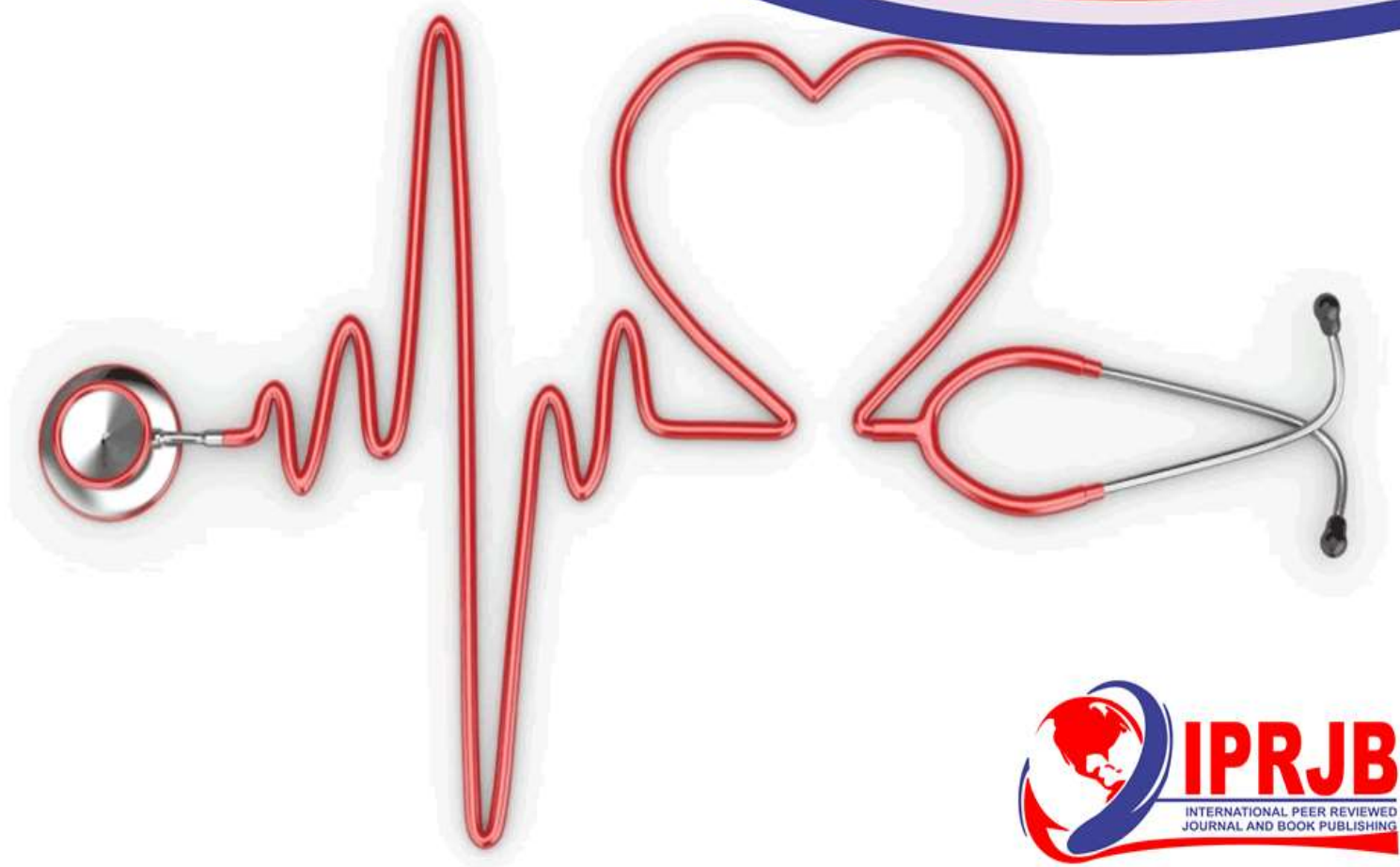


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**Effectiveness of a Facility-Based Health Education Intervention on Utilization of
Emergency Obstetric and Newborn Care Services among Women of Reproductive Age
in Nakuru County Kenya**

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Effectiveness of a Facility-Based Health Education Intervention on Utilization of Emergency Obstetric and Newborn Care Services among Women of Reproductive Age in Nakuru County, Kenya



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Abstract

Purpose: Emergency obstetric and newborn care (EmONC) is the most important intervention to improve maternal survival. The study assessed facility based health education intervention on utilization of Emergency Obstetrics and Newborn care services.

Methodology The study was a randomized control trial and utilized a mixed method. Multistage sampling was used. Key informants were purposefully selected Allocation to each study group was done on a 1:1 ratio; hence each group had 191 participants. The sample size was determined by Kelsey *et al* 1996 formula for calculation of sample size for randomized controlled trials and in order to take care of attrition 10% increase was done hence the sample size was 382 women. Pregnant mothers 26-32 weeks of gestation were enrolled. Structured questionnaire, focused group discussion and key informant interview schedules used. A pre-test was conducted at Kuresoi North Sub County. To ensure validity, research assistants were trained on the various research instruments. Descriptive statistics Fisher's exact test at bivariate and odds ratio at multivariate analysis level were computed. Qualitative data was analysed using thematic content analysis. Ethical approval for the research was sought from the K.U research ethical committee, the National council for Science and Technology and Ministry of health. Informed consent was obtained from respondent prior to the study.

Results: The intervention group had 95.93% (n =165) utilization of EmONC services in comparison to the control arm 75.29% (n = 128). There was no significance difference in the control group from base line to final survey OR 1.209, CI 0.742 to 1.969 and P-value 0.446. From the study findings the chances of EmONC services utilization after intervention was high. Those that received the intervention were seven times likely to utilize than those that did not receive the health education with an OR 7.734, 95% CI 3.363 to 17.787 and a P-value <0.001 when we compare the intervention group and the control group.

Unique Contribution to Theory, Practice and Policy: Administration of Health education is crucial in the utilization of EmONC services thus improving maternal mortality and morbidity. This study concurs with the Theory of Planned Behavior and the theory of Reasoned Action. Health education intervention may change the behavior intention of the client hence influencing utilization of EmONC services. It is recommended stakeholders to come up with a well-structured health education program in all regions of Kenya to improve emergency obstetric and newborn care services utilization.

Keywords: EmONC Services, Utilization, Women of Reproductive Age, Health Education

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INTRODUCTION

Emergency obstetric and newborn care (EmONC) services are a set of critical life-saving interventions and care for women and newborns during pregnancy, childbirth, and postpartum period if or when a woman or newborn experiences serious complications (Otolorin et al, 2015). Basic emergency obstetric and newborn care (BEmONC) treat the major causes of maternal and newborn morbidity and mortality: It includes administration of parenteral antibiotics, parenteral anticonvulsants; uterotonic drugs , manual removal of the placenta; assisted vaginal delivery; removal of retained products of conception; and neonatal resuscitation. Comprehensive emergency obstetric and newborn care (CEmONC) in addition to basic function includes blood transfusions, caesarian section, neonatal intubation, and advanced resuscitation (UNFPA, 2014).

About 295,000 women died due to pregnancy-related causes in 2017. Of these deaths, 94% occurred in low-resource settings, and most could have been prevented. Sub-Saharan Africa accounted for 66% estimated at 542 maternal deaths per 100000 live births while the lifetime risk of maternal death was 1 in 37, compared with just 1 in 7800 in Australia and New Zealand (WHO, 2019).

Most maternal deaths are preventable, as the health-care solutions to prevent or manage complications are well known. All women need access to high quality care in pregnancy, and during and after childbirth. Maternal health and newborn health are closely linked. All births must be attended by skilled health professionals, as timely management and treatment can make the difference between life and death for the mother as well as for the baby (WHO, 2019).

In Kenya, 362 deaths per 100,000 live births occurred meaning nearly 5000 women and girls die annually due to pregnancy and childbirth complications (UNFPA, 2021). Reports by the Nakuru County Health Infrastructure (2018) revealed a maternal mortality ratio of 374 per 100,000. Nakuru county statistics 2018, revealed that only 48% of pregnant women complete the four antenatal visits. Over 400 maternal deaths were registered in the county. With the increase in antenatal visits from 4 to 8 by WHO 2016 there is a need to assess the utilization of the EmONC services, this study sought to find out the effectiveness of health education on utilization of EmONC services among women of reproductive age in Nakuru County.

A qualitative study on barriers and enablers to emergency obstetric and newborn care services use in Wolaita Zone, Southern Ethiopia by Alemayehu¹, Yakob, and Khuzwayo, (2022) revealed that the barriers and enablers of EmONC service utilization were service users' perception and experiences, community-related factors, access and availability of services, healthcare financing, and health facility-related factors.

Health education is a scientific education that focuses on prevention and combines treatment. Its purpose is to let the audience have a correct and comprehensive understanding of the disease, improve people's self-protection ability, and enable them to receive effective care in social life. Health education is through the comprehensive and systematic shaping of people's physical and psychological factors so that they can establish a correct, positive, and self-improving ideology (Yuan, 2017).

Health education can effectively improve people's misunderstanding of diseases, lifestyles, and behaviours, so as to achieve the purpose of vaccination and nursing. In health education, considerations must be made on the individual differences of each patient, family environment, and other factors (W. L. Li, 2017, Q.M.Ly, 2016).

Health education as a tool for health promotion is critical for improving the health of populations and promoting health capital. Yet, it has not always received the attention needed. The limited interest is due to a lack of understanding of health education by those working in this field; lack of knowledge of and consensus on the definitions and concepts of health education and promotion; and the difficulty health educators face in demonstrating efficiency and showing tangible results of the practice of health education (WHO, 2012).

Education improves knowledge, skills, reasoning, effectiveness, and a broad range of other abilities that can be applied to improving health. Countries with higher education levels are more likely to have better national health conditions. Among the adult education levels, tertiary education is the most critical indicator influencing healthcare in terms of infant mortality, life expectancy, child vaccination rates, and enrollment rates (Viju Raghupathi and Wullianallur Raghupathi, 2020). An understanding of the benefits of health education can serve as the key to reducing maternal and infant mortalities and morbidities.

The study adopted the theory of reasoned action and the theory of planned behavior. The Theory of Planned Behavior (TPB) declares that conduct acquirement hinges on inspiration (intention) and capability (conduct control). The theory of reasoned action explains how pregnant mothers utilize health facilities by assuming that they exhibit certain conduct after analyzing all available information. The theory looks at attitudes which is the frame of mind that supports a decision to be good or bad. If a mother believes that utilizing EmONC services will result to safe motherhood, they will have a good frame of mind but if they believe the services will lead to death, then they will have a bad frame of mind and avoid the services. In this study the sociocultural, socioeconomic, socio demographic factors will influence use of life saving amenity in the county by influencing women's behavior hence help to improve maternal health or decrease the mortalities and morbidities associated with pregnancy and delivery. Health education intervention may change the behavior intention of the client (Martin Fishbein and Icek Ajzan, 1980).

The null hypothesis for the study was; There is no relationship between health education intervention and utilization of EmONC services among women of reproductive age in Nakuru County Kenya. This hypothesis was rejected because from the findings health education influenced seven times utilization of EmONC services.

METHODOLOGY

Study Design: The study was a Randomized control trial double-blind.

Study area: The study was conducted at Nakuru County with an area of 2,325.8 km². The town is located 160 km North West of Nairobi and is the fourth largest urban center in Kenya after Nairobi, Mombasa and Kisumu. It is situated at an altitude of 1859m above the sea level and it is within the region of the Great Rift Valley. It has a population of 2,162,202 people (KNBS, 2019).

Study Population: They were pregnant mother from 26 to 32 weeks gestation and aged 15-49 years

Sample size: Kelsey *et al.*, 1996 formula was used for calculation of sample size for randomized controlled trials. The total sample size was calculated by applying the *open epi software* (Dean *et al.*, 2010), and in order to take care of attrition 10% increase was done on

the minimum sample size hence the sample size was 382 women . Through cluster-randomized trial 2 wards Bahati ward and Elburgon ward were selected which were assigned to either the intervention group (n=10) or the comparison group (n=10) by computer generated randomization. Allocation to each study group was done on a 1:1 ratio; hence each group had 191 participants. Key informants were purposeful selected.

Formula:

$$n_1 = \frac{(Z_{\alpha/2} + Z_{1-\beta})^2 pq(1-p)(r+1)}{r(p_1 - p_2)^2}$$

Inclusion Criteria: Pregnant mothers 26- 32 weeks gestation aged 15-49years who consented to be included in the study. Key informant interviewees were required to have been in the facility for at least six months.

Exclusion Criteria: All those women who were mentally unstable, those who did not consent and were from other counties apart from Nakuru County. KII who were sick during the study period.

Data collection techniques: Structured questionnaire administered by trained research assistants were used which contained both open ended and closed ended questions. The interview took about 20 - 30 minutes of participant's time. Qualitative data was collected in an audio recorder directed by a key informant interview guide. The key informant interviewing guide questions were open ended to allow respondents to give responses freely. The interview took about 20 - 30 minutes of participant's time. A focused group discussion guide was used to collect pre base line data from pregnant women. Data was collected in three phases

Phase I: The pre- baseline data was collected from documented guidelines and through focused group discussion among pregnant women 26-32weeks of gestation in each of the two sub-counties hospitals For the KII, an outlined interview schedule was used based on literature review. The interviews were audio recorded and transcribed by the researcher.

Phase II: In this phase the intervention tool was developed and verified by two specialists an obstetrician and a midwife.

Phase III: This was the recruitment stage and intervention phase which depended on the group the participants was randomly selected. Phase I and phase II took at most two month and due to the corona epidemic phase III took four months i.e. Data collection period took ten weeks during the duration of pregnancy and 42 days post-delivery. This was done between late January and May 2019

Data analysis and Presentation: Analysis of the data was done using STATA version 11.2. Study variables were described using summary statistics. Bivariate analysis to assess the association was done using chi-square (χ^2) tests. Binary logistic regression analysis was also done to control for confounders in the test for associations. The level of significance for hypothesis testing was set at $p \leq 0.05$.

Outcome measures: Utilization or Non utilization of EmONC services.

Intervention: Facility based Health Education intervention package

RESULTS

Proportion of Women Utilizing EmONC Services

A total of 293 (85.67%) women utilized EmONC services. The intervention group reported a higher proportion with 95.93% (n =165) of EmONC service utilization in comparison to the control arm 75.29% (n = 128).

Proportion Utilizing EmNOC Services

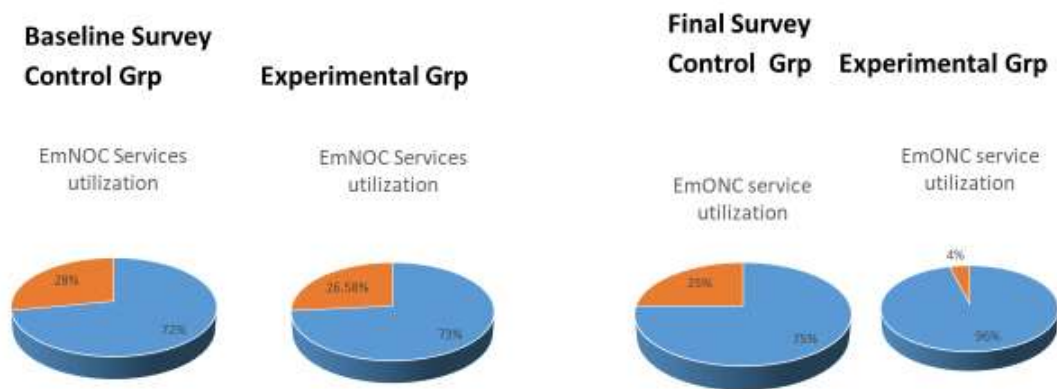


Figure 1: Proportion of Women Utilizing EmONC Services

From the study findings the level of education was significant at χ^2 40.402, and p value <0.001. Parity was significant at χ^2 43.724 and a p value of <0.001.

Table 1: Socio Demographic Factors Associated With Utilization of EmONC Services at Baseline

		Utilization of EmONC Services			χ^2 /Fishers' Exact	Df	P-value
		Did not utilize	Utilized	Total			
Age category	15 - 19	2	2	4	15.445	2	0.011
	20-24	6	32	38			
	25-29	20	87	107			
	30-34	32	63	95			
	35-39	22	33	55			
	40-44	4	8	12			
	45-49	0	4	4			
Marital status	Married	82	200	282	3.145	2	0.185
	Single	4	25	29			
	Divorced	1	4	5			
Level of education	None	3	1	4	40.402	2	<0.001
	Primary	23	19	42			
	Secondary	45	91	136			
	Tertiary	15	118	133			
Religion	Catholic	9	26	35	0.478	2	0.787
	Protestant	64	175	239			
	SDA	13	28	41			
Parity	1	10	91	101	43.724	2	<0.001
	2	28	82	110			
	3	23	33	56			
	4	18	14	32			
	5	5	7	12			
	6	1	0	1			
	7	1	0	1			
	8	1	0	1			

Chi square Test for Goodness Fit

From the study findings, Secondary education influences utilization of EmONC services at AOR 8.791 95% CI 3.631 TO 21.285 and a P-value <0.001. Clients with secondary education were eight times likely to utilize EmONC services as compared to those with no education. Respondents with tertiary education were 2.5 times likely to utilize EmONC services.

Table 2: Chi Square Test

	B	S.E.	Wald	df	P-value	AOR	95% C.I.for EXP(B)	
							Lower	Upper
Age category			0.813	6	0.992			
15 – 19	21.189	18255.64	0	1	0.999	1.59E+09	0	.
20 – 24	20.107	18255.64	0	1	0.999	5.4E+08	0	.
25 – 29	20.302	18255.64	0	1	0.999	6.56E+08	0	.
30 – 34	20.343	18255.64	0	1	0.999	6.83E+08	0	.
35 – 39	20.328	18255.64	0	1	0.999	6.73E+08	0	.
40 – 44	20.344	18255.64	0	1	0.999	6.84E+08	0	.
45 – 49	Reference							
Level of education			24.724	3	0			
Primary	2.816	1.725	2.665	1	0.103	16.718	0.568	491.719
Secondary	2.174	0.451	23.215	1	<0.001	8.791	3.631	21.285
Tertiary	0.919	0.366	6.282	1	0.012	2.506	1.222	5.139
None	Reference							
Parity	0.736	0.155	22.434	1	0	2.087	1.539	2.829
Major source of Income			15.33	4	0.004			
Support from Husband	0.395	1.352	0.086	1	0.77	1.485	0.105	21.001
Wages	-2.132	1.724	1.53	1	0.216	0.119	0.004	3.478
Salary	-1.775	1.569	1.28	1	0.258	0.169	0.008	3.669
Self-earnings	-0.717	1.406	0.26	1	0.61	0.488	0.031	7.676
Support from Parents	Reference							
Constant	-23.926	18255.64	0	1	0.999	0		

Table 3: Factors associated with Utilization of EmONC Services

	Baseline utilization			χ^2	Df	P-value	OR	95%CI	
	Utilized	Not Utilized	Total					Lower	Upper
Intervention (Elb)	113(73%)	41(27%)	154(100%)						
Control (Baha)	116(72%)	46(28%)	162(100%)	0.124	1	0.725	1.093	0.667	1.792
Total	229(72.5%)	87(27.5%)	316(100%)						

From the findings, there was no significant difference between the control group and the intervention group at the baseline level.

	Intervention Group (ELBURGON) utilization			χ^2	Df	P-value	OR	95%CI	
	Utilized	Not Utilized	Total					Lower	Upper
End term	165(96%)	7 (4%)	172(100%)						
Baseline	113(73%)	41(27%)	154(100%)	32.916	1	<0.001	8.552	3.705	19.742
Total	278(85%)	48(15%)	326(100%)						

There was a statistical significance in utilization of EmONC services among the Intervention group when we compare the baseline and final survey. After administration of the Health

Education intervention package, the respondents were eight times likely to utilize the services at OR 8.552, 95% CI 3.705 TO 19.742, P-value <0.001.

Chi square Test for Independence

From the study findings the chances of EmONC services utilization after intervention was high. Those that received the intervention were seven times likely to utilize than those that did not receive the health education with an OR 7.734, 95% CI 3.363 to 17.787 and a P-value < 0.001 when we compare the intervention group and the control group.

	End term utilization			χ^2	Df	P-value	OR	95%CI	
	Utilized	Not Utilized	Total					Lower	Upper
Intervention (Elb)	165(96%)	7(4%)	172(100%)						
Control (Bah)	128(75%)	42(25%)	170(100%)	29.662	1	<0.001	7.734	3.363	17.787
Total	293(86%)	49(14%)	342(100%)						

Discussion

After administration of health intervention package in the experimental group, the mothers that received the health education were seven times more likely to utilize EmONC services at χ^2 29.662 95% CI 3.363 – 17.787, & a p-value <0.001. Knowledge of individual birth plan was associated with utilization of EmONC services at χ^2 18.67, a p-value of 0.002, Knowledge of the components of a birth plan was associated at χ^2 19.512, a p-value of 0.000. This concurs with a study on the role of health education on the utilization of cancer screening by Hirpa *et al.*, (2020) where-to-one health education and educational brochure was associated with cervical cancer screening. Similarly, a study by Abidion *et al.*, (2013) stated that in developing countries, the main reasons for the low utilization of cervical cancer screening services are attributed to a lack of knowledge about the disease and service availability. It also agrees with a study in Ethiopia that demonstrated the lack of proper health information from health care providers and low awareness about the disease determined low utilization (Gebre Z GMaDA., 2016), (Bayu et al, 2015). The knowledge of danger signs influenced utilization of the services at χ^2 11.201 & a p-value of 0.011. Similarly, Nepal Kumar (2012) in the study reported that only 11% of women knew about the five top danger signs of pregnancy.

Eighty one percent of the respondents from the control group did not have knowledge on the individual birth plan neither the components of the plan while 100% of the respondents in the experimental group were aware on the individual birth plan and the components of the birth plan. Majority of the respondents 47.67% reported the individual birth plan to be a plan by the mother on how they intended to give birth. Majority knew of the danger signs during pregnancy and childbirth. Studies in other counties show that most women in rural areas are not aware of the danger signs of pregnancy. For instance, Abdou Jammeh *et al.*, (2011) observed that majority of women seldom know in detail the danger signs of pregnancy and childbirth, or some misinterpret them with hope for the best. As a result, the women end up not seeking health care because they are not aware of the existing challenges. Similarly, Nepal Kumar (2012) in the study reported that only 11% of the women knew about the five top danger signs of pregnancy.

Awareness on childbirth challenges was a major issue influencing utilization of EmONC services where various issues influenced the respondents to visit the health facilities 82.5% in control group and 94.1% in the experimental group of the respondents said due to complications of excessive bleeding, while 12% in control and 2.3% in experimental were not sure. This is contrary to a study by Hirpa *et al* (2020) on the role of health education on cervical cancer utilization that revealed the frequently mentioned reasons mentioned by participants in the intervention group for not getting screened were lack of time (78%), not having been sick (12%) and not knowing. Similarly, in Ethiopia, lack of proper health information from health care providers and low awareness about the disease determined low utilization (Gebru Z GMaDA., 2016), (Bayu *et al.*, 2015)

The study also reveals that majority of the women in the two regions received quality care while noting that health workers have a positive attitude towards them and their work. It was also established that most women were aware of the challenges associated with pregnancies and delivery. Key complications likely to be experienced by the women during delivery that were mentioned by the women include excessive bleeding, and danger of death for both the mother and the child.

Limitation of study

The study design was costly in terms of money and time. Only few women in the county were sampled hence the information cannot be generalized to other counties. Another limitation was the global Covid 19 pandemic that may have had a negative effect on the utilization of EmONC services. However, since both the intervention and control were similarly affected, with multivariate analysis, relatively precise factors associated with utilization could still be realized.

Ethical Consideration

Ethical approval to conduct the research was sought from the Kenyatta University research ethical committee, Ref number KU/ERC/APPROVAL/VOL.1/1 Permission was sought from the National commission for Science and Technology Ref number 262400 and Nakuru Department of Health Services, Ref number NCG/CDMS/GEN.VOL.1/311. Informed consent was obtained from respondent prior to conducting the study. Explanations on the nature of the study, informing them of their right for privacy and confidentiality and withdrawal from the study at any stage of the study.

CONCLUSION AND RECOMMENDATION

Conclusion

The number of women who utilized EmONC services increased when comparing the baseline survey and final survey. Health education intervention package had a positive influence on the utilization of EmONC services

Recommendations

Given that health education has been found to influence utilization of EmONC services positively, it will be imperative for the stakeholders to come up with a well-structured health education programme in all regions of Kenya especially in the rural areas.

Acknowledgement

I thank the Almighty God for giving me the courage and strength to complete this study. I wish to thank Professor Margaret Keraka and Dr. Drusilla Makworo for their guidance and mentorship that facilitated the successful. I earnestly appreciate the Nakuru County Health Management Team for assenting and authorizing the conduct of this study in the area. The management of Elburgon sub county hospital and Bahati sub county hospital for allowing me to conduct the study. To the research assistants who played a key role in data collection, I acknowledge your dedication, for the duration of data collection despite challenges related to covid 19. My sincere gratitude goes to the respondents who were extremely cooperative and helpful during data collection.

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