

## Influence of Integrating Childbirth Preparation Program on Birth Outcomes among Pregnant Women in Western Kenya

Mable Wanyonyi<sup>1</sup>  
Maximilla Wanzala<sup>2</sup>  
Mary Kipmerewo<sup>3</sup>  
Evans Raballah<sup>4</sup>

<sup>1</sup>[mkwanyonyi@mmust.ac.ke](mailto:mkwanyonyi@mmust.ac.ke) (+254720966656)

<sup>2</sup>[mwanzala@mmust.ac.ke](mailto:mwanzala@mmust.ac.ke) (+254719740951)

<sup>3</sup>[mkipmerewo@mmust.ac.ke](mailto:mkipmerewo@mmust.ac.ke) (+254722797865)

<sup>4</sup>[eraballah@mmust.ac.ke](mailto:eraballah@mmust.ac.ke) (+254722420658)

<sup>1</sup><https://orcid.org/0000-0002-5720-3293>

<sup>2</sup><https://orcid.org/0000-0002-6155-9794>

<sup>3</sup><https://orcid.org/0000-0003-1220-6439>

<sup>4</sup><https://orcid.org/0000-0002-3304-6836>

<sup>1,2,3,4</sup>Masinde Muliro University of Science and Technology P.O. BOX 190-50100, Kakamega, Kenya

### ABSTRACT

*Childbirth education and preparation has been fronted as key element in enhancing maternal and neonatal health and preventing some adverse outcomes. There is paucity of literature in Kenyan setting linking maternal childbirth education and maternal and neonatal outcomes. The study aimed to assess the effect of an educational intervention in childbirth and its influence on maternal and neonatal outcomes among expectant women in western Kenya. A Quasi-experimental design was utilised. The health facilities were selected by simple random sampling. Expectant women were enrolled at antenatal care services and allocated to either the control group or the intervention group. Those in the intervention group went through 2 hourly sessions of childbirth preparation teaching twice in the course of the 32<sup>nd</sup>-35<sup>th</sup> weeks of gestation. Investigation and assessment on specific maternal and neonatal outcomes was done within 48 hours following delivery. Chi-square and independent t tests were used to determine the statistical difference. More mothers in the control experienced prolonged labour 12% compared to 2.2% in the intervention ( $P<0.001$ ). Progression failure was high in the control 8.9% compared to 1.1% in the intervention ( $P=0.001$ ). The control had more cases of augmentation 11% compared to 2.7% in the intervention ( $P=0.004$ ). Higher APGAR scores were recorded in the intervention group at 1 and 5 minutes compared to the control ( $P<0.001$ ). Few cases of birth asphyxia were in the intervention 1.6% compared to 5.8% in the control ( $P<0.001$ ). The intervention program aimed at enhancing childbirth knowledge and improving self-efficacy offered prior to birth was successful in reducing adverse birth outcomes in mothers and their neonates in the intervention group. A program aimed at enhancing women's self-efficacy and improving their knowledge on childbirth should be structured and incorporated in the routine antenatal care to reduce some adverse maternal and neonatal health outcomes associated with fear anxiety and uncertainty related to inadequate childbirth knowledge.*

**Keywords:** Expectant Women, Childbirth Preparation Program, Maternal Outcomes, Neonatal Outcomes

### I. INTRODUCTION

Anxiety related to childbirth pain is one of the most significant reasons that make women desire for caesarean section. Evidence has shown that panic and worry related to childbirth pain is a major reason for women opt for caesarean sections (Rasool et al., 2021). The women's encounter with labour makes them anticipate the pain with fear, anxiety and always in low moods. Feelings of fear, desperation, exhaustion and deprivation of energy associated with the magnitude of the contractions and the intensified pain during labour have been reported by earlier studies (Khamchian et al., 2020). All these have potential negative impacts on maternal and neonatal outcomes. Additionally, women expressed the thoughts of despair and were scared to death. Adequate pain control has a potential of alleviating the adverse psychological experiences of women resulting from high tension reactions such as fear or panic from intense labour pain (Bakhteh et al., 2022). The current study sought to address maternal fear, anxiety and pain by integrating a program aimed at enhancing childbirth knowledge and improving self-efficacy during the antenatal period and thereafter evaluating their effects on maternal and neonatal outcomes. The program

taught expectant mothers on non-pharmacological methods of pain relief, improved their coping strategies and allayed fear and anxiety related to childbirth.

Childbirth pain is influenced by physiological, mental, societal, traditional and surrounding factors. It is awful in nature and quickly intensifies with time (Nguyen et al., 2021). Too much pain increases the mothers' worries and uncertainties during childbirth and at the same time trigger the sympathetic nervous system. These in response increase production of catecholamines, such as epinephrine and norepinephrine, consequently leading to increased pain, delayed labour stages, and dissatisfaction with the delivery experience (Rúger-Navarrete et al., 2023). Delayed labour culminates into apprehension worry and exhaustion that culminates in decreased maternal self-reliance and pride. There is an association between prolonged labours and utilization of pharmacologic agents of pain relief. Prolonged labour is also associated with high chances of injury, prenatal deaths, use of oxytocin and increased rates of prenatal mortality and rate of caesarean and instrumental delivery (Rasool et al., 2021). The relationship between lifelong stress and childbirth outcomes demonstrates the importance of modalities to decrease this factor (Hildingsson et al., 2022). Currently, a variety of analgesic and supportive methods are utilised for alleviating labour pain. But due to some problems associated with pharmacological agents on maternal and neonatal health, they are hardly used. Recent evidence suggests use of non-pharmaceutical interventions of pain management in labour with supportive care being fronted as being effective (Cabral et al., 2023). The current study utilised an educational intervention program to enhance maternal self-efficacy through various non-pharmacological ways of pain relief and measured its impact on the specific outcomes on mothers and their new-borns.

Recent evidence suggests that various interventions have impacted on outcomes relating to the mothers and their new-borns. A comparative study in Iran between women who incorporated delivery plans in readiness for childbirth resulted in more spontaneous vaginal deliveries and less duration of first and second phases of labour compared to their counterparts who did not have the delivery plans. Additionally, they were more satisfied with the process of childbirth and initiated breastfeeding much earlier than the control group (Mohaghegh et al., 2023).

In addition, maternal composure self-confidence and self-assurance reduced the risks of developing adverse birth outcomes in Indonesia (Ramie &Mahdalena, 2023). The impact of prenatal preparation on birth outcomes have been documented by earlier authors. In Turkey, those who went through prenatal training recorded more vaginal births, lower depression, less anxiety and stress symptoms in relation to those who did not attain the training. In Korea lower caesarean births and decreased use of analgesia was documented in the group that went through prenatal preparation though both groups had comparable anxious and depressive levels (Hong et al., 2021). In Tanzania, less surgical births, cases of haemorrhages, fits and new-born adverse birth outcomes were recorded during delivery in family centred prenatal training schedule in comparison with the control group (Shimpuku et al., 2019). Due to the paucity of literature on an educational intervention program in pregnancy and its effects of maternal and neonatal outcomes in western Kenya, the current study was conducted to address this gap-in-knowledge.

### 1.1 Objectives of the Study

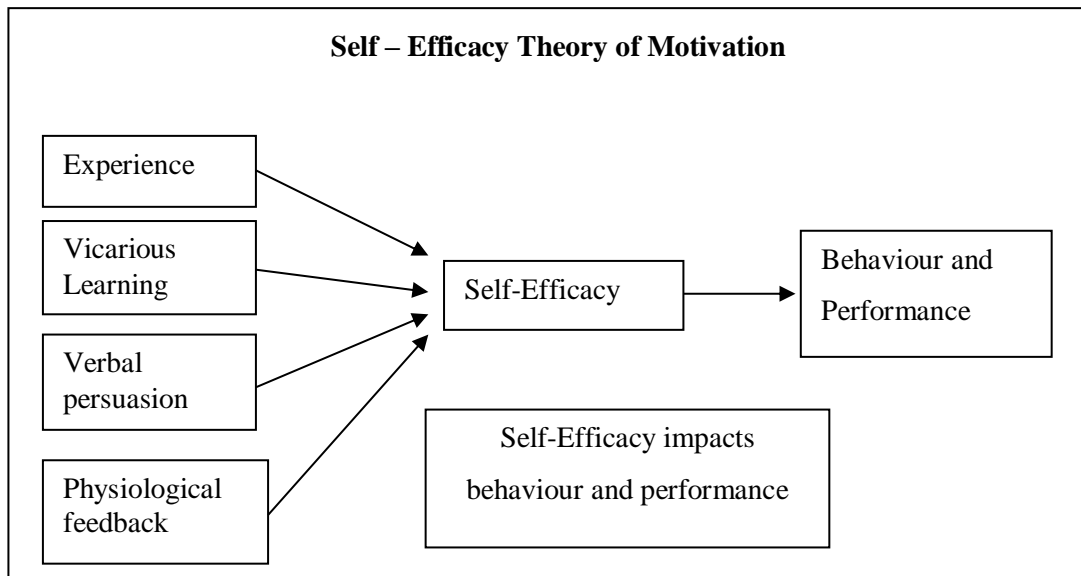
1. To determine the effect of integrating childbirth preparation program on maternal outcomes among pregnant women in Kakamega County.
2. To determine the effect of integrating childbirth preparation program on neonatal outcomes among pregnant women in Kakamega County.

## II. LITERATURE REVIEW

### 2.1 Theoretical Framework

The intervention in the current study relied on the concepts from the self-efficacy theory of motivation that was designed by the psychologist Albert Bandura (Bandura, 1977). He described self-efficacy as personal confidence in the ability to control not only their actions but also on events that that affect their lives. Personal ability can provide a basis for motivation; wellness and accomplishment. The main concepts in this theory include mastery experiences, verbal persuasion, role modelling and improving physiological feedback to include reduced fear and anxiety These concepts were used as the basis for the childbirth preparation and intervention. The expectation was to prepare mothers to have self-efficacy, composure and confidence during childbirth. The intervention in the current study was adapted from China, where an educational program based on self- efficacy theory achieved low levels of childbirth pain perception and high levels of self-efficacy among first time mothers (Hatamleh et al, 2019). However maternal and neonatal outcomes were not evaluated. The current study sought to establish the relationship between enhanced childbirth knowledge and self-efficacy with maternal and neonatal outcomes. Numerous benefits to daily life have

been linked with high self-efficacy, such as ability to recover or adjust easily to distress; healthy way of life like exercise or losing weight, enhanced employees accomplishment and attainment of educational goals (Bandura, 1977). Behaviour and performance as outcomes of the theory could influence maternal and neonatal outcomes in terms of composure, self-reliance, confidence and ability to perform coping techniques or their inadequacies (Rúger-Navarrete et al., 2023). Adjusting to distress related to childbirth was vital for mothers in the intervention by utilizing the taught skills and achieving calmness.



**Figure 1**  
*Self-Efficacy Theory of Motivation*  
Source: Bandura (1977)

Labour and childbirth are stressful events in women’s life time that require innovative and ameliorative means to manage. High efficacy is therefore required to overcome the stress by building resilience and internal strength. Self-efficacy theory was therefore suitable for this study to enable mothers develop competencies required during childbirth.

Hatamleh et al. (2019) reiterated that less effort has been done to incorporate self efficacy into prenatal care despite the numerous benefits in other aspects of life like education, exercise and improvement of employee performance. This is happening with the fact that self-efficacy is necessary for women to cope with childbirth. The current study addressed the above gap in literature.

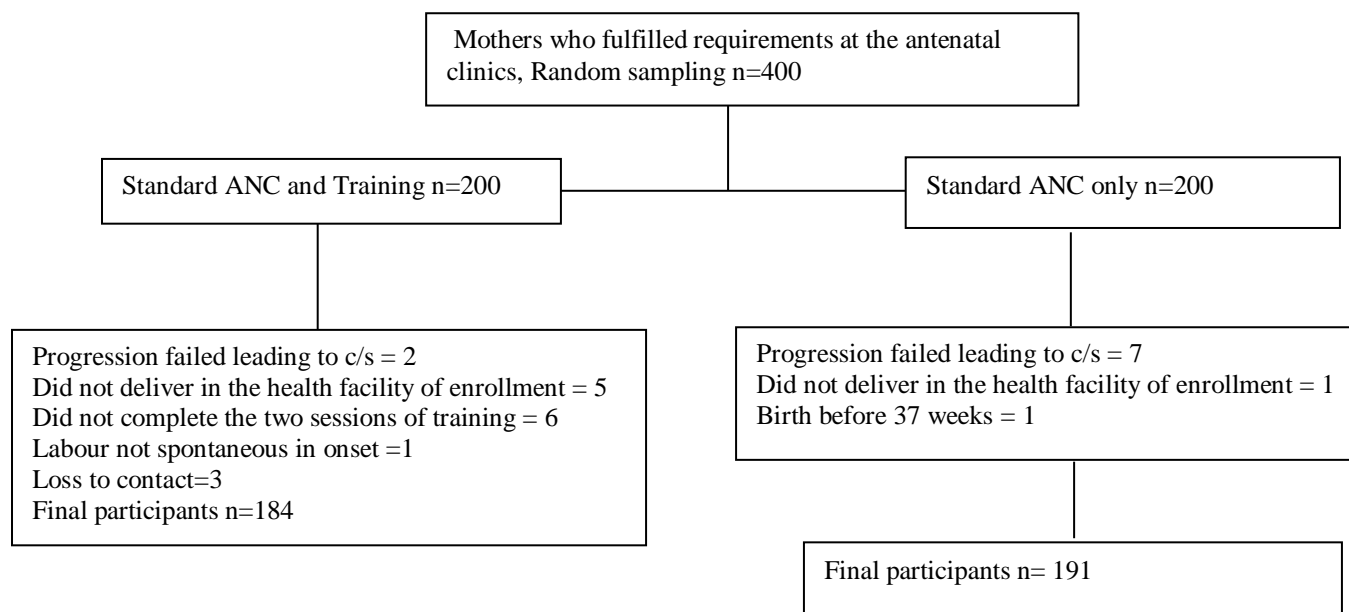
### III. METHODOLOGY

#### 3.1 Study Area

The study site was Kakamega County, in western Kenya. Previous data from the County estimate 67,127 deliveries, most of them being natural childbirth. Eligible pregnant women were recruited at one level 5 health institution and four level 4 hospitals.

#### 3.2 Study Design

The study utilised a quasi-experimental follow up design. Expectant women who fulfilled the requirements were taken up in the study at the prenatal care services of the specific health care institutions. Birth outcomes were assessed in no more than 48hours after delivery.



**Figure 2**  
*Process Chart Indicating Enrolment of Expectant Women to Standard ANC Care Only and Standard ANC Care with Training*

## METHODOLOGY

### 3.1 Study Population

Expectant mothers seeking for antenatal care services at Kakamega County Referral hospital, Butere, Malava, Iguhu, Makunga and Lumakanda level four hospitals in Kakamega County constituted the study population.

### 3.2 Inclusion Criteria

Participants with low risk pregnancies without any known pregnancy complications since their initiation of antenatal care were selected in the study. Women who had the intention of giving birth in the same facility they were attending antenatal care since a follow up was required, 18 years and above and confirmed singleton pregnancy. Gestation of 28-34 weeks as the training was done in the last trimester of pregnancy and aimed at pregnant women who were approaching delivery. Mothers who had high chances of achieving natural births.

### 3.3 Exclusion Criteria

Women who declined to be study participants. Mothers who experienced various difficulties related to pregnancy and delivery to include caesarean sections, adverse birth outcomes like pre-term births, birth anomalies or fresh still birth were also excluded from the study since they were under emotional stress.

### 3.4 Sample Size Determination

The study utilized Fischer's technique to arrive at the sample size. Utilization of hospital deliveries in Kakamega County was estimated at 70 % by the former Kenya Demographic and Health Survey at the time of study hence a prevalence of 0.70. Overall 400 participants were enrolled with an addition of 20% of the sample to cater for the loss to follow up.

### 3.5 Sampling Technique

Kakamega County Teaching Referral Hospital was singled out for being the only level 5 health facility in the region. The other five health facilities were randomly picked from the eleven sub-Counties. Proportions of mothers in each facility were allocated according to delivery statistics of that facility. The attendance records at the antenatal clinic had detailed information about maternal socio-demographics and the fetal age which assisted in identifying and enrolling mothers in the study. The recruitment of those in the intervention and without was done in turns of weeks, i.e. week one could be controls, week 2 cases, and week 3 controls and so forth up to the desired number in all the

institutions. Each facility had equal number of participants in the standard antenatal care group and the group that had additional preparation on childbirth. Simple random sampling was utilised to pick a specific number of mothers in each week. The two groups in each facility were set apart by weeks to reduce the spill-over effect. Thereafter, mothers were contacted through their registered telephone numbers and planned for physical contact where the purpose of the study was communicated and proper screening for eligibility criteria was done. Those who fell short of the requirements or who were unreachable through their mobile devices were replaced from the register. Grouping of participants in numbers of 10-15 was done for easier follow up based on their gestation period. Twice interaction lasting a minimum of 120 minutes each was organized for all the groups receiving childbirth training and preparation in addition to the routine antenatal care amidst the 32<sup>nd</sup>-35<sup>th</sup> weeks of gestation. Follow up on all participants in the control and intervention group was done and assessment on outcome measure was done in the first 48 hours after parturition.

### **3.6 Training of Research Assistants**

Twelve research supporters were trained to interrogate mothers and assemble the data, 2 per facility since the 6 health facilities were far apart and mothers delivered at various times. Vihiga County Hospital served as a pretesting facility using 15 mothers attending ANC and intrapartum services at the facility. The reliability of the tools was assured by their effective utilisation in China (Ip et al., 2009) and Saudi Arabia (Alsomali et al., 2023) and found to be sufficient.

### **3.7 The Measure in the Study**

The program aimed at enhancing education relating to childbirth and self-efficacy among expectant women. The desired effect was to assist the women attain the necessary coping techniques related to stressful events of childbirth and the associated pain. The program had two face to face sessions lasting 2 hours each. The working days and weekends were utilized to enable working mothers to participate during weekends. A teaching session was arranged in group of 10-15 mothers for increased interaction and discussion. The renowned constructs grounded on self-efficacy theory by Bandura were utilised during the learning process (Bandura, 1977).

### **3.8 Enhancing Awareness and Persuading Participants**

Participants were encouraged to take an active role in childbirth preparedness. Childbirth was normalised as a physiological process that can be taken with ease and relaxation. Vital information included the bio-psychological events of childbirth, causes of childbirth pain, indications of labour and its normal course, phases of labour and its various stages. The expectations and the normal routine approach related to physiological birth. The advantages and benefits of a natural physiological delivery were taught. Power point illustrations, charts, pictures and videos were utilized to promote the teachings.

### **3.9 Coping Strategies**

The approaches for coping with childbirth pain, and their association with self-reliance for childbirth were demonstrated. Different survival techniques to include inhalation methods, mental repose, staying calm and composed, diversion measures, cognitive restructuring of pain, strolling, rubbing and talking to God to assist mothers to manage emotional tensions and pain during labour were coached. A demonstration of coping behaviours mentioned above was done. Expectant mothers were required to practice the learnt survival techniques using memory aids with use of notes, photographs or pneumonic.

#### **3.9.1 Return Demonstrations**

All participants were expected to practise the coping strategies and do a back demonstration of the learnt coping strategies.

#### **3.9.2 Vicarious Learning**

The participants learnt through role models by visualizing a video. Two different expectant women demonstrated coping strategies of pain during labour process.

#### **3.9.3 Mastering of Coping Competencies**

Expectant mothers vowed to practise the learnt survival techniques using various means of recalling the learnt behaviour. Photographs, pneumonic and Pamphlets' summarizing major coping strategies for directing self-rehearsals

were given to the mothers. A practical log for everyday recordings for individual evaluation was reinforced. Competency was to be achieved by continuous practice.

### **3.9.4 Verbal Persuasion**

Participants were motivated and appraised for their continued practice. Group discussion on areas of concern during childbirth, sharing experiences and what to anticipate during the process of labour (pain, common procedures: vaginal examination (VE), nutrition, positions) was enhanced.

These mothers were followed up and evaluated at the end of pregnancy on the objectives of the study. The usual routine prenatal care was offered to the control group without arranged educational childbirth preparation classes. These mothers were followed up and thereafter comparisons were made between the two groups with regard to the study objectives to determine the influence of the arranged educational childbirth program on birth outcomes.

### **3.10 Data collection Procedure and Tools**

This study utilised structured questionnaires to assemble data on the social and demographic factors of the mothers as well details on maternal and neonatal outcomes. After delivery, all files of mothers under study were taken and evaluated for the following:

### **3.11 Maternal Outcomes**

#### **3.11.1 Length of Labour**

The length of labour for each participant was evaluated. This was done by examining the history in the file as well as on the individual partograph when true labour started and the duration for the whole process of labour. For a primi- para time should not have exceeded 18 hours whereas for a multi-para time should not have exceeded 12 hours. Beyond the stated time, it was termed prolonged labour. Comparison of this outcome was made between the control and the intervention group to determine which group experienced more prolonged labours.

#### **3.11.2 Final mode of delivery**

All mothers were expected to deliver through natural means by spontaneous vaginal delivery as per the inclusion criteria. The current study established how many ended up with other modes of delivery such as caesarean sections, vacuum delivery or forceps unrelated to obstetric emergencies but rather progression failure. This was compared between the two groups to determine which one had other modes of delivery other than normal vaginal delivery.

#### **3.11.3 Failure to progress**

Mothers who started naturally, with spontaneous onset of labour but could not progress well and an intervention had to be used for successful birth of the baby; this may include augmentation with oxytocin. Use of analgesia during labour was also be evaluated. This was compared between the two groups to find out which group had more interventions and or complications.

#### **3.11.4 Postpartum haemorrhage**

Related to prolonged labour. This was compared between the two groups to see which had more cases of haemorrhages.

### **3.12 Neonatal Outcomes**

The current study specifically analysed group APGAR scores of the neonates, fresh stillbirths, and babies born with asphyxia. These outcomes were evaluated by looking at the files to see the actual documented records on APGAR scores, whether baby born alive or dead, and number of babies who had asphyxia among mothers in the intervention and those in the standard care.

### **3.13 Data analysis**

Data cleaning and entry into excel sheet was done. The 26<sup>th</sup> version of SPSS was utilised to analyse the data. The frequencies of maternal and neonatal complications were recorded in each group and statistical differences were determined by performing chi-square tests and t- tests.

## IV. FINDINGS & DISCUSSIONS

### 4.1 The Social and Demographic Traits of the Study Participants

Table 1 below displays the social and demographic traits of the study participants. The participants were three hundred and seventy five (375), with mean age of 24 years, many were married (73.1%), Christians (93.9%), with secondary education (45.3%), unemployed (56.6%), had above four antenatal visits (79.2%), multi-para (52.2%) and planned pregnancies (56.8%). Both groups were homogenous as indicated by there being no significant statistical difference between them.

**Table 1**  
*Socio-Demographic Characteristics of the Study Participants*

Parameter	Study Groups		P value
	No intervention	Intervention	
<b>Age Median (IQR)</b>	24.00 (8)	25.00 (9)	0.113 <sup>a</sup>
<b>Marital status</b>			
Single: n (%)	54 (28.3)	44 (23.9)	
Married: n (%)	137 (71.7)	137 (74.5)	
Separated: n (%)	0 (0)	3 (1.6)	0.143 <sup>b</sup>
Divorced: n (%)	0 (0)	0 (0)	
Widowed: n (%)	0 (0)	0 (0)	
<b>Religion</b>			
Christian: n (%)	176 (92.1)	176 (95.7)	
Muslim: n (%)	15 (7.9)	7 (3.5)	0.151 <sup>b</sup>
Hindu: n (%)	0 (0)	1 (0.5)	
Others: n (%)	0 (0)	0 (0)	
<b>Education level</b>			
None: n (%)	0 (0)	4 (2.2)	
Primary: n (%)	58 (30.4)	52 (28.2)	0.100 <sup>b</sup>
Secondary: n (%)	92 (48.2)	78 (42.4)	
Tertiary: n (%)	41 (21.5)	50 (27.2)	
<b>Employment status</b>			
Student: n (%)	29 (15.2)	23 (12.5)	
Not employed: n (%)	107 (56)	105 (57.1)	
Casual: n (%)	14 (7.3)	10 (5.4)	0.628 <sup>b</sup>
Permanent: n (%)	4 (2.1)	8 (4.3)	
Self-employed: n (%)	37 (19.4)	38 (20.7)	
<b>No. of ANC visits</b>			
Less than 4: n (%)	39 (20.4)	39 (21.2)	0.853 <sup>b</sup>
Four and above: n (%)	152 (79.6)	145 (78.8)	
<b>Parity</b>			
Primi-para: n (%)	75 (39.3)	73 (39.7)	
Multi-para: n (%)	100 (52.4)	96 (52.2)	0.995 <sup>b</sup>
Grand multi-para: n (%)	16 (8.4)	15 (8.2)	
<b>Pregnancy planning</b>			
Planned: n (%)	104 (54.5)	109 (59.2%)	0.349 <sup>b</sup>
Not planned: n (%)	87 (45.5)	75 (40.8%)	

Data presented as n (%) unless otherwise stated. <sup>a</sup>Statistical difference determined by Mann-Whitney tests;

<sup>b</sup>Statistical significance determined by Pearson Chi-Square tests.

### 4.2 Influence of an Educational Intervention Programme on Maternal and Neonatal Outcomes

The impact of the educational training programme on maternal and neonatal outcomes is shown in Table 2 below. Results show that maternal and neonatal complications were less in the group that had childbirth preparation and training relative to the group without. About 12% of mothers had prolonged labours in the control group compared to 2.2% in the intervention group ( $P < 0.001$ ). Mothers who experienced progression failure were 8.9% in the group without childbirth preparation and training compared to 1.1% in the group that was prepared and trained

( $P=0.001$ ). Additionally, 11% of mothers in the group without training were augmented compared to 2.7% in the trained group ( $P=0.004$ ). With regard to neonatal outcomes APGAR scores were higher in the intervention group at 1 and 5 minutes compared to the controls ( $P<0.001$ ). Furthermore the intervention group had less cases of birth asphyxia 1.6% compared to 5.8% in the control ( $P<0.001$ ).

**Table 2***Influence of an Educational Intervention Programme on Maternal and Neonatal Outcomes*

Outcome	No intervention	Intervention	P value
<b>Maternal outcomes</b>			
<b>Length of labour</b>			
Normal n (%)	168 (88)	180 (97.8)	
Prolonged n (%)	23 (12)	4 (2.2)	<0.001 <sup>a</sup>
<b>Complications</b>			
No complication n (%)	168 (88.0)	180 (97.8)	
Progression failure n (%)	17 (8.9)	2 (1.1)	0.001 <sup>a</sup>
Postpartum haemorrhage n (%)	6 (3.1)	2 (1.1)	
<b>Other interventions</b>			
None n (%)	170 (89.0)	178 (96.7)	0.004 <sup>a</sup>
Augmentation	21 (11.0)	5 (2.7)	
<b>Neonatal outcomes</b>			
<b>APGAR Score</b>			
1 minute	8.06 (0.061)	8.79 (0.040)	<0.001 <sup>b</sup>
5 minutes	9.02 (0.045)	9.76 (0.039)	<0.001 <sup>b</sup>
10 minutes	9.92 (0.029)	9.97 (0.12)	0.077 <sup>b</sup>
<b>Birth outcomes</b>			
Alive and well n (%)	180 (94.2)	181 (98.4)	
Fresh still birth n (%)	0	0	0.035 <sup>a</sup>
Born with Asphyxia n (%)	11 (5.8)	3 (1.6)	

Data displayed as n (%) or mean (std error of mean) as stated. <sup>a</sup>Statistical differences determined by Chi-square tests;

<sup>b</sup>Statistical differences by use of independent t-tests.

### 4.3 Discussions

The study investigated the relationship between antenatal educational intervention program and maternal and neonatal outcomes. Findings indicate that women prepared and trained on childbirth had less maternal and neonatal complications compared to those who were not. This could be accredited to the fact that mothers who were prepared and trained on childbirth were more composed and confident during childbirth as the programme was designed to empower mothers with knowledge and self-efficacy during childbirth. Adequate Knowledge about childbirth could have enabled mothers to be calmer and allow the physiological process to occur without much resistance in the body and mind hence fewer complications. A comparative study in Indonesia established that self-composure and capability during childbirth is associated with reduced risk of developing adverse birth outcomes in the mother and neonate (Ramie & Mahdalena, 2023). In the current study the specific complications were established contrary to the previous study that recorded frequencies of the occurrence of the complications without being specific to each complication.

There were few cases of caesarean sections recorded in the group that went through preparation and training on childbirth compared to the group that did not receive childbirth preparation and education. This could be due to the fact that those who were prepared and educated were empowered with survival skills and had no fear of childbirth relative to the control. This findings compare with those of a recent study in Iran where birth plans integrated into antenatal classes yielded more vaginal births (Mohaghegh et al., 2023). In Turkey, an investigation on the influence of antenatal education on the option for childbirth, showed that those who underwent the education were more likely to give birth through spontaneous vaginal delivery, than those who did not go through the education (Çankaya & Şimşek, 2021). Similarly, in Korea an association between antenatal education and pregnancy outcomes recorded lower rates



of caesarean births and decreased use of epidural analgesia in women who had an antenatal education (Hong et al., 2021).

The present study documented higher cases of prolonged labours in the group without preparation and education on childbirth than those that were prepared and educated. This could be credited to the fact that the group without childbirth education had few coping strategies and increased fear and anxiety that could have led to prolonged labours. Comparatively a recent study in Iran revealed that there were shorter first and second lengths of the stages of labour in the group that had delivery plans integrated into childbirth classes (Mohaghegh et al., 2023). However the current study did not look into the duration of the different stages of delivery but rather the whole process of labour. The effect of hypno-birthing training on birth outcomes recorded lower rates of interventions, shorter periods of delivery and increased vaginal delivery rates (Buran & Aksu, 2022).

The current study also registered less bleeding in the group that went through preparation and education on childbirth compared to the group that did not. This could be attributed to the fact that few mothers had prolonged labour in the intervention as compared to the controls since the study was keen on haemorrhages related to prolonged labours. Similar findings were reported in Tanzania where few cases of bleeding or seizure during labour were documented for mothers who had gone through family oriented antenatal educational program to boost the outcomes in the mother and the neonate (Shimpuku et al., 2019).

Agreeable findings were also recorded in India, on the impact of prenatal breathing techniques on labour outcomes. Mothers in this previous study rehearsed the techniques before labour and during labour. The study recorded spontaneous onset of labour, increased vaginal births, short periods of labour and less need for interventions like augmentation (Karkada et al., 2023). Unlike the current study, the previous study was done among first time mothers only.

With regard to neonatal outcomes higher APGAR scores were recorded in the intervention group at 1 and 5 minutes in relation to the controls. Furthermore, the group that received childbirth education and preparation had less cases of birth asphyxia compared to their counterparts. Mothers who had arranged schedule on childbirth education may have utilized more relaxation and breathing techniques that improved maternal oxygenation states and improved neonatal outcomes. Comparable observations were made in Tanzania where less neonatal complications were recorded in the education group (Shimpuku et al., 2019). In Indonesia similar results were recorded where few childbirth complications were documented (Ramie & Mahdalena, 2023). The previous studies though did not record specific complications of the neonate. Higher APGAR scores were recorded at 1 minute in the group that had mindfulness childbirth and parenting compared to the enhanced usual care group (Veringa-Skiba et al., 2022).

Contrary to the findings in the current study, there was no recorded difference among the groups on neonatal outcomes for those who used either low-voltage electrical current to relieve pain or aromatic essential oils of lavender plant and natural delivery in Iran (Hashemi et al., 2020). Similarly, no predefined neonatal outcomes were recorded in Switzerland on the influence of skilled inhalation techniques on maternal and neonatal outcomes (Leutenegger et al., 2022). In view of these, more studies need to be done to elucidate the association between antenatal education programme and specific neonatal outcomes.

## V. CONCLUSIONS & RECOMMENDATIONS

### 5.1 Conclusions

The antenatal childbirth preparation and education that was offered prior to birth to the expectant mothers in the intervention was successful in enhancing outcomes in the mother and the new-born relative to the group that did not go through the program.

### 5.2 Recommendations

There is need for an arranged program aimed at providing necessary information on childbirth to be integrated in the last trimester of pregnancy to enhance maternal knowledge on the birthing process and survival techniques that culminate into reduced fear and anxiety, increased maternal self-reliance and composure hence improved maternal and neonatal outcomes.

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