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The Impact of Birth Preparedness on Pregnancy Outcome: Findings from Lurambi Sub County, Kakamega County, Kenya

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Abstract

Background: Annual global estimate of 287,000 maternal deaths were recorded in 2010 as a result of complications of pregnancy and childbirth. Sub-Saharan Africa and Southern Asia accounted for 85% of this burden (245,000 maternal deaths). Birth preparedness and complication readiness (BP/CR) is a relatively common strategy employed by numerous groups implementing safe motherhood programs.

Aim: To determine the link between birth preparedness and complication readiness to pregnancy outcomes.

Methods: Health facility based cross-sectional study was used among women in the reproductive age group 15-49 years at 36 weeks and above of gestation who were attending Antenatal care (ANC). The pregnancy outcomes were defined as either favourable or unfavourable events for both mother and baby. A birth preparedness assessment index (BPAI) was developed and used to assess preparedness of respondents.

Results: The respondents were at different levels of birth preparedness based on a Birth Preparedness and Assessment Index (BPAI); 28.9% were at level 1; 40.0% at level 2; 25.6% at level 3 and 6.4% at level 4. There were no cases reported at level 5 which represented the best level of preparedness. However, there was no relationship between pregnancy outcome and the level of birth preparedness ($p=0.915$). The ANC attendance was associated with birth preparedness (Odds ratio [OR]=2.7026, 95% confidence interval), which suggested that those mothers who had 3 or more ANC visits, undertook adequate birth preparations were almost 3 times more likely to experience favourable birth outcome than those who did not.

Conclusion: The age of the mother, marital status, ANC attendance, delivery preparations and birth weight were the most significant variables in determining pregnancy outcome. Therefore, there is need for community education on preparation for birth and its complication.

Keywords: Birth preparedness; Complication readiness; Birth outcome

Introduction

Due to inequities in functioning health systems, pregnant women in the developing world have a high risk of morbidity and mortality despite the World Health Organization (WHO) vision of universal coverage of health care [1]. It is estimated that the adult lifetime risk of maternal mortality in women in the sub-Saharan region is 1 in 38 [2]. This figure sharply contrasts that of the developed world, which stands at 1 in 3,700. In addition, the maternal mortality ratio (MMR) in sub-Saharan countries is high (510 per 100,000 live births), contributing to 62% of maternal deaths in the world [2]. Improvements in maternal health and reductions in maternal mortality have been slower than anticipated and despite isolated successes remain far below the MDG5 target of a 75% reduction in the maternal mortality ratio (MMR) from 1990 to 2015 [3]. However, child survival progress is accelerating [4]. It was estimated that only 31 countries were on track to achieve the MDG4 target to reduce child mortality by two-thirds between 1990

and 2015 [5]. Therefore, to achieve reduction and end in preventable maternal and neonatal mortality, the global community needed to focus attention and resources on effective strategies to reduce maternal and neonatal deaths, particularly in poor and underserved communities [6]. The Three Delay Model provided by Thaddeus and Maine [7] identifies delays in seeking, reaching and obtaining care as the key factors leading to maternal death. Birth Preparedness and Complication Readiness (BP/CR) is therefore a strategy to promote the timely use of skilled maternal and neonatal care, especially during childbirth, based on the theory that preparing for childbirth and being ready for complications, reduces delays in obtaining this care and enhances the probability of getting a favourable outcome [8]. This strategy is equally useful in programs that focus on emergency obstetric and neonatal care (EmONC) and skilled care during childbirth, although the specific BP/CR messages and the relative importance placed on birth preparedness versus complication readiness would differ between the two approaches [8].

Birth preparedness and complication readiness in this study, was defined as the extent to which a woman possessed the pre-requisite

attributes, attitude and environmental qualities necessary for ensuring a favourable pregnancy outcome. It required the anticipation of what will be needed along the way towards achieving a favourable and safe delivery and actually making them ready. It was viewed as a package of services, information or knowledge needed to produce a favourable birth outcome. Environmental factors that could directly or indirectly influence birth preparedness and readiness for complications included, among others, the social economic status, local politics, infrastructure and communication. Attitudinal factors included beliefs about pregnancy held by the woman and cognitive factors including knowledge, the ability of the mother to read and understand health related materials and remember specific facts, to synthesize facts and ideas into concepts and apply the concepts to oneself. The study sought to link birth preparedness and complication readiness, at the individual level, to pregnancy outcome. The pregnancy outcomes were defined as either desirable or undesirable events for both the mother and the baby and ranged from severe morbidity necessitating admission and on the extreme, mortality. Desirable outcome was a healthy mother and baby upon discharge from the hospital.

Materials and Methods

Study location and population

The study was conducted at selected health facilities in Lurambi Subcounty, Kakamega County in Western region of Kenya. The chosen

study sites included both Government and private facilities that offered comprehensive essential obstetric and neonatal care (CEmONC) in the county. The sub county borders Butere, Mumias and Bungoma sub counties to the West, Uasin Gishu and Nandi sub counties to East, Lugari to the North and Vihiga County to the South. Total population estimate was 603,422 with females of reproductive age 15-49 years estimated at 44,049 (7.3% of the total population), urban population estimate-58,832. Total fertility rate for Western region was 4.7 children per mother and Contraceptive Prevalence Rate (CPR) at 62% for all family planning methods [9].

The study population comprised women in the reproductive age group 15-49 years. The sample was drawn from pregnant females at 36 weeks and above of gestation who were attending ANC, those within 42 days post-delivery and attending the post-natal and child welfare clinics and pregnant mothers due for delivery and admitted in the maternity units.

Data collection and birth preparedness

A cross-sectional study design was used. Data was collected using a structured pre-tested interviewer-administered questionnaire. The pregnancy outcomes were defined as either desirable or undesirable events for both the mother and the baby. The key informant interview was carried out with Traditional Birth Attendants (TBAs) and the matron in charge of labor ward. A birth preparedness assessment index (BPAI), was used to assess preparedness of every respondent (Table 1).

A. Preconception Preparedness Criteria			
S/No.	Indicator	Scores	
		1 Point	2 Points
1	A visit to a VCT center for HIV testing	No	Yes
2	A visit to a doctor for medical checkup or genetic counselling	No	Yes
3	Use of contraceptives	No	Yes
4	Pregnancy planned or unplanned	Unplanned	Planned
5	Age at first pregnancy	Under 18 or above 35 Years	19-34 Years
6	Total number of pregnancies	More than 4	Less than or equal to 4
7	Mothers weight	Less than or equal to 38 kgs	More than 38 kgs
B. Antenatal Preparedness Criteria			
1	ANC attendance	No	Yes
2	Gestation age at first ANC attendance	2nd or 3rd Trimester	1st Trimester
3	Birth interval	Less than 2 years	2 or more Years
4	Financial savings	No	Yes
5	Transport arrangements	No	Yes
6	How soon do you seek treatment while sick during pregnancy	More than or equal to 2 weeks	Under 2 weeks
7	Expected date of Delivery (EDD)	Unknown	Known
8	Clothing for the baby	Unprepared	Prepared

C. Intrapartum Preparedness Criteria			
1	Birth before arrival (BBA)	Yes	No
2	Identified a professional birth attendant	No	Yes
3	Identified next of kin in case of emergency	No	Yes
4	Prepared an emergency delivery kit for a clean safe delivery	No	Yes
5	Made transport arrangements	No	Yes
6	Delivery site	Home	Health facility
7	Time in labor spend at home	More than or equal to 12 h	Less than 12 h
D. Post-partum preparedness criteria			
1	Duration of hospital stay as a discharge in	More than 2 days	Less than or equal to 2 days
2	Attendance of post-natal clinic	No	Yes
3	Attendance of child welfare clinic	No	Yes
4	Use of contraceptives	No	Yes

Table 1: Birth preparedness assessment index: individual level.

The tool (BPAI) made use of gold standard variables/indicators already held to be valid, with known sensitivity and specificity [10] to compare the test with other measures/outcomes.

A scoring system (Table 2) was used to grade the various levels of birth preparedness based on a standard criteria (the Birth Preparedness Assessment Index-BPAI) that was administered to every

participant. The index took into consideration the important known parameters that can affect birth outcome and this was divided into the preconception, antenatal, intrapartum and the immediate post-partum periods. Every participating mother was subjected to BPAI, which was assessing the preparedness of the mother for her pregnancy state.

Birth Preparedness Level	Score	Comments
1	26-31	Standard not met, no efforts, only excuses
2	32-36	Standard not met, demonstrated effort visible
3	37-42	Standard met
4	43-47	Standard met, demonstrated effort to surpass standard, visible commitment to do even better in future
5	48-52	Excellent, hardly possible to improve any further.

Table 2: The birth preparedness assessment index score/grade.

Sampling

The study was health facility based. A sampling frame consisting of all the fifty Government, Faith based organization and private health institutions in the district were used. A multistage stratified sampling strategy was used. Since these facilities were not homogenous in terms of the kind of services they offered, they were grouped into four strata which were homogenous in themselves, i.e., those offering comprehensive emergency obstetric and neonatal care (CEmONC), those offering basic emergency obstetric and neonatal care (BEmONC), health centers and dispensaries. At each of the drawn facility level, three departments, MCH/FP, Labour ward, Maternity (Ante/Post Natal wards) were taken into consideration and the sample size per facility apportioned equally to the three departments.

Sample size

The sample size was determined using Fischer's formula based on the proportions of various pregnancy morbidities as follows: childbirth and puerperium (13.8%), the proportion of expectant mothers that die (5.7%) and the proportion of expectant mothers who deliver and have no problems (13.9%) [11]. These were proportions of the total National in-patient statistics, and the precision was set at 0.05.

$$\text{Sample size} = Z^2 \times p \times (q) / d^2$$

Where $Z=1.96$ a statistical constant representing 95% confidence interval.

Where $d=5\%$ or 0.05, sampling error, p is the probability of a favourable outcome with q being its complement ($q=1-p$).

Sample size based on morbidity = $1.962 \times (0.138)(0.862)/0.052=183$

Sample size based on mortality = $1.96^2 \times (0.057)(0.943)/0.05^2=83$

Sample size based on those with no complications following delivery = $1.96^2 \times (0.139) (0.861)/0.05^2=184$

Total sample size=450

Assessment of perinatal outcomes

Birth weights less than 2500 g were considered unfavourable, while babies with a birth weight of 2500 g and above were considered favourable. All neonatal deaths were considered unfavourable regardless of the weight. Morbidity and mortality was used to characterise maternal outcome.

Data Analysis

Quantitative data was coded, summarized and categorized by reducing a collection of written responses from the questionnaire to numerical codes, edited for completeness and accuracy and analysis done using the statistical package for social sciences (SPSS), after cross-tabulations. The analysis was both descriptive and analytical using frequency distributions, cross tabulations, logistic regression and discriminant analysis and was aimed at ascertaining the association between the levels of birth preparedness and pregnancy outcome.

Ethical Considerations

After clearly explaining the purpose, aims, risks and objectives of the study to the potential participants, those mothers who were willing to participate were enrolled and asked to sign a written consent. Participants had the right to refuse participation and that there was no coercion whatsoever. The participants benefited from the knowledge gained from this study and any participant noted to have obstetric complications was referred for treatment. The study was designed in such a way that it was non-invasive and did not interfere with the participant's way of life. Privacy and confidentiality were maintained.

Results

A total of 450 cases were surveyed out of which 84.7% were married while 12.4% were single. The rest were separated or widowed. Majority of the respondents were in the housewife category (60.2%). Those in formal employment accounted for 11.3% of the total, while 10.9% were unemployed. The educational achievements of respondents revealed that just over half had a primary school education (52.4%) while those with secondary school education accounted for 38.8% of the total. Thus, 91.2% of all the cases in this study had at most a secondary school education. Only a negligible 0.2% had attained university education.

A total of 49 mothers were aged 18 years and below, with the youngest mother recorded being 15 years and the oldest 46. Thus 10.9% of the mothers constituted teenagers in this study. In this study, age was a significant determinant of pregnancy outcome ($P<0.05$), with the older mother being better prepared, possibly out of experience than the younger first time mothers .

Majority of interviewees attended ANC up to 4 times (70%) with a small proportion (2.2%) attending the same more than 4 times. ANC attendance based on religious persuasion of respondents indicated that

Protestants were much more likely to attend ANC (71.0%) compared to Catholics (27.4%).

Most of the mothers (94.0%) relied on the husband or other guardians for settling the hospital bills, with only 2.2% having made prior savings and 2.9% making use of the National Hospital Insurance Fund (NHIF).

A total of 379 (84%) babies' sampled weighed more than 2500 g, 73% of them transitioned well and recorded favourable outcomes. Of the 71 babies that weighed less than 2500 g, 94% required admission for more than 7 days in the newborn units and therefore recorded unfavourable outcomes as per the definition in this study.

Delivery Preparations

Majority of the respondents (98.4%) did not make any delivery preparations with only 1.6% making some preparations. Taboos and beliefs accounted for 99.8% of the reasons why no preparations were made. Respondents indicated that five was the optimal number of children in terms of maternal safety. This was cited as the highest safe number by 81.3% of the respondents. However, two-thirds of the respondents did not know what safe child spacing involved.

About three-quarters of respondents (72.4%) believed that taking medications during pregnancy is unsafe while only 10.4% thought that there was no harm. The rest thought that if drugs were taken only as prescribed there would be no problem (17.1%). Almost all the surveyed cases had a live birth as outcome of the last pregnancy (99.8%). For these respondents, the baby did not require admission in most cases (99.8%). The most common mode of delivery was spontaneous vertex (99.1%).

For the cases that required caesarian delivery, maternal health was considered important in 75.0% of the cases while the rest was accounted for by foetal complications. In fact, the feeling among majority of respondents was that pregnancy was risky in some way (99.8%). In the rare cases captured in this study where maternal death occurred, the major cause of death was haemorrhage.

Majority of respondents who developed complications and were admitted to a healthy facility (82.2%) were attended to in less than one hour. Those attended to between one hour and three hours accounted for 13.6% of the total while a small percentage (4.2%) did not receive attention until after 3 h. There was therefore a negligible delay encountered at the facility level and the facilities were relatively well stocked with supplies as the mothers were not required to buy any commodities.

Factors associated with preparation for birth/complication

In multivariate analysis, preparation for birth and its complication was higher among literate women, married women, women with parity range of 2-4, women with history of still birth and those who had been advised about birth preparedness during their antenatal care follow ups. The dependent variable (outcome) was associated with birth preparedness. Outcome is equivalent to 2 if the birth outcome is favourable; otherwise it is 1 for unfavourable outcome. Since the dependent variable was discrete, the logistic regression model was used to estimate the significance of birth preparedness in predicting favourable or unfavourable outcome.

When we tested the hypothesis that the outcome coefficient was significantly different from zero, the Wald statistic for this coefficient

was 2891.489 which was highly significant at 99% confidence level (degrees of freedom=1, with a Chi-square distribution). The Odds ratio (exp B), is the effect of the independent variable on the probability of an event occurring divided by the probability of the non-occurrence of the event. In this case, a one unit change in outcome would make the event 2.7026 times as likely. In terms of probability, the favourable outcome is given by: Probability (p) of occurring was given by: $2.7026 / (1+2.7026)=0.7299$. Probability of non-occurrence was $1-p=0.2700$. The odd ratio, therefore, was $0.7299/0.2700$.

The odds ratio for outcome coefficient was 2.7026 with a 99% confidence interval which suggested that those mothers who undertook adequate birth preparations were almost 3 times more likely to experience favourable birth outcome than those who did not. Maternal education was a strong predictor in preparation for birth/complication (Odds Ratio 3.789). Marital status was another factor that was strongly associated with birth preparedness and complication readiness (Odds ratio 2.986). Married women were more likely to be

prepared for birth/complication than non-married (Odds Ratio 2.511). There was a statistically significant association between parity and preparation for birth and its complications. Women with parity range of 2-4 were more likely to prepare for birth and its complications than grand multiparous (more than 4 deliveries) – Odds Ratio 2.56; and primiparous women (first time delivery) (Odds Ratio 1.894). Women who had history of still birth were also more likely to prepare for birth and its complications than those who did not have still birth (Odds Ratio 1.96).

Birth Preparedness Assessment Index (BPAI)

One third (28.9%) of the respondents were at level 1 of birth preparedness. Barely 40.0% met the required minimum standard (level 2), while 25.6% met the required standard (level 3), and a further 6.4% were at level 4. There was no case recorded at level 5 of preparedness (Table 3).

Indicator	ANC Attendance			Danger Signals of Pregnancy					Payment of Hospital Bills			Delivery Preparedness	
	<4	4	>4	Bleeding	Mal-presentation	Anaemia	Odema	BP	Husband	Saving	NHIF	Yes	No
Options	<4	4	>4	Bleeding	Mal-presentation	Anaemia	Odema	BP	Husband	Saving	NHIF	Yes	No
Frequency	125	315	10	195	204	38	10	3	423	10	17	7	443
Percent (%)	28	70	2	43	45	8.4	2.2	0.7	94	2.2	2.9	1.6	98

Table 3: Birth outcome by level of preparedness effect of health facilities on birth outcome.

Effect of health facilities on birth outcome

The facility a mother booked into had a significant effect on the birth outcome (P=0.001). The PGH Kakamega recorded 6% cases of

poor birth outcome and 94% of the positive birth outcome. Mukumu Mission Hospital, which is the next most important health facility, had 12% and 88% respectively (Table 4).

Level of Birth preparedness	Number of mothers	Favourable outcome	Unfavourable outcome
Level 1	130 (28.9%)	114 (87.7%)	16 (12.3%)
Level 2	176 (39.1%)	162 (92%)	14 (8%)
Level 3	115 (25.6%)	109 (95%)	6 (5%)
Level 4	29 (6.4%)	27 (93%)	2 (7%)
Level 5	0	0	0

Table 4: Practices of respondents on preparation for birth/ complications.

Mukumu Mission Hospital had a relatively higher proportion of poor birth outcome. Primigravid mothers accounted for 28.2% of the cases. The highest parity was 11.00 (representing 0.2% of the total). The oldest mother was 46 years and she had a positive birth outcome. There were 49 cases aged over 35 all with positive birth outcome and at least a level 3 preparation. ANC Attendance and Birth outcome Results of the odds ratios indicate that the three variables (Level of birth preparedness, Health facility attended and, the number of times ANC attended) had a similar prediction probability. A respondent whose level of preparedness was high was almost three times (2.71) as likely to have a positive birth outcome compared to the one whose

level of preparedness was low. Similarly, the type of health facility attended also greatly increased the odds of a positive birth outcome, with better-equipped facilities promoting the likelihood of a favourable outcome. The odds of having a favourable birth outcome are 2.73 indicating that respondents who make more visits to the ANC were almost three times as likely to have a favourable outcome compared to those that make fewer visits. Persons with primary level education were more likely to attend ANC less than 4 times (62.8%) compared to those with a secondary level education (33.1%). (Odds Ratio 3.789) (Tables 5 and 6).

Health Facility	Total number of cases	Favourable outcome	Unfavourable outcome
PGH	221 (49.1%)	208 (94%)	13 (6%)
Mukumu	118 (26.2%)	104 (88%)	14 (12%)
Nursing homes	70 (15.6%)	65 (93%)	5 (5%)
Health centers	39 (8.7%)	33 (85%)	6 (15%)
Dispensaries	2 (0.4%)	2 (100%)	0 (0%)

Table 5: Birth outcome at the five health facilities.

Number of times ANC attended	Code	Favourable outcome	Unfavourable outcome	Total
Less than 4 times	1	114 (91%)	11 (9%)	125 (28%)
4 times	2	290 (92%)	25 (8%)	315 (70%)
More than 4 times	3	8 (80%)	2 (20%)	10 (2%)
Total		412 (92%)	38 (8%)	450

Table 6: ANC attendance and birth outcome.

Results from the FGD and KI interviews

The persons involved included, health workers (Nurses in charge of labor ward, ANC clinic, Antenatal and post-natal wards), TBAs and expectant mothers and those within puerperium. The aim was to find out what kind of preparations were done as far as birth preparedness and complication readiness was concern.

TBAs responses

“Marriages in our days were pre-arranged and each family in the interested party was scrutinized for ailments that could be passed on or those that they thought were infectious” said Leya, 76 year old TBA. “It was very difficult to marry if there was family history of diseases like schizophrenia, epilepsy or leprosy, or if one was from families known to practice witchcraft and many other social anomalies like murderers.” she went on. This can be viewed as a form of preconception preparedness/counselling. By avoiding marriage from a family with schizophrenia for instance, avoided the chances of getting an offspring with the same disease. “Children born out of incest were abandoned or outcast” she explained, as they were likely to be weaker offspring. “Mothers could stock firewood, fuel as well as water and food”, so that when they deliver, they do not have to go into the pains of looking for these necessities because they will be feeling weak after delivery and needed to concentrate on taking care of the newborn baby. “Preparedness in the olden days was different from modern time preparedness” stated Khatenje, 57 year old TBA. “There were self-help groups whereby mothers supported each other in terms of food preparation, general cleaning, merry go rounds, and donations”. A baby belongs to the community and therefore, they could not let a baby go hungry by ensuring that the mother is comfortable”. She went to explain that “The husband was not allowed to sleep in the same house with a mother who had delivered until after a period not less than six months” lest something bad happens to the baby”. This is viewed as a family planning strategy / abstinence. Most of the information relating to pregnancy child birth and care was passed on from the elders to the young ones by word of mouth. There used to be teaching lessons for

the young from the elders. “Elaborate preparations were not done due to taboos, myths and beliefs” added Hebo one of the village elders. “How do you prepare for what you have not seen?” he posed. The argument being uncertainty. “One cannot prepare for what she is not sure of” he added. They consider pregnancy to have certain risks and they had herbal remedies for various pregnancy related ailments. From the TBA responses, there were traditional ways of eliminating what can be viewed as hereditary/familial conditions that could be passed on. Preparations made were not directly related to the baby for fear of “something bad” happening to the unborn baby.

Expectant mothers responses

“My biggest challenge is uncertainty about the outcome of the pregnancy. I did not make any elaborate arrangements because I was not sure of the baby surviving. It would be very traumatizing for me to see the items that I had prepared and yet the baby is not there” Said Truphena – 34 year old mother of three. Preconception preparedness was an unknown concept to most of the mothers interviewed. Intrapartum preparedness was not as elaborate, a few kept a new razor blade and string for severing and tying the cord. Post-partum preparedness- many used oral contraceptives without the knowledge of the husbands most of whom were opposed to use of family planning methods.

Health workers responses

Preconception preparedness was reported as nil, since the health care workers (HCWs) encounter patients who are already expectant. They play a major role in ANC, a few (46%) come for delivery, and some are referred in critical condition. They offer post-natal care and child welfare services at facility and community level as outreach services. They would like to see a situation where preconception counselling is done. The observation in the ward was that there was little preparation done; even financially, many patients were retained on the wards due to lack of money to settle hospital bills (before the

policy on free maternity care came in force). Poverty is a crucial factor in birth preparedness and complication readiness.

Discussion

Pregnancy and childbirth is considered a normal physiological process and consequently most potential mothers do not make any prior arrangements thereby leaving everything to chance. There are cultural beliefs and taboos that inhibit mothers from making prior preparations. Most of these taboos are out dated and need to be discarded if we are to make meaningful reduction in perinatal morbidity and mortality. There are tremendous gains in child survival and therefore the question of not preparing because one is not sure of the child's survival should not arise [12]. Globally 210 of 1000 babies born in 1955 died before their 5th birthday-a total of 20.6 million deaths that year [13]. By 1995, the death rate had fallen to 78 per 1000 giving a total of 10.6 million deaths in that year [13]. This should decline further to 37 per 1000 by the year 2025, when it is projected that the total deaths will be 5.1 million. This implies that the chances of a new born surviving are steadily increasing [13]. This figure would be much lower without HIV infection and Aids.

Antenatal screening programmes are rarely undertaken due to lack of facilities and medical expertise, funding difficulties and the erroneous belief that the poorly educated pregnant women will not avail themselves. Indicators of increased risk of poor pregnancy outcomes include factors like advanced maternal age, abnormal findings on early ultra sound screening, teratogenic exposure, positive family history of genetic disorders and previous chromosomal or congenital foetal anomaly [14]. Pregnancy and child birth involve significant health risks, even for women with no apparent health problem. Approximately 40% of all pregnant women experience pregnancy and labour related health problems and 15% of all pregnant women suffer long term or life threatening complications [15].

It is on this basis that every woman must be encouraged to develop a birth preparedness and complication readiness plan, and to deliver under the care of a skilled health provider. The community and family should be aware of the major danger signals, including any bleeding during pregnancy [15]. The World Health Organization (WHO) recommends that the expectant mother should attend a minimum of four targeted or focused antenatal clinic (ANC) visits, each of which has specific items of client assessment, education and care to ensure prevention, early detection and prompt management of complications. The four visits are spread out through the entire pregnancy during which specific activities are carried out to guide the woman along the path of survival. The visits are spread out as follows; first visit less than 16 weeks, 2nd visit 20-24 weeks, 3rd visit 28-32 weeks and the 4th visit 36 weeks. Some clients may require more visits depending on their needs [16]. The time sectors of pregnancy preparedness in which a woman should prepare, range from the preconception, antenatal and intrapartum periods through to 42 days following delivery (the postpartum period).

In this study, the various levels of preparedness were determined by the birth preparedness assessment index (BPAI). Pregnancy is often a time of profound emotional and developmental upheavals and can present developmental crisis for both partners. Vivid dreams and fantasies are common and healthy during pregnancy. Most commonly, pregnant women dream of or imagine they are unprepared, being attacked, hurt or trapped, have forgotten something or are becoming physically unattractive. Fantasies and dreams may focus on sex, death

and resurrection, delivery at home and the physical appearance of the baby. Recurrent themes may indicate an area of concern for the client [17].

About 10.9% of the mothers constituted teenagers in this study. Age was a significant determinant of pregnancy outcome ($P < 0.05$), with the older mother being better prepared, possibly out of experience than the younger first time mothers. Teenage pregnancies are associated with difficult deliveries with consequent unfavourable outcome. One fifth of deliveries in teenage mothers need to be assisted instrumentally or operatively explained by the increased risk of cephalopelvic disproportion (CPD), prolonged labour and delayed second stage of labour [18]. Harrison et al. [19] in a study in Nigeria found out that the rate of CPD was higher, prolonged labour more common in teenage mothers than their older counter parts. Hypertension is reported to complicate about 7% of all pregnancies in general and pre-eclampsia accounts for 5% [20]. Hypertensive disorders of pregnancy are a major cause of perinatal morbidity and mortality [20]. Teenagers formed 27.3% of the Hypertensive patients while those over 35 years formed 18.3% in a study by Buga et al. [20] in South Africa. Various authors believe that the pregnant teenagers experience poor pregnancy outcome, however some researchers maintain that except in the young teenagers (less than 16 years) this poor outcome may be a consequence of poverty and not the age of the mother [21]. Moreover, when antenatal care is of high quality and supportive services are offered, available and accepted, teenagers have the same rates of uneventful pregnancies and birth outcome as older women [21].

In this study, birth weight was a significant predictor of outcome ($P < 0.05$), conforming to other studies reported in the literature. Out of the 379 babies weighing more than 2500 g, 73% of them recorded favourable outcomes. WHO estimates the global rate of such deliveries at 17-18%. The incidence of low birth weight is not uniform throughout the world, being higher in developing countries with estimates varying from 10-30% as compared to developed countries with a rate of 3-8% [22]. Babies born of mothers aged 18 years and below had birth weight of 100-300 g lower than those of mothers older than 18 years in a study by Feleke et al. [23]. The mean birth weight was considerably lower for primigravida and the proportion of low birth weight babies correspondingly higher. This could be explained by the fact that there is general agreement that pregnancy outcomes are more favourable in multipara than primiparae [23]. Birth weight has been recognised as an index of intrauterine growth, as it gives an indication of intrauterine growth of the fetus and predicts to some extent the outcome of the pregnancy [24].

In some cultures, preparations start early including preparing a room for the unborn baby, bedding, toys, clothing, savings, and even the name of the unborn baby [25]. A walk through a maternity unit will reveal varying levels of birth preparedness on the part of the mothers, the majority leaving things to chance while some make very elaborate preparations. In most cases they will not have any clothing for the baby or any money to pay the hospital bills. In other instances, some give birth before arrival (BBA), a situation that is full of attendant risks of infection and birth injuries. In a study by the MoH, UoN and Population Council [26], birth before arrival (BBAs) accounted for 2% of all the deliveries in four Districts of Western Kenya.

In Kenya, levels of preparation will vary with levels of education, status in society and the knowledge of the danger signs of pregnancy on the part of the mother [26]. In Lurambi Subcounty, the scenario is the same and things are entirely left to chance and this leads to

untoward health consequences. A national institute of health and human resources expert panel in America recommended that ANC begins prior to conception, preferably within one year of planned pregnancy [17]. It has been shown that consistent and comprehensive ANC began early in pregnancy markedly reduced perinatal mortality and morbidity [17]. Ideally this should encompass risk assessment, social services, client education, and medical care and should begin prior to conception (preconception counselling). Available preconception assessment data indicate that by identifying problems early, it is possible to resolve them prior to conception and ultimately improve outcomes, including HIV/AIDS risk factors [26]. The concept of preconception care has been established and ideally ANC should be a continuation of such a physician-supervised programme for women. It provides information on potential risks of pregnancy [13].

“Wantedness” of pregnancy is a critical determinant of pregnancy outcome; most teenage pregnancies are unwanted. A woman’s attitude towards pregnancy and child birth, her lifestyle, the resources available to her during her pregnancy and the behavior expected of her by her culture all influence her sense of wellbeing. Adolescent girls who become pregnant feel ashamed or guilty and will tend to conceal the pregnancy and consequently will not attend ANC. To others, becoming pregnant during adolescence is viewed by the peer group as an accomplishment and a sign of maturity. In the business setting, pregnancy may be viewed as annoyance, something that is likely to interfere with productivity and may not be tolerated [27]. Pregnancy related discrimination suits are on the rise [28]. An expectant woman executive working with the giant Google organization claimed in a suite that she was sacked over her pregnancy after she was branded a human resource nightmare. She was pregnant with quadruplets and lost three of her unborn children as a result of emotional distress [28].

The woman’s attitude towards her unborn child may be pride, acceptance, satisfaction, rejection or as is usually the case, ambivalence. In most normal pregnancies, women experience anxiety and depression as well as positive feeling of excitement and hopefulness. Women who have marital difficulties, who do not have adequate social support during pregnancy and who have conflict about their own personal identity are likely to experience greater emotional stress [27].

Adequate preparation can therefore be viewed as the most basic minimum level of preparation sufficient to give a positive birth outcome. In this study, delivery preparations, which hinge on the actual delivery time, were the most significant. These include the mother having made transport arrangements, delivery under the care of a skilled attendant, knowing the danger signals of pregnancy and thus being able to act quickly on the first two aspects of the three delay model of a maternal death.

Conclusion

From the study findings, the age of the mother, marital status, ANC attendance, birth weight and delivery preparations were significant variables in determining pregnancy outcome. The mothers who were well prepared for their pregnancy were three times more likely to get a positive outcome than those who were not. Therefore, there is need for community education on preparation for birth and its complication with more emphasis on intrapartum preparedness.

Recommendations

Families should be aware of the need for birth preparedness and readiness for complications as this will go a long way in reducing

delays in seeking care with consequent favourable outcome. More health education is needed as the mothers have the information but seem not to know what to do with that information. Women need to be empowered to make their own decisions regarding the pregnancy and not to wait for their husbands because this delays management. Expectant husbands should be targeted as a preparedness strategy as most of the respondents relied on them for financial reasons and crucial decision making. Increase male awareness of reproductive health. Birth preparedness and complication readiness plans should be introduced as a matter of policy in the ANC teachings. Expectant mothers should be taught about the minimum levels of preparedness with a focus on intrapartum preparedness. The difficulty in measuring “Preparedness”, the tool used in this study is acknowledged, and may not have been effective as it may not have captured all aspects of preparedness. This study should provoke further research in this area.

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