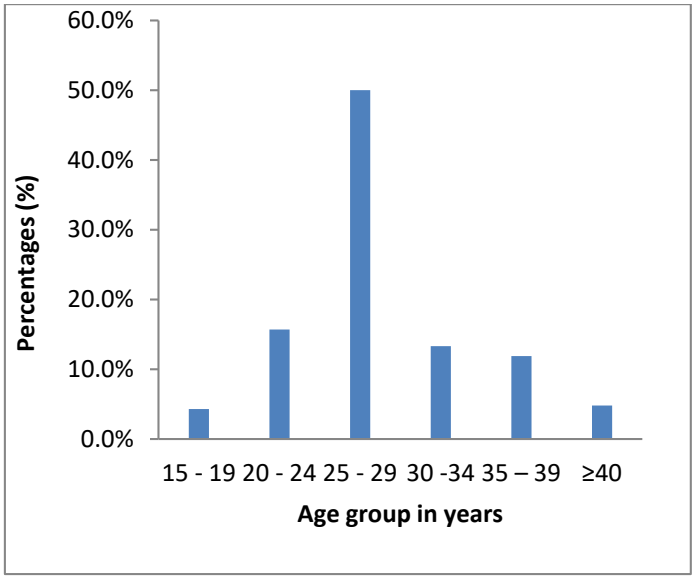

Fig 1: Age distribution of respondents

Table 1: Demographic characteristics of respondents

Variable	Frequency (n)	Percentage (%)
Marital status		
Married	194	92.4
Single	14	6.7
Separated	2	1.0
Ethnicity		
Gonja	83	39.5
Dagomba	27	12.9
Kamara	21	
Dagaaba	20	9.6
Vulgla	9	4.3
Hanga	8	3.8
Others	42	20.0
Total	210	100.0
Education		
No formal education	138	65.7
3	29	13.8
4	14	6.7
1	16	7.6
5	13	6.2
Total		
Occupation		
Farming	88	40.5
Trader	68	32.0
House wife	28	13.3
Public sector	23	11.0
Private sector	6	2.9
Total		

Table 2: Danger signs in pregnancy identified by respondents

Danger signs and symptoms	First	Second	Third	Total
Vomiting	92(46.2)	31(18.9)	4(3.2)	127(26.0)
Bleeding per vaginam	32(16.0)	86(52.4)	0(0.0)	118(24.0)
Severe waist pain	12(6.0)	2(1.2)	89(71.2)	103(1.10
Severe low abdominal pain	16(8.0)	24(14.6)	17(13.6)	57(11.7)
Severe headache	19(9.5)	16(9.8)	11(8.8)	46(9.4)
Abortion	5(2.5)	2(1.2)	0(0.0)	7(1.40
Anaemia	7(3.3)	0(0.0)	0(0.0)	7(1.4)
Oedema	5(2.5)	0(0.0)	0(0.0)	5(1.0)
Malaria	3(1.5)	3(1.8)	0(0.0)	6(1.2)
Fever	8(4.0)	0(0.0)	0(0.0)	8(1.6)
Nausea	0 (0.0)	0(0.0)	2(1.6)	2(0.4)
Vaginal discharge	0(0.0)	0(0.0)	2(1.6)	2(0.4)
Total	199(100.0)	164(100.0)	125(100.0)	488(100.0)

Table 3: Danger signs of labour identified by respondents

Danger signs and symptoms chosen	First (n/%)	Second (n/%)	Third (n/%)	Total (n/%)
Bleeding per vaginam	102(62.6)	3(2.2)	0(0.0)	105(32.9)
Big baby	0(0.0)	73(52.5)	3(23.1)	76(23.8)
Retain placenta	19(11.7)	16(11.5)	0(0.0)	35(11.0)
Abdominal pain	19(11.7)	0(0.0)	0(0.0)	19 (6.0)
Prolong labour	17(10.4)	12(8.6)	0(0.0)	29(9.0)
Breech presentation	0(0.0)	14(10.1)	4(23.5)	18(4.7)
Anaemia	3(1.8)	7(5.0)	0(0.0)	10(3.1)
Waist pain	3(1.8)	6(4.3)	0(0.0)	9(2.8)
Malaria	0(0.0)	3(2.2)	0(0.0)	3(0.9)
Skin rash	0(0.0)	3(2.2)	0(0.0)	3(0.9)
Eclampsia	0 (0.0)	2(1.4)	2(11.8)	4(1.3)
Eye discharge(baby)	0(0.0)	0(0.0)	3(17.6)	3(0.9)
Diarrhoea	0(0.0)	0(0.0)	3(17.6)	3(0.9)
Cervical lacerations	0(0.0)	0(0.0)	2(11.8)	2(0.6)
Total	163(100.0)	139(100.0)	17(100.0)	319 (100.0)

Danger signs and symptoms of obstetrics emergencies

The great majority, 193 (91.9%) of the women interviewed have ever heard of danger signs of pregnancy, 17 (8.1%) did not. Respondents were asked to choose three danger signs of pregnancy without repetition (in an order first, second and third). Approximately, 41.0%, 33.0% and 26 respectively knew of one, two and three signs correctly. The common danger signs of pregnancy were Vomiting (26.0%), bleeding per vaginam (24.0%), severe waist pain (21.1%), severe lower abdominal pain (11.7%) and severe headache (9.4%), table 2.

Of the 210 women interviewed, 160 (76.2%) have heard of danger signs of labour, while 50 (23.8) did not. More than half (51.1%) of the respondents knew of one danger sign of labour correctly. There were 43.6% and 5.3% who knew of two and three danger signs of labour correctly. The common danger signs and symptoms of labour were bleeding per vaginam (32.9%), big baby (23.8%), retained placenta (11.0%), prolong labour (9.0) and severe abdominal pain (6.0%). table 3.

The sources of information on obstetrics danger signs were: health care providers 191(91.0), mother-in-laws 6 (2.9%) and others 13 (6.2%).

Majority 187 (89%) of the respondents had previous live births, while 23 (11.0%) had stillbirths. Of the 187 respondents with live births, the great majority had 1 – 2 births, 27 (14.4%) had 3- 4births with 8 (4.3%) having 5 – 6 live births.

Number of pregnancies and the knowledge of dangers obstetric signs

Respondents were group into three groups based on the number of previous pregnancies and their knowledge on obstetric danger signs assessed. Majority of the women who had 3 – 4 previous pregnancies identified 1-2 danger signs 79 (37.6%), while many of those with 5 or more previous knew all the three signs 105 (50.0%) Figure 2**.**

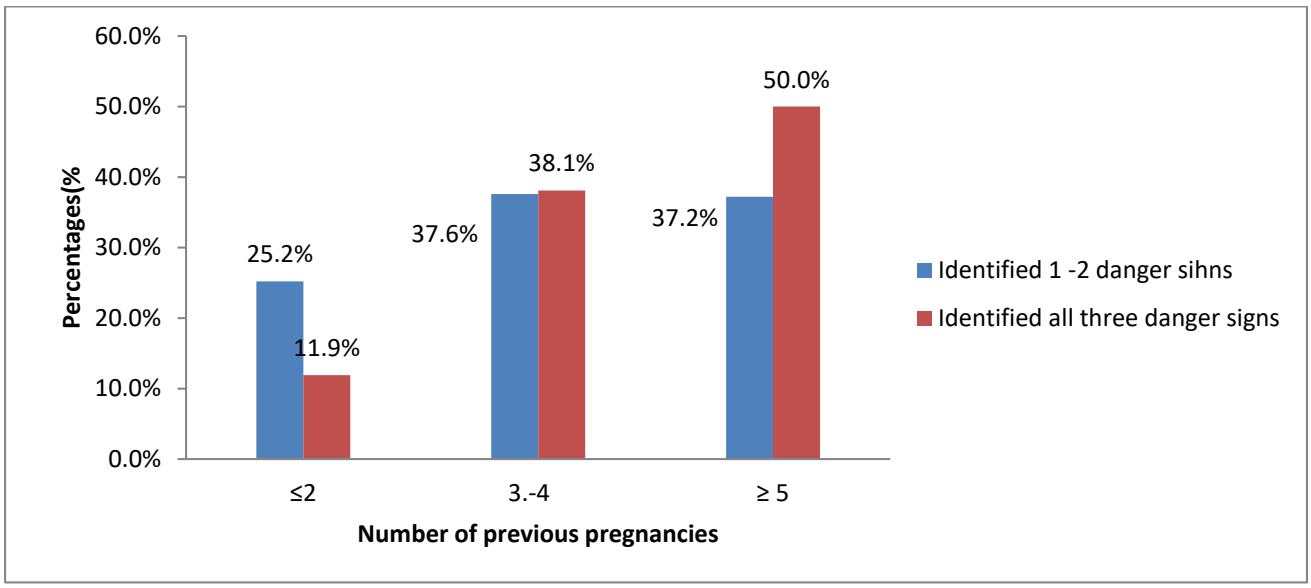

Fig 2: Relationship between parity and the knowledge of obstetric danger signs

Table 4: Decision makers during obstetric emergencies

Decision maker	First (n/%)	Second (n/%)
Husband	172(85.1)	6(3.5)
Mother-in-law	10(5.0)	99(57.2)
Father –in-law	7(3.5)	33(19.1)
Father	5(2.5)	0(0.0)
My self	5(2.5)	13(7.5)
Sister-in-law	3(1.4)	4(2.3)
Mother	0(0.0)	7(4.0)
Grandmother	0(0.0)	3(1.7)
Brother-in-law	0(0.0)	8(4.6)
Total	202	173

Table 5: Available community support systems for women in labour

Support	Support 1 (n/%)	Support 2 (n/%)	Support 3 (n/%)	Support 4 (n/%)	Total (n/%)
Transportation	77(37.4)	32(15.5)	0(0.0)	0(0.0)	109(14.4)
Choose place of delivery	103(50.0)	0(0.0)	0(0.0)	0(0.0)	103(13.5)
Financial support	0(0.0)	110(53.4)	0(0.0)	0(0.0)	110(14.4)
Preparation of items for child birth	5(2.4)	6(2.9)	53(28.3)	154(94.5)	218(28.6)
Provide care taker at the hospital	20(9.7)	47(22.8)	81(43.4)	0(0.0)	148(19.4)
Provide care taker for the home	1(0.5)	11(5.4)	53(28.3)	9(5.5)	74(9.7)
Total	206(100.0)	206(100.0)	187(100.0)	163(100.0)	762(100.0)

Decision maker in obstetric emergencies

Respondents were asked to mention the first and second decision makers during obstetrics emergencies. The great majority (85.1%) said the first decision makers were their husbands, followed by mother-in-laws (5.0%). Many of the respondents said the second decision makers were their mother-in-laws (57.2%) followed by father-in-laws (19.1%), table 4.

Community support systems for child birth

Respondents were asked to select from a list of options four support systems that were provided by their communities to support women in labour in order to prevent complications. The common support systems were; preparation of items for labour (28.6%), care taker at the hospital (19.4%) and transportation to place of labour (14.4%), table 5.

The great majority 206 (98.1%) of the women said community members normally organise blood donation for women after labour with obstetrics complication, while 4(1.9%) had no idea.

Discussion

In this study the great majority (91.9%) of the women were aware of the danger signs in pregnancy. This may be attributed to the fact that 81.3% of the respondents had 1 - 2 previous live births and might have learnt from their previous pregnancies. Our findings are in keeping with studies that found pregnancy and child birth to be risk factors for obstetrics complication and that early recognition of danger signs and symptoms leads to prompt decision to seek appropriate health care in order to avoid complications[1,2,3,4,5].

Majority (74.0%) of the pregnant women knew one to two danger signs of pregnancy. The danger signs in descending order were Vomiting, bleeding per vaginam, severe waist pain, severe lower abdominal pain and severe headache. Similarly, 76.2% of the postpartum women have heard of danger signs of labour. The common danger signs and symptoms of labour in descending order were bleeding per vaginam, big baby, retained placenta, prolong labour and severe abdominal pain. Based on the findings of the current study, we conclude that the respondents have adequate knowledge of the signs of obstetric emergencies. This therefore differ from Pembe et al[6] study in Tanzania, Hiluf et al[7] study in Ethiopia, Moran et al study[8] in Burkina faso and Ekanem et al[9] study in Nigeria that found low levels of awareness of obstetric danger signs during pregnancy, delivery and postpartum, among the study population. The current study is however in accordance with studies that found the knowledge of obstetrics danger signs to be higher among women who have multiple deliveries or high number of children. As the number of children increases the knowledge of danger signs during labour also increases[10,11]. The major sources of information on obstetrics danger signs were health care providers during antenatal visits (91.0%). This support studies globally that found antenatal clinics as the best grounds for equipping women with in formations particularly, danger signs and symptoms in pregnancy, labour and child birth, leading to reduction in obstetrics complications including maternal and neonatal deaths[12,13,14].

According to WHO in 2011, maternal mortality is the single biggest cause of death among women of child-bearing age in developing countries. [15] The overwhelming majority of these deaths are preventable. [16] In most cases it results from delay in decision taken during obstetrics emergency. [17] The current study found that the first major decision maker during obstetrics emergency were husbands (85.1%) with the mother-in-laws as the second decision maker (57.2%). Only 2.5% of the women said they would be the first decision makers in obstetric emergency. The implication of the pregnant or postpartum woman not being able to decide on her own during obstetrics emergencies in the absence of the husband or the mother-in-law could potentially be associated with delay in reaching a health facility and hence poor outcome for the mother and neonate. Delay in decision making and delay in reaching the place of delivery have been found to be associated with high maternal and neonatal deaths especially in the developing countries.[5,10,17]

Approximately, 78.5% knew of one to three support systems. The support systems in descending order were: preparation of items for child birth, care taker at the hospital, transportation to place of labour, financial support and in choosing the facility for child birth. The women in this study have good knowledge about the community support systems available for women in labour in their communities in order to prevent complications. This also means child birth in these communities was not for the woman only, but involves the families and community members. Furthermore, the respondents identified blood donation as a key measure that is normally undertaken by community members once complications occurred in labour. This is in keeping with studies that showed that successful pregnancy and child birth involves adequate preparation by the woman, family members and the community as a whole in order to avoid complications.[17,18]

The adequate knowledge of the respondents in this study on birth preparedness and complication readiness may due to the fact the great majority (92.4%) of them were married and have had one to two previous deliveries. This is similar to Mihret et al [19] study in Ethiopia that found that married women were more likely to be prepared for birth and its complication than non-married. They further argued that married women may have wanted and planned pregnancies which enable them to demand better service and get prepared[19].

The current study found that 65.7% of the women interviewed had no formal education and that 40.5% were farmers, yet had adequate knowledge on how to have a successful child birth. This is in contrast to studies in some developing countries showed found that literate and socio-economic advantage mothers were more likely to be prepared for birth/complication than illiterate and low socioeconomic mothers[19,20,21].

Conclusion

The study found that the respondents had very good knowledge of the danger signs of obstetrics emergencies. They have good community support systems for women in labour, but only very few of them can take their own decision during obstetrics emergencies.

Declarations

Inform consent/ethical consideration

The ethical Committee of the department of Midwifery, School of Allied Health Sciences of the

University of Development Studies approved the proposal. Permission was obtained from the West Gonja District Director of Health Sciences and the women before the questionnaires were administered.

Consent for publication.
All the authors agreed for the publication of the manuscript/work

Availability of data and materials
The data used to write this manuscript will be made available on request.

Competing interest
The authors declare that they have no competing interests

Funding
The authors received no funding for the work

Author's contributions
EMD, ESA and AMK conceptualized the study. ESA and AMK compiled and entered the data. EMD, ESA and AMK analysed the data. EMD, ESA and AMK drafted the manuscript. EMD, ESA, AMK and VY read, edited and approved the final manuscript.

Acknowledgements

We wish to express our profound gratitude to the women who consented to being interview and also to the staff at the various health centres who assisted us in the data collection.

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SPECIAL ARTICLES

EMERGENCY LAPAROSCOPIC APPENDECTOMY IN GHANA: THE 37 MILITARY HOSPITAL METHOD

Asumanu E[1], Yeboah R[1], Boadi B[1], Opae – Tetteh I[2], Teteyfio – Koney C[2]; Antwi AA[2] Adiali B[3], Ayebge VA[3], Idan P[3]

[1]Surgical Division 37 Military Hospital, Accra; [2]Anaethesia Division 37 Military Hospital, Accra; [3]Endoscopy & Laparoscopic Unit, 37 Military Hospital, Accra

Abstract

Summary: Emergency laparoscopic appendectomy is evolving as the method of preference for the management of acute appendicitis. Appendicitis is one of the common causes of acute abdomen diagnosed in the emergency unit in Ghana and open appendectomy has been the preferred method for most surgeons. Increasing patient preference for laparoscopy in Ghana will soon require an increase in the practice of emergency laparoscopic appendectomy in many centres. The number and sizes of ports as well as the site of placement, together with the technique of appendectomy, determines the uniqueness of the method of laparoscopic appendectomy. A simplified easy to apply method of laparoscopic appendectomy is needed to encourage its use in emergency centres.

Methods: The paper describes a 3-port method of laparoscopic appendectomy which combines the principles of open appendectomy and basic laparoscopy. Patient positioning and the operative removal of the appendix is similar to what as is done in open appendectomy. Pneumoperitoneum is achieved by open access through the umbilicus. Two additional ports are placed below the iliac crest for a good cosmetic effect. The amount of consumable used usage is comparable to that of open appendectomy.

Discusion: The question of a gold standard procedure for laparoscopic appendix still persists. The key criteria in the choice of any method should be the success rate, affordability, resource availability and suitability. The method described meets the above criteria in a low resource environment. It offers opportunity for the practice of laparoscopic appendectomy in institutions that practice open appendectomy. The sites of port placement makes the method especially suitable for population that are keloid prone. The use of the same principle for mesappendix and appendix excision as in open appendectomy helps improve the learning curve. Modifying the 10mm port into a retrieval bag at the end of the procedure presents gives the same effect as a conventional retrieval bag without an additional risk of infection.

Conclusion: The method has an inherent easy learning curve and is expected to help scale up the conversion from open to laparoscopic appendectomy.

Key Words: Appendicitis, Laparoscopy, Appendectomy

Introduction

Laparoscopy is gradually gaining grounds as the preferred choice for surgery in many specialties[1]. Emergency laparoscopy has evolved in many countries and the benefits are well documented[2- 4]. Globally the surgical management of appendicitis has moved towards the use of laparoscopy. Patient preference for laparoscopy in Ghana has been demonstrated in elective Gynaecology and General surgeries[5,6]. The successes of laparoscopy in elective surgery has not however been extended to benefit emergency surgery outcomes in Ghana[7]. Despite its advantage in reducing hospital stay and observed patient preference, laparoscopic appendectomy is an uncommon procedure in Ghana.

Appendicitis as a surgical emergency has been reported as a common cause of acute abdomen in Ghana[8,9]. The trend appears to be increasing and it is expected that laparoscopic appendectomy will soon be practiced in many centres driven by patient demand. This require a simplified and an easy to apply method that will encourage and scale up the use laparoscopy in the management of managing appendicitis in Ghana. The number of ports, the size of the ports used for instrumentation and the site of placement together with the technique of appendectomy determines the uniqueness of the method of laparoscopic appendectomy. Laparoscopic appendectomy has evolved from a three-port approach to a single port transumbilical approach though the three-port approach is widely practiced whether the appendix is perforated or not[10]. There are variations in the site of port

Corresponding Author: **Asumanu E**
Postgraduate Unit 37 Military Hospital, Accra

Email Address: easumanu@yahoo.com

Conflict of Interest: None Declared

placement in the three-port approach. The size of the ports used in the different techniques also show variation from the classical laparoscopy to the minilaparoscopy. This article describes a 3-port method of emergency laparoscopic appendectomy at the 37 Military Hospital.

Methods

Patient Selection

The patients for laparoscopic appendectomy are selected by the same criteria used for those who as will undergo open appendectomy. The diagnosis of acute appendicitis was made using the Alvarado scoring system. The inclusion criteria were all adults who were diagnosed with acute appendicitis at the surgical emergency of the hospital. Patients excluded were those with complicated appendicitis such as generalized peritonitis or mass formation. The work up and preoperative preparation are similar to open appendectomy. Patients are informed about the procedure and consent is signed for both laparoscopy and for possible conversion to open appendectomy.

Patient Positioning

General anaesthesia with muscle relaxation is given with a silicon foleys uretheral catheter in situ and a diathermy pad attached. Patients are placed supine with the arms placed by the sides. The right handed operating surgeon stands on the left side by the pelvis, the assistant stands cephalad on the opposite side with the scrub nurse stands on the opposite side in line with the surgeon. Standard cleaning and draping is done exposing the lower abdomen as the operating field. Fig 1

Figure 1. Position of operating team and patient

Pneumoperitoneum

Pneumopritoneum as a first step is achieved by insufulating the abdomen with carbon dioxide by the open method at the umbilicus in the following way: A skin incision, to accommodate a 10mm port, is made with a size 11 blade at the umbilicus and dissected down to the linea alba which is opened transversely to enter the peritoneum. A 2/0 suture is placed between the divided rectus sheath on the lateral side and left loosesly on a clip. This is used at the end of the procedure as traction to close the defect. A 10mm port with a trocar is inserted under direct vision through the umbilical opening into the abdominal cavity. This is assisted by lifting the abdominal wall on both sides with the hand. The trocar is removed and a light source is attached to confirm the presence of the port in the abdomen. Pneumoperitoneum is then achieved by attaching the carbon dioxide source to the port. The camera head is re-inserted for a diagnostic laparoscopy to confirm decision to continue with the laparoscopic appendectomy.

Port Placement

The next step of the method is the port placements. The two (2) additional ports are placed in the lower abdomen for the procedure in the following manner: Using the light source as a guide from within the abdominal cavity, a site is selected in the left iliac fossa about 3cm below the anterior superior iliac crest for a 10mm port. A stab incision with a size 11 blade into the subcutaneous fascia after which the trocar is advanced by rotating movement to enter the peritoneal cavity under direct vision from within the peritoneal cavity. This is then capped and converted to a 5mm port for instrumentation. A third port usually 5mm is inserted 1cm above the symphysis pubis and to the left of the midline in a similar fashion. The operating table is then lowered to the midthigh level of the operating surgeon. Fig 2

Figure 2. Port placement sites below iliac crest indicated by index finger (left) and scapel (right).

Appendectomy

The method of appendectomy is done in a manner similar to open appendectomy. Dissecting forceps are advanced through the ports with the laparoscope is focused on to the caecum by following the ascending colon downwards towards the right iliac fossa. Using the forceps, the appendix is identified and mobilized by the same technique as in an open appendectomy. Using the taenia of the caecum is recommended while dissecting any adherent omentum. The mesoappendix is displayed by traction on the non-gangrenous portion of the appendix. The appendicular vessels are diathermised and excised close to the appendix from the base to the tip using the bipolar forceps or a hook diathermy. The appendix which now hangs free from the caecum is ligated at the base with vicryl 2/0. An extracorporeal knot can be used. Peritoneal suction and/or lavage is done in case of any collection.

Removal of Appendix

The free appendix is grasped at the tip with the forceps in the 10mm (converted to 5mm) port and excised above the knot. The appendix is then pulled into the sheath under direct vision. Once the appendix enters the 10mm port sheath, the port is removed from the abdomen with the appendix in situ. A final inspection of the stump may be undertaken at the and the gas is then expelled by removing the remaing 2 ports. The entry wounds are closed with vicryl 2/0 to the fascia and skin. Local anaesthetic agent is used at the port site as part of post-operative pain management. Fig 3

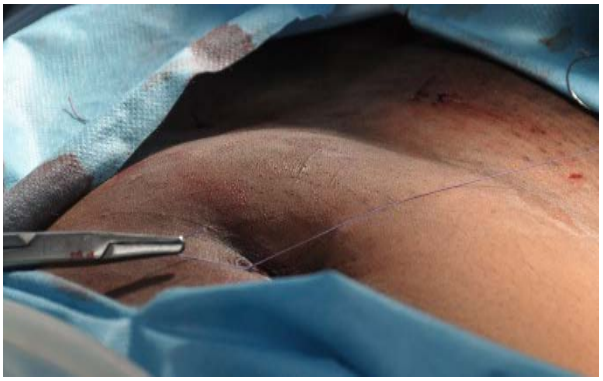

Figure 3. Apperance of Abdomen at final port site closure

Discussion

Appendicitis is a common diagnosis made in the surgical emergency room in Ghana This has added to the burden of patients attending the surgical emergency in Ghana with attendant increase in morbidity and mortality[9]. Reducing hospital stay through laparoscopic surgery will improve overall access to surgical emergency care. Another advantage of emergency laparoscopic appendectomy is the opportunity to establish a diagnosis and offer appropriate treatment at the same setting[3]. This might result in non-operative intervention and reduce the rate of negative laparotomy.

What is the gold standard method of laparoscopic appendectomy? There are varied methods of laparoscopic appendectomy described based on surgeon and institutional preferences[3,11-18]. The single port laparoscopic appendectomy has its appeal in the better cosmetic effect[11]. The steep learning curve and high cost of single port equipment makes it not suitable for institutions seeking to change from open to laparoscopic appendectomy. The two-port laparoscopy has a challenge of limited visualization of the abdominal cavity but offers an easier learning for junior residents[12]. The key criteria in the choice of any method should be the success rate, affordability, resource availability and suitability. The procedure for appendectomy continues to evolve with different set objectives[16]. The method described meets the criteria above and offers an opportunity to introduce laparoscopic appendectomy wherever open appendectomy can be done. Patient selection is as important in laparoscopic as in open appendectomy. Patients who are overweight, symptom duration of more than 3 days and an abscess formation have been found to prolong the duration of laparoscopic surgery[19]. Our method had a selection of patients with uncomplicated appendicitis and who were fit for surgery. This encourages acceptability of the method by staff and allows for easy performance of the procedure. Patient position and access to the peritoneum can be achieved in many ways depending on the resources available and the skill of the operating surgeon. We have used the supine position without any tilt in our method. The use of the umbilicus as our entry point allows for conversion to a laparotomy in the early learning period of laparoscopic appendectomy. The practice of a closed peritoneal access using the Veres needle provides safety and is good in the early learning curve. Our procedure uses the open approach which reduces the operating time and risk of injury. The presence of the umbilical stay suture in our method prevents any port site leakage of gas.

The number and placement of port continue to evolve in laparoscopic surgery[13-15]. The relatively high risk of hypertrophic scars among our patient population informed our choice of port placement sites. The umbilicus is a naturally occurring scar which blends with the operation scar. We have our additional ports placed to be hidden in the underwear to improve cosmetic effect. The position of the ports and the surgeon allows for good ergonomics without modifying patient position similar to what pertains to open surgery.

The technique of appendectomy requires division of the mesoappendix and excision of the appendix. There are various techniques for detaching the mesoappendix during laparoscopy[20]. Our technique requires that the mesoappendix is coagulated and detached close to the appendix. This has advantage of allowing smaller size vessels to be coagulated and reducing the volume of tissue attached to the appendix to be removed. The vessels are branches of the main appendicular artery and therefore are smaller in diameter. This is in contrast to open appendectomy where the appendicular artery may be ligated close to the base of the mesoappendix. The use of clips for the occlusion of the appendix before division is common place in laparoscopic surgery. In our centre, division of the appendix was done after ligating the base as practiced in open surgery using vicryl 2/0. An extracorporeal knot is recommended in the early stages of practice. There are no proximal sutures placed and the appendix stump is also left non-buried as in our open surgery. With this modification, the concern about the availability of clips or its cost will not hamper the performance of laparoscopic appendectomies. Any aspiration or lavage is done before the appendix is removed. In most laparoscopic centres, the removal of

the appendix is done using a retrieval bag. The purpose is to minimize spillage and surgical site infections. Our technique removes the appendix through a 10mm port. This achieves the same objective as the retrieval bag by avoiding contact with the entry wound. By this approach, the use of extraction bags is avoided which in turn reduces the cost of the procedure. This approach has been practiced in the subregion for laparoscopic appendectomy [21]. Once the appendix enters the sheath, the 10mm port is removed en masse with the appendix. It is for this reason that a 10mm port capped to a 5mm is used for instrumentation during the procedure. Because our second 10mm port lies beneath the underwear line the scar is nonvisible and cosmetically acceptable to patients.

Conclusion

The method is a simple easy to learn three port approach in performing emergency laparoscopy appendectomy.

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BRIEF COMMUNICATION

INTERVENTIONAL RADIOLOGY PRACTICE IN GHANA: THE CURRENT AND THE FUTURE

Sakodie DB[1]; AwukuYA[2]
[1]University of Ghana School of Medicine and Dentistry; [2]School of Medical Sciences, University of Cape Coast

Summary

The interventional radiologist (IR) uses radiological image guidance to target therapy. Despite the ranges of services that IR offers to patients, it is still a mirage to many of our patients. This is as a result of lack of trained personnel, the high cost of procedures and consumables and low knowledge among health professionals on the benefit of IR services. For many developing countries like Ghana IR is in the infantile stage and now taking off.

The aim of this paper is to highlight the scope of IR services and discuss the future of this subspecialty in Ghana. This paper will sensitize health professionals on the scope of interventional radiology practice in Ghana now and the future.

Key Words: Interventional radiology, Ghana, current and future.

Background

Interventional radiology (IR) refers to a range of techniques which rely on the use radiological image guidance (X-ray fluoroscopy, ultrasound, computed tomography [CT] or magnetic resonance imaging [MRI]) to precisely target therapy. Most IR treatments are minimally invasive alternatives to open and laparoscopic (keyhole) surgery. As many IR procedures start with passing a needle through the skin to a target (It is sometimes called pinhole surgery)1. The essential skills of an interventional radiologist are in diagnostic image interpretation and the manipulation of needles and the use of fine catheter tubes and wires to navigate around the body under imaging control. Interventional radiologists are doctors who are trained in general radiology and then superspecialize in interventional therapy making them a unique group of health professionals. There is hardly any area of medical specialty where IR has not had some impact on patient management outcomes. The interventional radiologist has many operational techniques. The range of conditions which can be treated by IR is enormous and continually expanding. It is important to recognise that the interventional approach is usually one of several treatment options available. Assessment for IR is done case by case and guided by current available evidence.

Well recognised advantages of these minimally invasive techniques include reduced risk of complications, shorter hospital stays, lower costs(sometimes), greater comfort, quicker convalescence and return to work. IR plays an important role during palliation for many advanced malignancies with especially malignancies of the hepatobiliary system[1].

Corresponding Author**: Benjamin Dabo Sakodie**
University of Ghana School of Medicine and Dentistry
Tel. Number: +233 244 662711
Email Address: ghana_neo@yahoo.com
Conflict of Interest: None Declared

The Ghana Story

During the early 1990's radiologist were performing angiography and image guided biopsies in Ghana with little or no formal training. In 1990, Korle-Bu Teaching Hospital had 2 general radiologists. Since a little over the past 2 years, the full range of Vascular and Interventional radiology services have been introduced at the korle-Bu Teaching Hospital and the National cardiothoracic center. Over five hundred (500) cases have been done successfully over the last 2 years with about 15% of these patients coming from other countries within the West African sub region. Complication rates have been very low (less than 2%).

Commonest indications include masses requiring tissue biopsies, post-surgical and hepatic abscesses, different stages of Hepatocellular carcinoma, obstructive malignant jaundice. Some of the complications encountered during these procedures include stent migration and stent fracture, contained subcupsular haematoma and post-embolization syndrome. Training in IR in Ghana is still in the embryonic phase as the two colleges involved in certification of radiologist are still turning out general diagnostic radiologists. The West African College of Surgeons (WACS) and the Ghana College of Physicians and Surgeons (GCPS) have till date turned out over 50 radiologists in Ghana. The training however is still in general diagnostic radiology and yet to formally start any sub specialization training.

Ghana with a population of over twenty-six million people[2] has just one certified interventional radiologist (2014) who trained at a centre in Asia (Singapore General Hospital). Undertaking a range of vascular and Interventional radiology services. Many patients have benefitted from the wide range of IR services in Ghana.

Some of the current procedures include but not limited to the following in the table below

Table 1: Breakdown of interventional procedures undertaken over two years

Vascular Interventions	
Transcatheter Arterial Chemoembolisation (TACE)	35
Percutaneous Angiography, Angioplasty and stenting	23
Percutaneous Thrombolysis	5
Central venous catheter insertions	27
IVC Filter insertions	5
Uterine fibroid embolization	4
Bronchial embolization	2
Non Vascular	
Biopsies	164
Abscess drainage	63
Microwave Tumor ablation	15
Fallopian tube recanalization	14
Percutaneous Gastrostomy feeding tube insertion	18
Nephrostomy Tube and DJ stent insertions	60
Biliary drainage and stenting	50
Radiofrequency ablation treatment for venous insufficiency	4
Nerve block treatments	22
Percutaneous Ethanol Injection	14

Despite the numerous advantages that IR offers to patients, there remain major challenges to the growth of IR in Ghana. Some of these include limited trained human resource (the current IR team is made up of one interventional Radiologist, a nurse and a radiographer). There is an urgent need to train more people to join the team and eventually expand the scope of these services. Access to consumables such as the appropriate catheters, guide wires, balloons etc is a major hurdle- Because IR is a fairly recent subspecialty and since the numbers are just going up, many vendors are reluctant to commit to the market.

The high cost of some of the procedure is usually due to high cost of consumables and for this reason some patients do not get the benefits of these lifesaving minimally invasive procedures. Knowledge among medical practitioners on the benefits of IR is still low and massive educational campaign is needed to create a paradigm shift. To this regard the Ghana society Of Interventional Radiology (GSIR) was formed two years ago to promote knowledge and encourage the adoption and practice of IR and to promote the science and art of IR in Ghana. This society also has five associate Ghanaian IRs living and practicing in the USA. They are willing to come to Ghana during selected times of the year to offer teaching and service.

The Future

With the rise of non-communicable diseases among Ghanaians and increased life expectancy, there will be increased demand for IR services.

There is the need to create a faculty within the radiology faculty of the Ghana college of Physicians and surgeons to help train more IR.

The bridge with the Ghanaian interventional radiologists in the diaspora should be strengthened and supported to encourage them to visit and offer both service and teaching annually.

Reference

1. British society of Interventional radiology (http://www.bsir.org/patients/what-is-interventional-radiology/)
2. Ghana Statistical Survey

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

Book Chapter
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Registration fees can be paid to: Ghana College of Physicians and Surgeons, Account Number 1181 0101 2726 1101, ADB GHANA LTD SPINTEX BRANCH. Registration fees cover snacks, lunch, conference materials and a certificate. For more information contact the Secretariat on 0302 238650, 0302 238703 Email: secretary@gcps.edu.gh; info@gcps.edu.gh