

Original Research Article

The Influence of Personal and Socioeconomic factors on the Demand for Caesarean Section among Female healthcare workers at the Komfo Anokye Teaching Hospital, KATH

ABSTRACT

Introduction; There has been increase in the Demand for Caesarean Section (CS) or Caesarean Delivery on Maternal Request (CDMR) in recent years with increasing financial and resource burden on health care delivery especially in resource poor settings including Ghana. This study was conducted to ascertain the factors influencing the demand for Caesarean delivery among female health workers at the Komfo Anokye Teaching Hospital, Kumasi.

Methods; The study was a descriptive cross-sectional conducted among 351 randomly selected female health staff from the Komfo Anokye Teaching Hospital. Data was captured with the use of questionnaires and analysed using descriptive statistics and logistic regression.

Results and Findings; Almost 3 in 10 (27.7%) of health workers delivered through Cesarean Section. Fourteen percent indicated that they would willingly demand for CS for several reasons; with “avoiding labor pains” as the most cited reason. Factors that influenced demand for CS were negative birth experiences (OR=3.9; 95% CI=0.4, 29.6) and having problems during pregnancy (OR=17.9; p<0.001), mothers’ income or ability to pay (OR=2.6; p=0.01), spousal influence (23.7%), level of education (23.2%) and sexually satisfying spouse (18.9%). Others were availability of competent specialist/staff, 49.6%, advanced technology, 24.1% and success stories of CS from peers (26.3%) and belonging to the National Health Insurance scheme (OR=12.7; p<0.001), human resource capacity (OR=8.3; p<0.001) and being a health staff (OR=2.7; 95% CI=1.2, 5.7; p=0.01).

Conclusion; Demand for CS is very high among health workers. Understanding women’s reasons behind demanding for CS is necessary to avoid non-medical CS and help to channel the resources involved to other pertinent areas of health delivery.

Keywords: Ceasarean section; Kumasi; Socio-economic; Health Staff; Women

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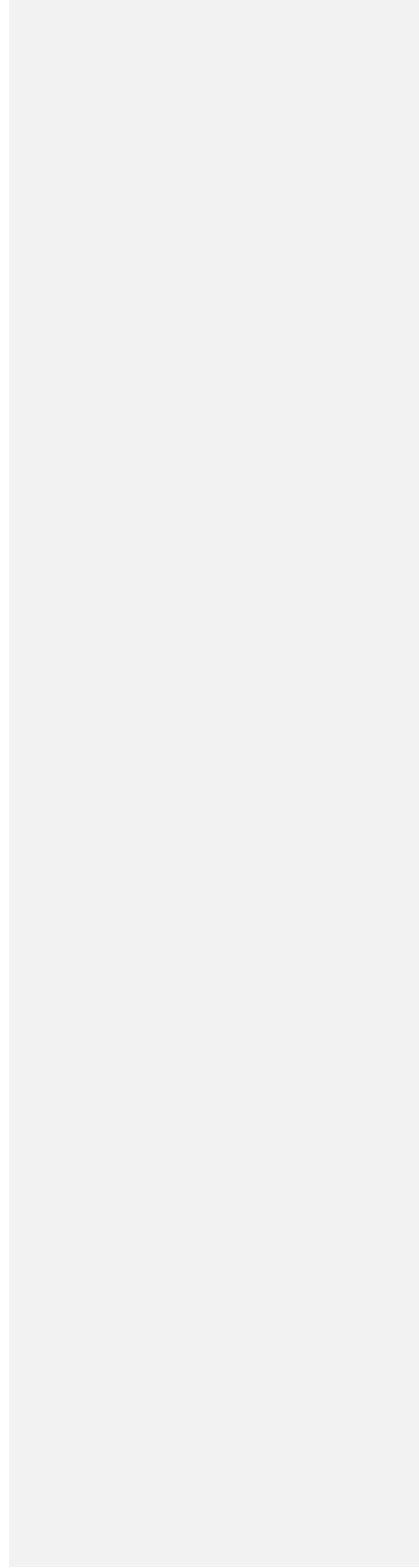
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UNDER PEER REVIEW



1.0 Introduction

Caesarean delivery, also known as caesarean section, is a major abdominal surgery involving two incisions (cuts). One incision is through the abdominal wall (Laparotomy) and the second is an incision involving the uterus (Hysterotomy). Caesarean delivery on maternal request (CDMR), patient choice caesarean, or caesarean on demand all refer to elective caesarean section (CS) for singleton term pregnancy carried out on maternal request in the absence of maternal or fetal indications. At times, it becomes absolutely necessary for a caesarean section to be performed especially, in emergencies or for the safety of the mother or baby. (Bailliere's Nurses Dictionary, 2005). Legend has it that, Roman Leader Caesar, was delivered by this surgical operation and the procedure was named after him. (Boley, 1991)

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Pregnant women who request a caesarean section should not automatically get one, if there are no medical reasons to support it. Instead they should be properly counselled about the merits and demerits of caesarean section and vaginal birth and how labour can be managed so that they can make a fully informed choice about the best care for themselves and their baby. If a doctor still thinks that a caesarean section is inappropriate, then the request can be declined, but the woman should be referred to another doctor.

The rate of caesarean section has been climbing for the past 25 years, and many people with an interest in obstetrics feel it is too high. Figures from the national sentinel caesarean section audit carried out for 2001 showed that 21.5% of pregnant women in England and Wales had caesarean section although, the rates varied from 18% to 25% around both countries of those women who did have caesarean section, 71% (representing 1.5% of all births were the result of the mother's request (Kmietowicz, 2004).

David James, Professor of fetomaternal medicine and Director of medical education at Queen's Medical centre in Nottingham, estimates that 10% of indicators for caesarean section are invalid. Since 2001, his unit has reduced its rate of caesarean deliveries from 29% to 21-22%. He did this by encouraging women who have had previous caesarean to opt for vaginal birth. According to him, 71% of Caesarean sections in 2001 were the result of the mothers' request. (Kmietowicz 2004)

In Ghana, the case is not different as more expectant mothers are choosing to deliver per caesarean section. The proportion of caesarean section among total deliveries in Ghana increased steadily from 4.3% in 1999 to 5.8% in 2003. The rate at the Komfo Anokye Teaching Hospital in Kumasi, Ghana, has similarly increased from 14.8% in the year 2001 to 21.8% in 2005 (Danso et al, 2008). The Ashanti region recorded a caesarean section rate of 10.6% in 2009 (Dr. Joseph Oduro, Deputy Director – Public Health, Ashanti). Against this background, the study therefore seeks to ascertain the factors that lead to maternal request for caesarean section among Health Workers at the Komfo Anokye Teaching Hospital (KATH) in Kumasi.

1.1 Problem Statement

Women are losing confidence in their ability to give birth vaginally. Certainly, caesarean section is not the answer, as it poses more complications than vaginal deliveries. There is no doubt that a smaller number of women having vaginal birth have complications than those who have a caesarean section (Kmietowicz 2004). It is alarming to know that, for every 69 caesarean section, there will be a respiratory problem, for every 333 caesarean sections, one newborn will experience a significant feeding problem and for every 317 caesareans, one new born will require a respirator for more than 24 hours (Klein, 2004)

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The steady rise in CS rate is an emerging issue of concern in mother-child health care and a matter of international attention. Unnecessary CS have resulted in increased infection, hemorrhage, organ damage, drug complications, prematurity, increased neonatal illness, and longer hospitalization. Therefore there is the need to clearly define who is medically fit for a caesarean section to avoid preventable complications. The rising rate of caesarean delivery also has the potential to divert human and financial resources from other arguably higher priority Health interventions. If there is a shift from this, more health resources could be directed positively in giving other kinds of care to patients in the wake of limited and scarce resources faced by many developing countries of which Ghana is no exception.

Almost four in ten (36.5%) of Female Health workers had had caesarean section in KATH (Records Review June-September 2011). Against this background, there is the need to find out

the factors that influence the Demand for CS. Ironically, Health workers are suppose to give education on the need to avoid unnecessary demand for CS as this may result in preventable complications such as increased infection, haemorrhage, organ damage, prematurity, longer hospitalization among others. However, there is no evidence on the factors that influence the demand for CS among Health workers, hence this study.

2.0 Methodology

2.1 Study methods and design

A cross-sectional study design was employed. Quantitative method was used to describe the relationships between study variables. The study involved the collection of primary and secondary data from healthcare workers at the Komfo Anokye Teaching Hospital, KATH.

3.2 Study Area

The Komfo Anokye Teaching Hospital (KATH) in Kumasi, Ghana, is the second-largest hospital in the country and the only tertiary health institution in the Ashanti Region. It is the main referral hospital for the Ashanti, Brong Ahafo, Northern, Upper East and Upper West Regions. The hospital was built in 1954 as the Kumasi Central Hospital. It was later named Komfo Anokye Hospital after Okomfo Anokye, a legendary fetish priest of Ashanti. It was converted into a teaching hospital in 1975 affiliated to the medical school of the Kwame Nkrumah University of Science and Technology. The hospital is also accredited for postgraduate training by the West African College of Surgeons in surgery, obstetrics and gynaecology, otorhinolaryngology, ophthalmology and radiology. The hospital currently has about 1000 beds from the initial 500 beds when it was first built. The hospital is governed by a Board made up of four non executive members (Government Appointees), Six Executives and the Dean of the school of Medical sciences. The Hospital operates within the Ministry of Health's broad Policy Framework. The chief executive, Professor Ohene Adjei sees to the day to day management of the hospital. The hospital has clinical and non-clinical directorates. The clinical Directorates include Anaesthesia and Intensive Care Unit (ICU), Child Health, Dental, Eye, Ear, Nose and Throat (DEENT) Diagnostics, Medicine, Obstetrics & Gynaecology Oncology, Polyclinic, Pharmacy, Surgery and the Accident and Emergency Department. The Domestic Services, Security, Supply Chain Management and Technical Services are the non clinical directorates of the hospital.

2.3 Study population

The study involved Female Healthcare workers who were in their reproductive ages i.e. 18-49 years, expectant and non-expectant mothers. The following categories of healthcare workers participated in the study: Nurses, Doctors, Pharmacists, Physiotherapists, Healthcare Assistants and Biomedical Scientists.

Inclusion criteria

- All female Health workers in their reproductive ages at KATH who, consented to participate in the study.

Exclusion criteria

- Female Health workers in their reproductive ages who, work outside KATH and or did not consent to participate in the study.

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2.4 Sample size and sampling techniques

A nominal roll of all female health staff at the Komfo Anokye Teaching Hospital (KATH) was obtained from the Human Resource Department of the hospital. A sample interval was estimated by dividing the sample size over the total female health workers (351/1440). This gave a scale factor of 1:2 which was used to randomly select respondents. The first respondent was selected by randomly picking folded papers without replacement from the first 5. The random picking fell on 2, that is, the second on the list and this was the first respondents. Then the fourth person on the list was picked as the second, 6 as third, 8 as fourth and so on and so forth till 351 were selected. In all, there were 901 Nurses, 127 Doctors, 22 Pharmacists, 10 Physiotherapists, 13 Biomedical Scientists and 367 Healthcare Assistants.

Total number of respondents is estimated below according to Kirkwood and Sterne, 2003)

$$n = \frac{Z^2 pq}{d^2}$$

Where

n = the desired sample size

z = Confidence interval 95% $\alpha=0.05$ (1.96)

p = the proportion in the target population who will go in for CS is estimated to be 0.218.

q = 1.0-p, i.e. (1.0-0.218) = 0.782

d = degree of accuracy desired at 0.05

$$n = \frac{(1.96)^2 (0.218) (0.782)}{(0.05)^2}$$

$$n = 261.96 \approx 262$$

Assuming a 10% non-response rate of 26.2 \approx 26, the sample size was **288**

With 1.2 design effect, the sample size became **288 x 1.2 = 345 \approx 351**. Selection of participants was proportionate to the size of the various categories of healthcare workers. Thus, there were 219 Nurses, 31 Doctors, 5 Pharmacists, 3 Physiotherapists, 4 Biomedical Scientists, and 89 Healthcare Assistants involved in the study.

2.5 Data collection techniques and tools

Data from the respondents was collected through a structured questionnaire. Closed and Open ended questions were administered to the healthcare workers. There was a record review on caesarean section among healthcare workers at the Komfo Anokye Teaching Hospital (KATH).

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2.6 Pre-testing

All the data collection tools were pre- tested for 3 days in a non study Hospital (Korle Bu Teaching Hospital). The pre-testing allowed me to identify potential problems in the proposed

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study. It also enabled me to modify the methods and logistics of data collection before the actual fieldwork started.

2.7 Logical Framework of the study.

Table 1 presents a summary of the logical framework of the study

Table 1: A summary of the Logical Framework of the study

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Objective	Dependent Variable	Independent Variable	Conceptual Definition of Dependent Variable	Indicators	Scale of Measurement	Data collection Method	Statistical Analysis
To assess the influence of personal factors on the demand for elective caesarean section	Personal Factors	Demand for caesarean section(CS)	Fear of painful prolonged Labour Sexuality concerns Injury to other organs Pelvic floor trauma Perineal damage Negative Birth Experience Missing the birth experience Fetal brain injury Best form of Obstetric Care Complications such as urinary or fecal incontinence or fistula	Proportions, frequency, odds ratio, p-values	Ordinal Nominal Nominal Nominal Nominal Nominal Nominal Nominal Nominal	Questionnaire	Logistic regression (bivariate and multivariate) analysis, descriptive statistics
To examine the socioeconomic factors on the demand	Socioeconomic factors	Demand for caesarean section(CS)	Level of income Human Resource capacity Health system financing (Health Insurance)	Proportions, frequency, odds ratio, p-values	Ordinal Nominal Nominal Ordinal Nominal	Questionnaire Records Review	Logistic regression (bivariate and multivariate) analysis, descriptive

for elective caesarean section			Level of education				e statistics
To identify health related factors influencing the demand for elective caesarean section	Health related factors	Demand for caesarean section(CS)	Parity(primiparous or multiparous) Placenta Previa Placental Abruption Uterine Rupture Fetal Distress Repeat caesarean Cord Prolapse Cephalopelvic Disproportion Active Genital Herpes Diabetes Pre eclampsia Birth Defect Multiple Births Breech Presentation Failure to Progress in labour	Proportion s, frequency, odds ratio, p-values	Nominal Nominal Nominal Nominal Nominal Nominal Nominal Nominal Nominal Nominal Nominal	Questionnaire Records Review	
To determine the influence of technology on the demand for elective caesarean section	Technology	Demand for caesarean section(CS)	Efficacy of caesarean section Pain control Improvement in Anaesthesia Antibacterial Techniques Shorter operating time	Proportion s, frequency, odds ratio, p-values	Nominal Nominal Nominal Nominal Nominal	Questionnaire Records Review	Logistic regression (bivariate and multivariate) analysis, descriptive statistics

2.8 Data handling and analysis

Data collected were checked for completeness and correctness, and double-entered into data sheets on a computer on daily basis by two data clerks using the Statistical Package for the Social Sciences (SPSS). Data cleaning and verification was done on a regular basis and back-up copies were kept. Further detailed analysis and report writing was done over a 3-week period.

Logistic regression; first bivariate and second multivariate were run to assess the strengths of influence of the study variables on the main outcome, demand for CS.

2.9 Ethical issues

The study protocol was submitted to the Ethics Committee of the School of Medical Sciences, KNUST, and the Committee on Human Research, Publications and Ethics (CHRPE) at KATH for ethical clearance before the study commenced. Administrative clearance was sought from KATH. Written informed consent for the study was obtained from respondents. All information obtained remained confidential and was used for the purpose of the study only. Signed consent forms were kept separately from completed questionnaires.

3.0 Results

3.1 Introduction

The findings for the study are presented in this chapter. Out of the 375 questionnaires administered, 351 merited inclusion for analysis as the rest were not responded to and or ineligible for the study. The presentation of the findings is in tables and figures that are preceded by a narration. It is organized by the background of the respondents, the demand for caesarean section, socio economic and health factors that could affect the decision of health workers to demand for caesarean section.

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3.2 Socio-demographic characteristics of the respondents

Figure 1: Provides summary of the major proportions reflected in the background characteristics of the respondents, whereas **Table 2** gives details of the background variables. The mean age of the respondents was 26.8 (4.8) years.

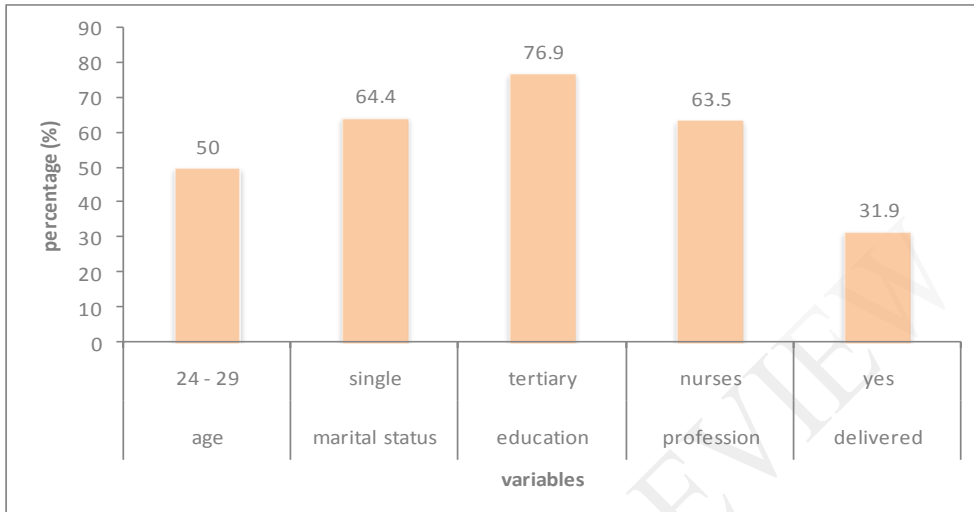


Figure1: Summary of background characteristics of respondents (N = 300)

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Table 2: Socio-demographic characteristics of respondents

Variable	Frequency N=351	Percentage (%)
Age		
- 20 – 24	116	33.0
- 25 – 29	176	50.0
- 30 – 34	29	8.3
- 35 and above	30	8.5
<i>Mean(SD)</i>	26.78 (4.8)	
<i>Median(range)</i>	26 (29)	
Marital status		
- Single	226	64.4
- Married	121	34.5
- Divorced	4	1.1
Educational level		
- Junior High School	7	2.0
- Senior High School	74	21.1
- Tertiary	270	76.9
Profession		
- Nurse	223	63.5
- Doctor	34	9.7
- Pharmacist	6	1.7
- Physiotherapist	4	1.1

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- Health Care Assistant	80	22.8
- Biomedical scientist	4	1.1
Money expended per day		
- 25 percentile	5.0	
- 50 percentile	10.0	
- 75 percentile	15.0	
<i>Median (range)</i>	<i>10 (198)</i>	
Have a child		
- Yes	112	31.9
- No	239	68.1
Mode of delivery	(n=112)	
- Caesarean section	31	27.7
- Vaginal	81	72.3
Personal choice of caesarean section delivery	(n=31)	
- Yes	10	32.3
- No	21	67.7

Eighty three percent (83.3) of the respondents were less than 29 years. About thirty five percent (34.5%) of the respondents were married and 64.4% were single. The rest, 1.1%, were divorced. Majority 76.9%, of the respondents had obtained tertiary level of education, with varied health professional background including nursing, 63.5%, health care assistants, 22.8%, 9.7% doctors and 1.7% pharmacist as detailed in Table 2 above. The median expenditure per day for the respondents was GHC12.10 with a range of GHC198.00. Seventy five percent of the respondent spent at most GHC15.0 per day. About thirty two percent (31.9%) of the respondents had had a child and the rest, 68.1% did not have a child. Out of the 112 respondents who had had child/children, 27.7% and 72.3% respectively had caesarean section and vaginal delivery for their most recent deliveries. Among the 31 who had caesarean section delivery, 10 representing 32.3% said they requested for that mode of delivery whereas the rest, 21 (67.7%) did not. The reason for choosing caesarean section included avoiding pains via vaginal delivery (3), poor progress of labour (2), big baby (2), avoiding fetal distress (1), cephalopelvic disproportion (1), and its convenience and safety (1).

3.2 Personal factors for consideration in demanding for caesarean

In **Figure 2**, 14% out of the 351 respondent said they would demand for CS when pregnant and the rest, 86% would not demand for it.

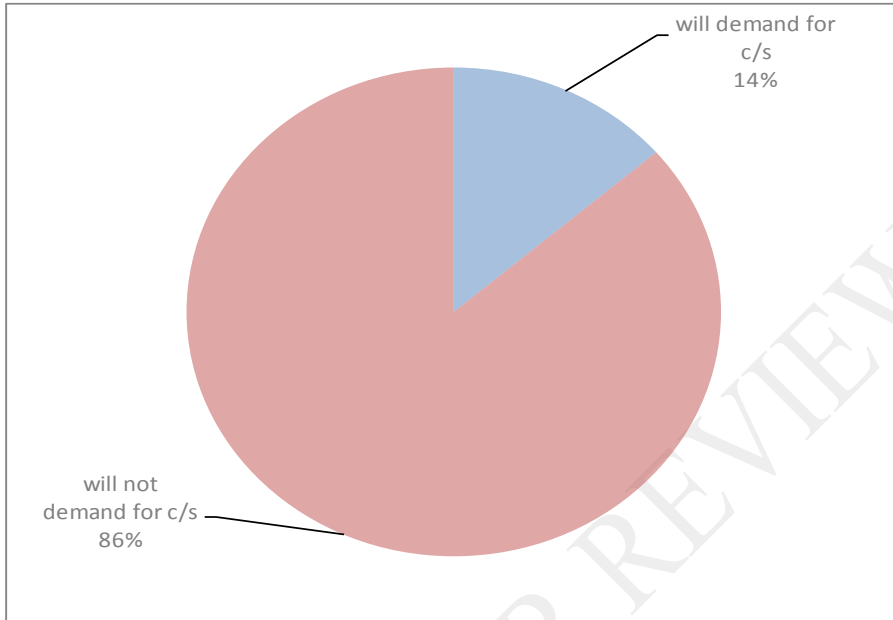


Figure 3: Distribution for demand for caesarean section by the respondents

In Figure 3, the reasons attributed to demanding for CS included avoiding labour pains, 68.8%, safety of the procedure, 16.7%, avoiding complications, 10.4% and due to age of the respondents 2.1%.

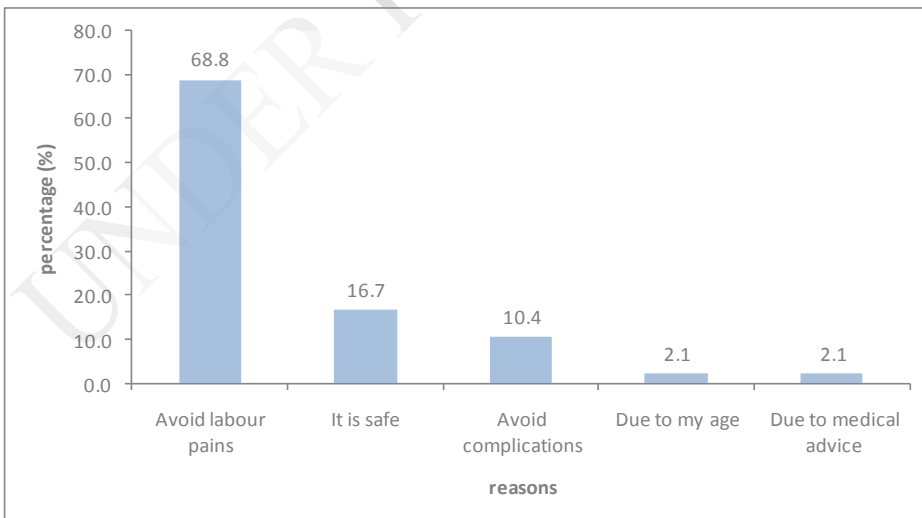


Figure 4: Reasons for demanding for caesarean section (n = 48)

In **Table 3**, it is evident that over half (51.3%) of the respondents rated that labour pains could be extremely painful and 37.3% said it was very painful. Out of the 112 respondent who had child/children, 24 representing 6.8% said they had had negative bad experience and that the experience could influence them (7) forming 29.2% would influence their decision to demand for caesarean section. The respondents, 36.2% indicated that their decision to demand for caesarean section as the preferred mode of delivery when they have pregnancy problems, however, the preference of vaginal delivery as expressed by the rest, 63.8%. Fifty percent (50.4%) and 49.6% of the respondents respectively considered that vaginal delivery and caesarean section has more complications. Most feared complications of delivery included Vesico/recto vaginal fistula, 36.2%, damage to baby's brains, 35.9%, and injury to other organs, 18.5% as detailed in Table 3.

Table 3: Distribution of personal factors that could influence demand for CS

Variable	Frequency (N = 351)	Percentage (%)
Rating labour pains		
- Extremely painful	180	51.3
- Very painful	129	37.3
- Moderately painful	34	9.8
- Not painful	6	1.6
Had a negative birth experience	(n=112)	
- Yes	24	6.8
- No	88	78.6
Negative birth experience influence choice of CS	(n=24)	
- Yes	7	29.2
- No	17	70.8
Preferred mode of delivery in times of pregnancy problem		
- Vaginal delivery	224	63.8
- Caesarean section	127	36.2
Type of delivery with more complications		
- Vaginal delivery	177	50.4
- Caesarean section	174	49.6
Most feared complication*		
- Vesico/recto vaginal	135	36.2
- Damage to the baby's brain	134	35.9
- Faecal incontinence	24	6.4
- Injury to other organ	69	18.5

3.3 Socio-economic factors on the demand of caesarean section

According to the clients, Income/ability to pay for CS could influence 10.8% of them to demand for CS. The other socio-economic factors that were indicated to influence their decision to demand for CS included spousal influence (23.7%), level of education (23.2%) and sexually satisfying spouse (18.9%) as detailed in Table 4 below. Among the respondents, 11.7% said that having NHIS would influence their decision to demand for CS. Seventeen percent (17.4%) of the respondents said they would demand for CS based on their income level and another 58.7% would do same if there existed the requisite human resource in the hospital. Nine percent (9.1%) of the respondents said that the decision to demand for CS could be influenced by the fact that they are health workers.

Table 4: Distribution of responses on Socio-economic factors that could influence the demand for CS

Comment [T18]: respondent

Variable	Frequency (N = 351)	Percentage (%)
Socio-economic factors that influence CS*		
- Income/ability to pay	59	10.8
- Peer influence	58	10.7
- Insurance status	69	12.7
- Level of education	126	23.2
- Spousal influence	129	23.7
- Sexually satisfy spouse	103	18.9
NHIS influence choice for Caesarean Section		
- Yes	41	11.7
- No	310	87.2
Choose CS based on your income level		
- Yes	61	17.4
- No	291	82.6
Opt for CS when there is human resource capacity with competence		
- Yes	206	58.7
- No	145	41.3
Desired day of delivery influence choice for CS		
- Yes	112	31.9
- No	239	68.1
Being a health staff influence choice of CS		
- Yes	32	9.1
- No	319	90.9

3.4 Influence of health related factors and technology on demand of CS

Competent specialist/staff, 49.6%, advance technology, 24.1% and success stories of CS from peers, 26.3% were the health related factors indicated by clients to influence demand for CS. On condition that the respondents do not have any medical condition, 11.7% said they would demand for CS.

In the view of 32.2% and 27.8% of the respondents, easy usage of technology, and specialist use of technique respectively could influence demand for CS. Other factors that could influence demand for CS were spinal, minimal/little scar and general anaesthesia as said by 41.2%, 26.7% and 17.6% respectively. Eleven percent (11.1%) of the respondents said they would demand for CS because it is presumed to be the best mode of delivery. Pain control and duration of vaginal delivery were said to influence the demand for CS by 43.0% and 37.6% respectively as detailed in Table 5 below.

Table 5: Distribution of responses on Health and Technological factors that could influence demand for CS

Variable	Frequency (N = 351)	Percentage (%)
Health related factors that influence people to seek CS.		
- Competent/specialist staff	232	49.6
- Advanced technology	113	24.1
- Success stories of CS from peers	123	26.3
Demand CS if you have no medical condition		
- Yes	41	11.7
- No	310	88.3
Means by which technology influence demand for CS		
- Ease of use	81	13.6
- Safety	191	32.2
- Affordability	71	12.0
- Specialist to use technique	163	27.4
Techniques that influence CS		
- Spinal anaesthesia	88	14.8
- General anaesthesia	196	41.2
- Minimal/little scar	84	17.6
- Low transverse incision	127	26.7
Demand CS because it is presumed to be the best obstetric care		
- Yes	69	14.5
- No	39	11.1
Pain control influence choice of CS		
- Yes	312	88.9
- No	151	43.0
Duration of vagina delivery affect demand for CS		
- Yes	200	57.0
- No	132	37.6
	219	62.4

A bivariate analysis of the factors that respondent considered could influence their demand for CS was done. It was evident that having problems with pregnancy could increase the likelihood of demand for CS by 17.9 folds [95% C.I. (6.6, 48.5); p-value - <0.001] however the perceived mode of delivery with complication reduced significantly the likelihood of demand for CS (OR = 0.3; 95% C.I. [0.1, 0.7] significantly (p-value = 0.01) the demand for CS.

All the socio economic factors assessed in the study except the desire to delivery on a particular day had statistically significant odds of increasing the demand for CS. These included having NHIS cards (OR =12.7; p-value <0.001); human resource capacity (OR =8.3; p-value <0.001) and being a health worker (OR 2.7; p-value = 0.01). The health related and technological factors that significantly influence the respondents decision to demand for CS included competent staff (OR = 2.3; p-value = 0.01), advanced technology (OR = 2.3; p-value = 0.01) and duration of vaginal delivery (OR = 9.9; p-value = <0.001).

Table 6: Bivariate regression analysis of the influence of personal, socio-economic and health and technology on demand for CS

Variable	Odds ratio	[95% C.I.]	p-value
Personal factors			
- Rating of labour pain	0.8	[0.5, 1.3]	0.40
- Having negative birth experience	3.9	[0.4, 29.6]	0.18
- Having pregnancy problems	17.9	[6.6, 48.5]	<0.001
- Mode with more complications	0.3	[0.1, 0.7]	0.01
Socio-economic factors			
- Having NHIS	12.7	[5.7, 28.1]	<0.001
- Level of income	2.6	[1.2, 5.7]	0.01
- Human resource capacity	8.3	[2.9, 23.8]	<0.001
- Wanting a baby at a particular day	1.2	[0.6, 2.3]	0.56
- Being a health staff	2.7	[1.2, 5.7]	0.01
Health related and technological factors			
- Competent staff	2.3	[1.2, 4.3]	0.01
- Advanced technology	2.3	[1.2, 4.2]	0.01
- Success stories of CS from peers	2.3	[1.2, 4.3]	0.01
- Having no medical condition	53.4	[22.5, 126.8]	<0.001
- Having spinal of anaesthesia	1.57	[0.7, 3.4]	0.27
- Pain control	7.5	[3.6, 15.4]	<0.001
- Duration of vaginal delivery	9.9	[4.3, 22.9]	<0.001

Multivariate analysis of the factors that were personal, socio-economic, health related and technology factors that influence demand for CS is detailed in Table 7 below.

Table 7: Multivariate regression analysis for the odds estimates of factors that significantly influence the demand for CS

Variable	Mode 1 OR [95% C.I]	Mode 2 OR [95% C.I]	Mode 3 OR [95% C.I]
Personal factors			
- Rating of labour pain	0.7 [0.4, 1.5]	0.7 [0.3, 1.6]	4.6 [0.7, 28.1]
- Having negative birth experience	7.9 [0.9, 63.2]*	5.5 [0.6, 48.9]	-
- Having pregnancy problems	17.9 [6.6, 48.5]*	0.1 [0.0, 0.35]	0.2 [0.0, 4.2]
- Mode with more complications	0.3 [0.1, 0.7]	0.5, [0.2, 1.3]	0.2, [0.1, 4.2]
Socio-economic factors			
- Having NHIS		1.4 [0.5, 4.2]	1.2 [0.1, 18.0]
- Level of income		0.3 [0.1, 0.7]	0.8 [0.1, 7.8]
- Human resource capacity		4.1 [1.1, 14.7]*	14.4 [0.5, 382.0]
- Wanting a baby at a particular day		0.5 [0.2, 1.3]	1.4 [0.1, 13.0]
- Being a health staff		4.1 [1.4, 12.2]*	11.2 [1.0, 122.2]*
Health related and technological factors			
- Competent staff			1.8 [0.0, 240.1]
- Advanced technology			3.6 [0.0, 4141.9]
- Success stories of CS from peers			-
- Having medical condition			60.3 [3.6, 1008.0]*
- Having spinal of anaesthesia			0.8 [0.0, 34046.0]
- Pain control			7.5 [0.9, 61.1]
- Duration of vaginal delivery			0.9 [0.1, 12.3]

• (*) = value is less than 0.05

• (-) = omitted

In Model 1, assuming that all personal factors were kept constant, experience of negative birth experience and having had problems with previous pregnancy significantly increased the odds of demand for CS by 7.9 and 17.9 respectively. In model two when personal and socio-economic factors perceived to influence demand for CS were assessed, all other factors except human resource capacity and being a health staff did not increase the likelihood for the demand for CS among the health workers. Human resource capacity and being a health worker respectively, increased the odds of CS by four folds (OR =4.1) which were statistically significant. A further block modeling of all the factors including health related and technological factors are as shown in Model 3. In Model 3 assuming all factors were kept constant, the key factors that could significantly increase the likelihood of demand for CS among the health workers were being a health workers (OR = 11.2) and having no medical condition (OR = 60.3).

5.0 Discussion

There is a rising demand for caesarean sections globally. However, there is not much evidence on the factors that influence the demand for CS. The study involved 351 health workers randomly selected from the staff nominal roll at the Komfo Anokye Teaching Hospital, KATH. The study employed quantitative methods with administration of open and closed ended questions. There was also a record review on caesarean section among healthcare workers at the Hospital.

This chapter discusses the major findings of the study on the demand for caesarean section (CS) among health workers at the Komfo Anokye Teaching Hospital (KATH) in the Kumasi Metropolis of the Ashanti Region, Ghana. The factors considered in the study included personal factors and socio-economic factors influencing demand for caesarean section, health related factors as well as technological factors and how they influence preference for caesarean section among health workers at KATH.

Globally, the demand for c/s has been on the ascendancy. Studies from Europe, Africa and other continents indicated the increasing preference of mothers for CS either than vaginal delivery during birth. The case has however not been very different in Ghana as more women now prefer to deliver by C/S. Although studies have reported a 3–4 fold increased risk of maternal death from caesarean section as compared with vaginal delivery (Deneux-Tharau, 2006) and that post operative complications such as febrile morbidity, sepsis, haemorrhage and wound infection, are higher with caesarean delivery, the operation remains one of the most commonly performed surgical operations in obstetric practice the world over (Ncayiyana, 2005; Awoyinka, Ayinde and Omigbodun, 2006). It has become relatively very safe due to improved surgical technique, better anaesthesia, safe blood transfusion and the availability of highly effective antibiotics. Contrast with other studies, this study was conducted among health workers in order to identify factors influencing the demand for caesarean section among health workers at KATH in the Kumasi Metropolis of Ghana. Reports from other countries have emphasized that health related factors, technology, socio economic and other personal factors account for women's preference for CS.

4.1 Demand for C/S

From the study result, the prevalence of demand for caesarean section among the 351 respondents was 28% while intention to use was 14%. This result show nearly three-fold the rate of caesarean section recorded in the Ashanti region in 2009 (10.6%) (Oduro, 2009). Slightly, more than a third, 33%, of the 28% personally demanded for the CS. Similar study of female obstetricians by Al mufti *et al* (1996) also showed that 31% of them would prefer elective caesarean section to vaginal delivery. Nationally, there has also been steadily increasing proportion of caesarean delivery among Ghanaian women from 4.3% in 1999 to 5.8% in 2003 (GHS, 2003)

The rate revealed by this study was however much higher than that of the study by Danso *et al* (2009). In that study, only 3.5% preferred planned caesarean section. The difference in the study population and the change in preferences of the women over time might have accounted for this difference in rates. This also emphasizes the steady increase in the preference of caesarean delivery among women in Ghana (GHS, 2003).

Studies from other parts of the world have also shown an increasing demand for CS. Report from a recent study by the WHO in three regions (Latin America, Africa and Asia) indicated that on the average, 25.7% of all deliveries were done by caesarean section, ranging from 2.3% in Angolan facilities and 46.2% in Chinese facilities (WHO, 2010). Studies from other parts of the world revealed even much higher demand for cesarean delivery. Data from hospital based studies in Urban China showed rates of caesarean section between 26% and 63% during the late 1990

4.2 Personal factors on the demand for CS

Explaining with the consumer theory, the rate at which an individual is willing to exchange one alternative for the other is equal for both alternatives (Mang, 2011). This means that women have an equal rate of choosing between CS and vaginal delivery. However, their choice of an alternative is based on the satisfaction derived from the particular alternative. This study further explored the women personal reasons behind their demand for C/S.

“Avoiding labour pains” was the most cited reason for demanding for caesarean section (68.8%). Other reasons attributed to demanding for CS included “safety of the procedure”, 16.7%, “avoiding complications”, 10.4% and “due to my age”, 2.1% and “due to medical advice”, 2.2%. This was similar to findings by Danso *et al* (2008), where avoidance of labour pains was the main reason for preferring to deliver by caesarean section. Fear of painful labor also emerged as a reason for opting for caesarean delivery in the study by Al mufti *et al* (1996). However, inconsistent with this study, the most cited reason for the obstetricians’ preference for caesarian delivery was “Fear of perineal damage”.

Similar to this finding, studies from other parts of the world have indicated woman’s choice of caesarean section in order to avoid pain during birth. A study conducted in china indicated that many couples do not want to have more than one birth experience and opt for CS to avoid pain.

Pain avoidance and missing the birth experience also emerged the main reasons for demanding for caesarian section in a study by Alder *et al* (2009). Other reasons cited included traumatically experienced previous birth and the child’s well being were other important reasons.

Consultants in obstetrics have debated the necessity of performing caesarean section among women who have had previous difficult vaginal delivery or long and painful labour if the women are fully informed. Some women for the fear of fetal brain damage no more consider vaginal delivery as an option after previous successful caesarean sections.

4.3 Perception of C/S

Preference for health care and demand for services is greatly influenced by clients’ perception of the service. These perceptions however to some extent reflect the knowledge level of the clients, past experiences and the socio- cultural background. Studies have shown a positive link between positive perceptions and positive decision making in terms of service utilization. In this study, we sought to investigate the perception of the female health workers on delivery choices and how it influences their demand for CS.

Almost all the respondents indicated that labour pain was painful (98.4%) with majority of them (51.3%) rating it as extremely painful. Only 6.8% had however, had a negative birth experience. In the bivariate analysis, women who had different perception of labour pain other than it being extremely painful were less likely to demand for CS (OR=0.8; 95% CI=0.5-1.3) although this was not statistically significant. Having negative birth experience could also increase the likelihood of opting for CS (OR=3.9; 95% CI=0.4-29.6).

It was evident that having problems during pregnancy could significantly increase the likelihood of demand for CS (OR=17.9; 95% C.I. =6.6, 48.5; p-value - <0.001). However the perceived mode of delivery with complication reduced significantly the likelihood of demand for CS (OR = 0.3; 95% C.I. =0.1, 0.7) significantly (p-value = 0.01) the demand for CS. Similar to this result, the study by Alder et al (2009) revealed that negative birth experience appeared to be decisive for caesarean birth delivery. It is evident from the study results that majority of the women perceived vaginal delivery as having more complications than CS (50.4% and 49.6% respectively). Vesico/recto vaginal fistula and damage to the baby's brain were the most reported complications feared by the health workers to result in the demand for CS (36.2% and 35.9% respectively).

This study result was contrary to the report from a study by Kmietowicz (2004) which indicates that a smaller numbers of women having vaginal birth have complications than do those who have a caesarean. In contrast to this study result, majority (51.7%) of the women interviewed in the study by Danso *et al* (2008) perceived CS as being dangerous to the mother and baby as compared to vaginal delivery. Some of the risk of CS could however be alarming as reported by Klein (2008). He indicated in his report that for every 69 caesareans the child will suffer a respiratory problem, and in 333 caesarean sections performed, one newborn will experience a significant feeding problem and out of every 317 caesareans, one new born will require a respirator for more than 24 hours.

In support of this assertion, the WHO's evaluation of the risk associated with CS in the Global Survey on Maternal and Perinatal Health between 2004 and 2008 found an association between caesarean section without medical indications and an increased risk of adverse maternal outcomes in an analysis of data from each region separately (Souza, 2008) with the incidence rate for severe maternal outcomes associated with caesarean section without medical indications being about three times greater than that associated with spontaneous vaginal delivery (42 cases/1000 and 15 cases/1000, respectively).

With the increasing rate of CS across the world, more research needs to be done into further establishing the relationship between caesarean section and risk of maternal outcome if women's confidence in CS is to be sustained.

4.4 Socio-economic factors on the demand for caesarean section.

The study results indicated that majority of the women interviewed were below 29 years with a mean age of 26.8 (4.8) years. Majority were not married (65.5%) and had tertiary level education (76.9%).

Level of education (23.2%), income/ability to pay for CS (10.8%), spousal influence (23.7%) and sexually satisfying spouse (18.9%) influence the health workers' decision to demand for CS. About twelve percent of the respondents however indicated that having the National Health Insurance Scheme card (NHIS) card would influence their decision to demand for CS and 17.4% of the respondents would demand for CS based on their income level. Consistent with this study, the study by Zene *et al* (2010) to determine the inequities in utilization of maternal health interventions in Namibia revealed an influence of education on the demand for CS. In that study, the rate of caesarean section in women with post secondary education is about seven times that of women with no education (35.5% vs. 5%). Similarly, the study in Brazil by Barros *et al* (1996) also revealed that caesarean section were more common among wealthy and educated women. Other studies from around the world have also reported consistent results, indicating an association between higher socio economic conditions and the rate of caesarean section (Belizan *et al*, 1999; WHO, 2010).

Assessing the influence of socio-economic factors in an odds estimation, the level of income of the health workers positively influenced their decision to demand for CS (OR=2.6; 95% CI=1.2-5.7; p=0.01). Having NHIS card and the human resource capacity also had significant influence on the demand for CS. In the multivariate analysis, level of education had a negative association with the demand for CS in both models 2 and 3 although that was not significant.

Delivering by caesarean section undoubtedly has high cost implication as compared to vaginal delivery due to the cost involved with the operation and the use of antibiotics before and after surgery. This cost was a deterrent to most mothers especially those with low income. The advent of NHIS in Ghana saw the curtailing of the cost associated with delivery and had led to an increase of maternal health services. This might account for the influence of NHIS on the demand of caesarean delivery as indicated in the results.

4.5 Health related factors and technology

The quality of care which includes the presence of modern equipment is key to ensuring services are acceptable to clients. This means delivering of service acceptable to clients that conforms to patient preferences regarding: accessibility, the patient-practitioner relation, the amenities, the effects of care, and the cost of care. Health workers, being part of healthcare delivery will even be more critical of these in deciding to demand for CS which requires the presence of modern amenities to guarantee the safety of the patient afterwards. This study further sought to investigate the health related factors that influence demand for CS by the health workers. Competent specialist/staff, 49.6%, advance technology, 24.1% and success stories of CS from peers, 26.3% emerged the health related factors that could influence demand for CS.

Having no medical condition, had a positively significant association with the demand for CS in the bivariate analysis (OR=53.4; 95% CI=22.5, 126.8; p<0.001). About twelve per cent indicated that they will demand for CS even when they have no medical condition. This shows the degree of acceptability of CS among the health workers as against other reports which indicate that

women demand for CS based on concerns about risk of intracranial hemorrhage, neonatal asphyxia and encephalopathy, prevention of still birth and overdue pregnancy (Brown (2010). Similarly, Gary *et al* (2006) also indicated that caesarean sections are performed for the certain medical reasons which includes placenta praevia, placental abruption, uterine rupture, fetal distress, repeat caesarean, cord prolapsed, cephalopelvic Disproportion (CPD), birth defects, active genital herpes and multiple births.

With the use of technology, this study revealed that demand for CS could be influenced by easy usage of technology (13.2%), safety of the technology (32.2%) and availability of a specialist to use the technology (27.4%). Advanced technology had a statistically positive association with the demand for CS in the bivariate analysis (OR = 2.3; 95% CI=1.2-4.3; p = 0.01). This could be explained by the fact that, clients view the employment of advanced technology that is manned by specialist as a possible means of the risk associated with CS.

Clinical trials conducted on the safety of the various caesarean methods have revealed that modern advanced methods of CS (Misgav-Ladach method) is associated with reduced blood loss, less operating time, less time to mobilization and reduced duration of postoperative stay in hospital for the mother as compared with the traditional method (Lower midline abdominal incision) (Abalos, 2009). As postulated by Donabedian (1990), the presence of amenities constitutes one of the seven pillars of quality and this influences clients' perception and acceptance of services.

Controlling pain during delivery, which is a major component of CS had a statistically significant association with the demand for CS in the bivariate analysis (OR=7.5; p<0.001) and this was said to influence the demand for CS by 43%. As indicated by the respondents, technological factors such as could influence the demand for CS were spinal anaesthesia, minimal/little scar and general anaesthesia (41.2%, 26.7% and 17.6% respectively).

The clients preference of anaesthesia could however be influenced by the perceived risk and benefits associated with the anaesthesia. Reports from other studies indicate that some babies are affected by the drugs given to the mother for anaesthesia during surgery. Some of these medications make the woman numbed so she can't feel pain. But they may cause the baby to be inactive or sluggish. Regional anaesthesia (spinal) has been the preferred option because it allows mothers to wake up immediately and interact with their babies. This has been supported by a recent report on anaesthesia-related maternal mortality in the United States which indicated that Maternal mortality associated with general anaesthesia was 6.5 per million, while that associated with regional anaesthesia was 3.8 per million, a risk ratio of 1.7. Even though overall anaesthetic-related maternal mortality continues to decrease, rates for regional anaesthesia are rising.

Duration of vaginal delivery also significantly influenced the demand for CS (OR = 9.9; p= <0.001) with 37% of the respondents indicating this will influence their demand for CS. Consistent with this study, fear of painful and prolonged labour, trauma to the urethral and anal sphincter were some personal reasons cited by the women for their demand of CS in the study by Mufti *et al* (1996). Vaginal delivery as compared to CS has a much longer duration and pain and this was also cited by some women as their reason for opting for CS as indicated in the reasons for demanding for CS above.

Most women who have had difficult vaginal delivery or an emergency caesarean section after a long and painful labour would not contemplate further attempts at vaginal delivery. Vaginal delivery after previous caesarean section is not considered at all by some women because of concerns about fetal brain damage (Brown 1998)

5.0 Conclusion

A majority of health staff interviewed were mainly nurses, married and had no child and mean age of 26.78 (*SD* 4.8). The demand for caesarean section among the female health workers was much influenced by the following personal factors.

Fourteen percent (14%) of the respondent admitted they will demand CS and this shows an increasing trend of demand for CS. The reasons cited for their demand for CS included safety of the procedure, avoiding complications, and due to age of the respondents with avoiding labour pains being the most cited reason.

Demand for CS was also influenced by the women's perception about delivery mode. Women who perceived labor pain as being extremely painful and those who had had previously negative birth experience were more likely to demand for CS. Majority of the women perceived vaginal delivery as having more complications than CS. Vesico/recto vaginal fistula and damage to baby's brain were the most cited feared complications of vaginal delivery.

There were also differences in the socio-economic characteristics of the women in relation to their demand for caesarean section. Majority of the women interviewed were not married and had tertiary level education. Certain socio-economic characteristics of the women influenced their demand for CS. The level of education, income level/ability to pay for CS, spousal influence, sexually satisfying spouse and having NHIS card influenced the health workers decision to demand for CS. Demand for CS was also influenced by human resource capacity.

Influence of factors relating to health and technology was evident in the study. Competent specialist/staff, advance technology and success stories of CS from peers could influence demand for CS. Duration of vaginal delivery also significantly influenced the demand for CS. Demand for CS among the women could also be influenced by easy usage of technology and health related factors, these included safety of the technology, availability of a specialist to use the technology, little or minimal scar, the type of anesthesia available: Spinal and general anesthesia.

The increasing demand for CS comes with it a responsibility on health managers and planners to ensure the availability of advanced technology, with trained specialists to man them in order to further minimize the risk associated with CS.

6.0 Recommendation

The following are recommendation for future health promotion and health education practice and for future research.

There should be a focus on provision of facilities and structures that can help with pain management and enhance safe and fast delivery vaginally. This will help reduce the demand for CS and help save cost.

At the household level, pregnant mothers should be educated on adopting more positive lifestyles and including seeking health at the right time to avoid complications during delivery which results in CS.

There should be education on the advantages and disadvantages on the mode of delivery to help individuals make informed decisions.

Spouses should help build confidence in their partners to deliver per vagina as it poses fewer complications than caesarean section.

Pregnant mothers should be well educated on good pregnant care including ANC attendance to help with early detection and dealing with any possible development that can be complicated during delivery.

References

Abalos, E. (2009). Surgical Techniques for Caesarean Section: RHL Commentary. *The WHO Reproductive Health Library*; Geneva: World Health Organization.

Al-Mufti R, McCarthy A, Fisk NM. (1996). Obstetrician's personal choice and mode of delivery. *Lancet*; 347:554

Alder J, Tschudin S, Hendriksen S, Bitzer J, Popp KA, Zanetti R, Hösli I, Holzgreve W, Geissbühler V. (2009). "Pregnant women's Perception of CS on demand". *Gruyter*; 37(3).

Annual report (2003). Reproductive and Child Health Unit: Public Health Division, Ghana Health Service. p. 23.

Appeawusu, A. (1997). Incidence of Caesarean Section in New Guinea. *PNG Medical Journal* (1997) Sept-Dec. Volume 40 (127-135)

Comment [T19]: recommendation must be specific " who does , what"

Comment [T20]: you need also incorporate strength and limitation of the study

- Awoyinka BS, Ayinde OA, Omigbodun AO (2006). Acceptability of caesarean delivery to antenatal patients in a tertiary health facility in South West Nigeria. *J Obstet Gynaecol* ; 26(3) : 208-10
- Barros FC, Behague DP, Cesar GV. (2002). Caesarean Sections in Brazil: Informed decision-making, patient choice, or social inequality? A population based Cohort study. *BMJ*; 324:16
- Belizan JM, Athabe F, Barros FC, Alexander S. (1999). Rates and Implications of Caesarean sections in Latin America: Ecological study, *BMJ* 1999, 319:1397 – 1402
- Boley, J.P (1991). “The History of Caesarean Section”. *Canadian Medical association journal*; 151 (4). pp. 319-322
- Danso KA. Adageba RK, Adusu-Donkor A, and Ankobea-Kokro F. (2008). Awareness and perceptions of and Attitudes towards Caesarean Delivery among Antenatal, Ghana Medical Journal, *GMJ*; 42:4.
- Deneux-Tharau C, Carmona E, Bouvier-Colle MH, Breart G (2006). Postpartum maternal mortality and caesarean delivery. *Obstet Gynaecol.*; 108(3 pt1):541–548.
- Donabedian A (1990). The seven pillars of quality *Arch Pathol Lab Med.*; 114(11):1115-8.
- Emedicinehealth (2011). Ceasarian birth. Retrived from; http://www.emedicinehealth.com/cesarean_childbirth/article_em.htm. Retrieved on 21 January, 2011
- Gary, F. (2006), William’s obstetrics, 22nd Edition, Cunningham.(ch.25)
- Kirkwood BR, Sterne JAC (2003), *Essential medical statistics*. 2nd Edition, Oxford: Blackwell Scientific.
- Klein M.C. (2004). “Elective caesarean section”. *CMAJ*; 171 (1).
- Kmietowicz, Z. (2004). “NICE advice against caesarean section on demand”. *BMJ*; 328:1031
- Komfo Anokye Teaching Hospital, KATH,
- Matshidze k, Richter L, Ellison G, McIntyre J. (2007). Caesarean Section Rates in South Africa: Evidence of bias among different population groups. *PMC*; 3 (71-79).
- Moyer C, Elsayed Y, Zhu Y, Engmann C, Yang H. (2010). “Is generalized maternal Optimism or Pessimism during Pregnancy Associated with Unplanned caesarean Section Deliveries in China? *Journal of Pregnancy*; 754938, doi 10.1155/2010/754938.
- Ncayiyana DJ (2005). Elective abdominal delivery-should women have the right to choose? *South Afr Med. J.*; 95(4):192

Nilstun, T., (2008). Caesarean delivery on maternal Request: Can the ethical problem be solved by the Principalist approach. *BMC medical Ethics*; 9:11.

Olubusola A, Sasha R, Ibrahim I. Bolaji (1998). *BMJ*;317:462-465. Retrieved from; <http://www.bmj.com/cgi/content/full/317/7156/462>

Salvador J, Cano-Serral G, Rodriguez-Sanz M, Lladonosa A, Borrell C. (2009). Inequalities in caesarean section: Influence of type of the maternity care and social class in an area with national health system". *J Epidemiol community Health* . 68: 259-261 doi 10.1136/Jech.2007.071977.

Shah A, Faundes A, Machoki M, Bataglia V, Amokrane F, Donner A, Mugerwa K, Carroli G, Fawole B, Langer A, Wolomby J.J, Naravaez A, Nafiou I, Kublickas M, Valladares E, Velasco A , Zavaleta N, Neves I, Villar J (2008). *Methodological considerations in implementing the WHO Global Survey for Monitoring Maternal and Perinatal Health*. *Bulletin of the World Health Organization*; 86(2):126-131.

Souza JP, Gulmezoglu AM, Lumbiganon P, Laopaiboon M, Carroli G, Fawole B, Ruyan P. (2010). Caesarean section without medical indications is associated with an increased risk of adverse short-term maternal outcomes: the 2004–2008 WHO Global Survey on Maternal and Perinatal Health. *BMC Medicine*; 8(1):71.

Souza JP, Gulmezoglu AM, Lumbiganon P, Laopaiboon M, Carroli G, Fawole B, Ruyan P. (2011). Should caesarean section be performed on request? *BMJ*; 342: doi: 10. 1136/bmj. D276.

Sufang G, Padmadas SS, Fengmin Z , Brown JJ, Stones RW, (2007). Delivery settings and caesarean section rates in China. *Bulletin of the World Health Organization*; 85 (733-820). Retrieved from: <http://www.who.int/bulletin/volumes/85/10/06-035808/en/index.html>.

Weller, B.J., (2005). *Bailliere's Nurses' Dictionary*, 24th Edition, Elsevier Science Limited, USA.

WHO (2010). Caesarean section without medical indication increases risk of short-term adverse outcomes for mothers. WHO/RHR/HRP/10.20.

WHO (1998). Recommended Caesarean rates. Retrieved from: <http://www.sciencebasedmedicine.org/index.php/whats-the-right-c-section-rate-higher-than-you-think/>

WHO's Global survey on *Maternal and Perinatal health 2004 and 2005*.

World Health Report (2010). Background Paper 29, on “Determinants of caesarean section rates in developed countries: Supply, demand and opportunities for control. WHO.

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