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Effectiveness of structured nutrition education on maternal breastfeeding self-efficacy and exclusive breastfeeding duration in Kiandutu health centre, Thika – Kenya

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ABSTRACT

Background

Optimal breastfeeding practices can help prevent under-nutrition among under five children and WHO recommends Exclusive breastfeeding (EBF) for the first half of infancy. Rates of EBF are however low globally with Kenya at 61.2% against the projected rate of 80% by end of 2017.

Aims

Factors that may influence the success of EBF interventions are unclear. The study aimed at assessing the effect of a structured nutrition education intervention (SNEI) on maternal breastfeeding self-efficacy (BSE) and EBF.

Methods

A cluster randomized study in which pregnant mothers attending two health facilities (Mangongeni and Kiandutu) in a resource restricted urban area of Thika –West, Kenya were randomized into either intervention or comparison groups. Maternal BSE was assessed at baseline (34 weeks) at midline (37 weeks) and at 6 months post-partum using the Dennis cindy breastfeeding self-efficacy scale-short form (BSES-SF).Those in the intervention went through four sessions of a structured nutrition education intervention (SNEI) that sought to improve BSE and taught the importance of EBF.

Results

There were no significant differences at 34th weeks gestation between the intervention versus comparison groups in the BSE scores but the findings were significant at midline and end-line (t=3.816, df 351 p=0.001, t=4.095, df 316 p=0.001) respectively. The intervention had an effect on BSE. p=0.001 (log odds 2.089 and 95% CI of 0.823-3.356). The survival distributions for the two groups were significantly different, log rank 20.277, (1, n=314) $p < 0.001$ for duration of EBF at 6 months post-partum. Those in the intervention were more likely to EBF, p=0.008 (OR 0.17 95% CI of 0.05-0.62).

Conclusions and Recommendations

A SNEI can improve BSE scores during anti-natal clinics and BSE is predictive of EBF duration. Health care providers can use the BSES-SF to identify mothers with low BSE scores and design interventions to assist in promoting EBF.

Keywords: Exclusive Breastfeeding, Breastfeeding Self-Efficacy Nutrition Education

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INTRODUCTION

Optimal breastfeeding practices can help prevent under-nutrition among under five children [1] and help prevent infections hence reduce neonatal deaths.[2] WHO recommends Exclusive breastfeeding (EBF) for the first half of infancy.[3] Exclusive breastfeeding (defined as giving an infant only breastmilk with no other liquids or solids, with the exception of drops or syrups consisting of vitamins, mineral supplements, or medicines) has been identified among ten interventions with the largest predicted effects on mortality of under-five children especially in the low and middle income (LMIC) countries.[4] Breast milk has all required nutrients [5, 6] and hence promotes growth and development. It also has immunological factors which help reduce infections.[7] Despite these advantages, rates of EBF are low in the world at 30% [1] and although the rates in Kenya are much higher at 61.2%,[8] this figure falls below the WHO target of 90% and the 80 % targeted by the Ministry of Health by 2017 end.[9]

Many mothers discontinue breastfeeding earlier than recommended and many predictors of EBF duration have been identified through studies and they include demographic attributes such as maternal age, marital status, education level, and socioeconomic status however all these factors are non-modifiable.[10–12] Similarly some modifiable psychosocial variables have been identified through research and they include attitude, social expectations and self-efficacy.[13-16] Self-efficacy is a key psychosocial factor and is defined as the confidence one has in the ability to complete a particular task.[17] It refers to a mother's perceived ability to breastfeed her new infant and is a salient variable in predicting breastfeeding outcomes as it determines:

1) whether a mother chooses to initiate breastfeeding,
2) how much effort she will expend,
3) whether she will have self-enhancing or self-defeating thought patterns, and
4) how she will emotionally respond to breastfeeding difficulties. [18]

Efficacious mothers are more likely to choose to breastfeed, persist in difficult times engage self-encouraging thoughts when dealing with breastfeeding problems and hence react positively to perceived breastfeeding difficulties. Both in the Bandura's cognitive-social theory and the health belief model, self-efficacy is a construct that influences people's behavior. It can be deliberately modified to influence behavior in a particular way.

A mother's breastfeeding confidence has been seen to positively correlate with the length of breast feeding.[19] In a prospective study that investigated breastfeeding self-efficacy (BSE), mood, and breastfeeding outcomes among primiparous women[20] found that those who had a high BSE at 2 days postpartum had a higher rate of exclusive breastfeeding at 6 months postpartum. On the other hand a significant lower median Self efficacy score 43.43 (SD=12.19) was obtained for those who used alternative techniques of infant feeding compared to a median self-efficacy score of 53.32 (SD=7.40) for those who EBF in a retrospective descriptive study.[21] Similarly, in a study that investigated the maternal and hospital factors associated with first-time mothers' breastfeeding practice in a prospective study found BSE was significantly related to exclusive breastfeeding during the hospital stay and was positively and significantly associated with breastfeeding exclusivity after discharge.[22] Other researchers [23] investigated the psychosocial variables associated with the ability to exclusively breastfeed to six months postpartum in a retrospective study. Results showed that women who exclusively breast fed to six months postpartum exhibited higher, BSE, and path analyses indicated that BSE was a strong significant predictor of both EBF intention and duration.

Modifiable factors can be manipulated by healthcare providers and therefore provide an opportunity for them to effect significant change in the desired behavior. There is need to place greater attention on the modifiable factors since other strategies may not produce intended results. For example, many strategies have been put in place by many governments including Kenya in the promotion of EBF. Strategies employed by the Kenyan Government currently include, the Baby Friendly Hospital Initiative, Comprehensive Policy guidelines on Maternal Infant Young Child Feeding among

others[24,25] and training health care workers on strategies of improving breastfeeding behaviour, but evidence shows that they have unsuccessfully promoted EBF[10] since rates are still low at 61.2%[8] against 90% recommended by the WHO.

Tools to measure self-efficacy have been developed translated into local languages and extensively tested in different parts of the world. Internationally accepted tools can be used to compare data across countries. Such a tool is the breastfeeding self-efficacy scale-short form (BSES-SF) developed by Dennis.[19] It has been translated and validated in a range of settings.[26-29] The tool has been used to identify mothers at risk of early discontinuation of breastfeeding to enable designing and evaluation of interventions that can assist them breastfeed for longer.[19] No such study has been documented in Kenya. This study designed and implemented a structured nutrition education intervention (SNEI) that sought to improve the BSE of mothers and assessed its effect and the duration of EBF in a low resource restricted area in two hospitals of Thika-West Sub-County in Kenya.

MATERIAL AND METHODS

Methods

This was a cluster randomized control study in which villages as opposed to individuals were randomized into either intervention (n=176) or comparison group (n=256) and were recruited on a rolling basis until the required sample size was met. The inclusion criteria included being less than six (<6) months gestation; absence of chronic diseases such as hypertension, diabetes, and tuberculosis, babies born low birth weight, multiple births and mothers below 18 years. Randomization was achieved through the Microsoft excel function which randomized villages into either intervention or comparison. Mothers who met the inclusion criteria were placed either in the intervention or comparison group according to their respective villages. The study trial started on 02/09/2013 and ended on 05/09/2014. Breastfeeding self-efficacy questionnaires were translated into Kiswahili, the Kenyan local language. The procedures of translation, validation and reliability testing are reported in another paper. [30]

Intervention

All mothers who accepted to participate in the study filled an initial Socio- demographic, a Household Food insecurity Access scale and KAP questionnaire. These tools assessed the socio-economic, demographic, food security situation and intra-partum factors. The intra-partum factors included factors that have been found to influence EBF from literature. They included haemoglobin levels, birth weight, number of clinic visits, giving pre-lacteal feeds and barriers to EBF investigated as a composite variable. Study objectives and expectations were explained to those in the intervention group while those in the comparison were allowed to go through the usual anti-natal clinic procedures. After the 34th week gestation all mothers filled the BSES-SF, they thereafter filled the questionnaire at the 37th week gestation or during their last clinic visit and again after six (6) months post-partum. Mothers in the intervention received personalized nutrition education geared towards improving their BSE at the health centres from nutritionists and were visited four times by community health workers (CHWs) before delivery. The CHWs encouraged mothers to exclusively breastfeed and answered questions raised by the mothers.

Outcome Measures

The primary outcome of the study, the prevalence of EBF was calculated as the ratio of infants at 24 weeks (6 months) who were fed on breast milk alone in the 24-hours preceding the interview to the total number of infants in the specific groups (intervention or comparison) and total number of infants under the study. The secondary outcome was BSE scores which were measured at baseline (34 weeks) at mid-point (37 weeks) and at 6 months post-partum.

Data Analysis

The statistical package for social sciences computer programme (SPSS version 22) was used for computation. Means and standard deviations were computed for maternal BSE scores, at baseline, mid and at post intervention. The independent–t test was used to compare BSE and EBF duration variables of those in the intervention verses comparison groups. The paired t-test was used to compare BSE pre and post intervention for the intervention group and

comparison groups separately. To determine the effect of the SNEI on maternal BSE a multivariate generalized estimating equation (GEE) analysis was performed. Chi-squire determined associations between categorical variables and EBF and a bivariate logistic regression was done to determine the effect of the intervention on EBF duration. Variables were entered into the bivariate logistic model if they tested significant at p= 0.05 level.

Ethical Approval

The study was approved by Egerton University Ethics Committee (Ref: EU/DVRE/028) and research permit research clearance and authorization obtained from the Kenya National Council for Science innovation & Technology (NCST/RCD/12A/013/64). The study was registered (ISRCTN34314544) and study participants signed informed consent forms.

RESULTS

Sample Characteristics

The overall mean age of the sample was 24.06 years old (minimum age 18 years and maximum 38 years) intergroup means were 24.15 and 23.99 years in intervention and comparison respectively with insignificant differences between the two groups. Of the total 1.6% had no formal education, 30.2% had primary education while 53.8% had secondary education. Only 14.4% had tertiary education with insignificant differences (p=0.05) in education levels between the two groups. Household income levels were categorized as below KES 11700 and above KES 11700 (1 US $ is equivalent to 100 KES). Those below KES 11700 were 40.6% (33.5% and 45.5% in the intervention and comparison groups respectively) while those above 11700 KES were 59.4%. (56.3% and 54.5% in the intervention and comparison groups respectively. Between group differences remained insignificant (p=0.05). The randomization process was therefore successful. Chi- square analysis was performed on the various categorical variables against EBF and Table 1. Below shows the results obtained.

Table 1 Demographic Characteristics of the Study Population

	EBF (n=194) %	Mixed Feeding (n=133) %	Total (n=327) %	Chi Square	p-value
Ethnicity				1.580	0.812
Kikuyu	29.2	70.8	100		
Kamba	30.0	70.0	100		
Luyha/Kisii	20.0	80.0	100		
EmbuMeru	37.5	62.5	100		
Others	28.6	71.4	100		
Marital Status				0.977	0.323
Married	21.8	71.9	100		
Single/Separated/Divorced	36.4	63.6	100		
Employment				3.205	0.361
Informal	24.7	75.3	100		
Formal	43.8	56.2	100		
Business	33.3	66.7	100		
None	27.6	72.4	100		
Parity				0.329	0.566
Primi-parous	27.5	72.5	100		
Multi-parous	30.4	69.6	100		
Education Level				31.044	0.001*
≤ Primary	8.0	92.0	100		
≥ Primary	38.5	61.5	100		

Household Income				1.362	0.043*
≤ 11700	25.5	74.5	100		
≥ 11700	31.5	68.5	100		
Group				35.449	0.001*
Intervention	45.3	54.7	100		
Comparison	15.0	85.0	100		
Sex				0.58	0.810
Boy	30.1	69.9	100		
Girl	28.8	71.2	100		

Chi squire test for categorical data *Significant at p<0.05

Other variables, which included haemoglobin levels, birth weight, number of clinic visits, Household food security giving pre-lacteal feeds and barriers to EBF all yielded significant association with EBF duration *p*=0.05.

Effect of Intervention on Maternal Breastfeeding Self-Efficacy (BSE)

Figure 1. summarizes the BSE scores at baseline (34th week) before delivery (37th week) and after six months postpartum. The effect of the SNEI on maternal BSE was measured by comparing BSES-SF scores at 34th week gestation (baseline) at 37th week gestation or just before delivery (midline) and at 6 months post partum (endline). Intervention versus comparison group showed no significant differences at baseline but the findings were significant both at midline and at end-line by t-test for equality of means (t=3.816, df 351 *p*=0.001, t=4.095, df 316 *p*=0.001) at midline and end-line respectively. The combined BSE scores (Intervention and comparison group) baseline mean of 60.35 ± 9.606 and the end- line mean of 63.32 ± 6.905 were significantly different with a mean difference of 2.962, t=6.083 and df 317, *p*=0.001. The before and after scores for the two groups separately also revealed significant differences. The baseline and end line mean of 60.92± 8.719 and 65.57 ±5.289 respectively for the intervention group yielded a significant difference, t=6.710 df (146) *p*=0.001 and a mean difference of 4.646. Baseline and end-line mean of 60.80 ±9.226 and 62.70 ± 6.455 for the comparison group, likewise yielded a significant difference, t=2.637 df (170) *p*=0.009 and a mean difference of 1.900. The implication here is that, there was an increase in BSE in the two groups but the increase was larger in the intervention group.

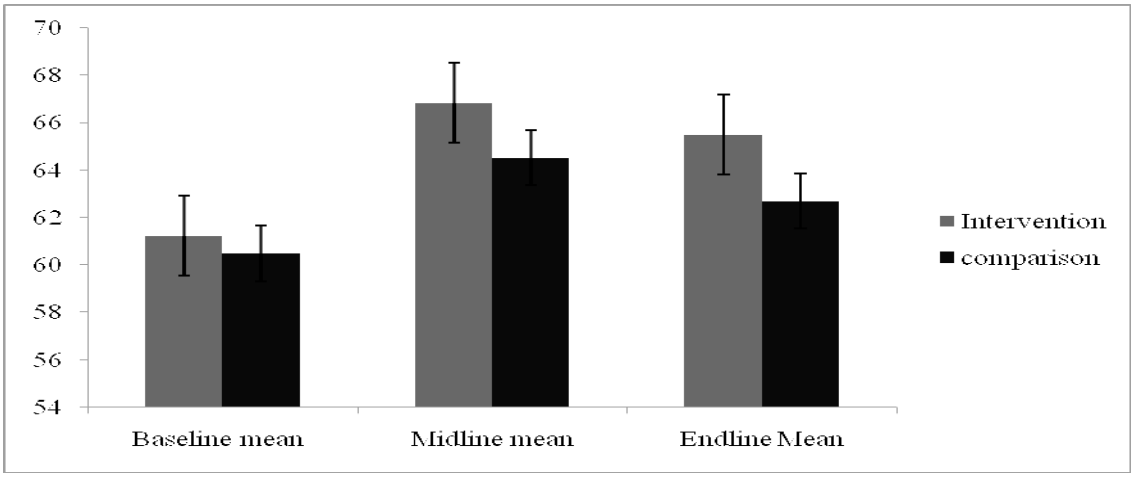

Fig 1 Comparison Between the Groups in BFSE at Baseline, Midline and after Intervention

Further a multivariate generalized estimating equation (GEE) analysis was performed. The findings indicated that the SNEI improved breastfeeding self-efficacy. With a significance of 0.001 (log odds 2.089 and 95% CI of 0.823-3.356) there is enough evidence to conclude that being in the intervention group had an effect on the maternal breastfeeding self-efficacy (BSE). Furthermore, with significant values (0.001) after controlling for time (baseline, midline and end-line), it is evident that the structured nutrition education intervention improved the BSE scores from baseline to 6 months post-partum.

Effect of Intervention on Breastfeeding Duration

Duration of exclusive breastfeeding was analyzed by Kaplan Meier survival analysis for the main study variable (Fig 2). More mothers were still exclusively breastfeeding at six months in the Intervention group (45.3%) compared to the comparison group (15.0%), therefore at univariate level rates in the intervention were higher compared to those of those in the comparison group. The mean duration was 142.717 days for the intervention group (± 3.322) verses 125.876 days (± 3.017) in the comparison group with an overall mean of 133.653 days (± 2.279). A log rank test was run to determine if there were significant differences in the survival distribution for the different groups (intervention and comparison). The survival distributions for the two groups were statistically significantly different, log rank 20.277, (1, n=314) $p < 0.001$.

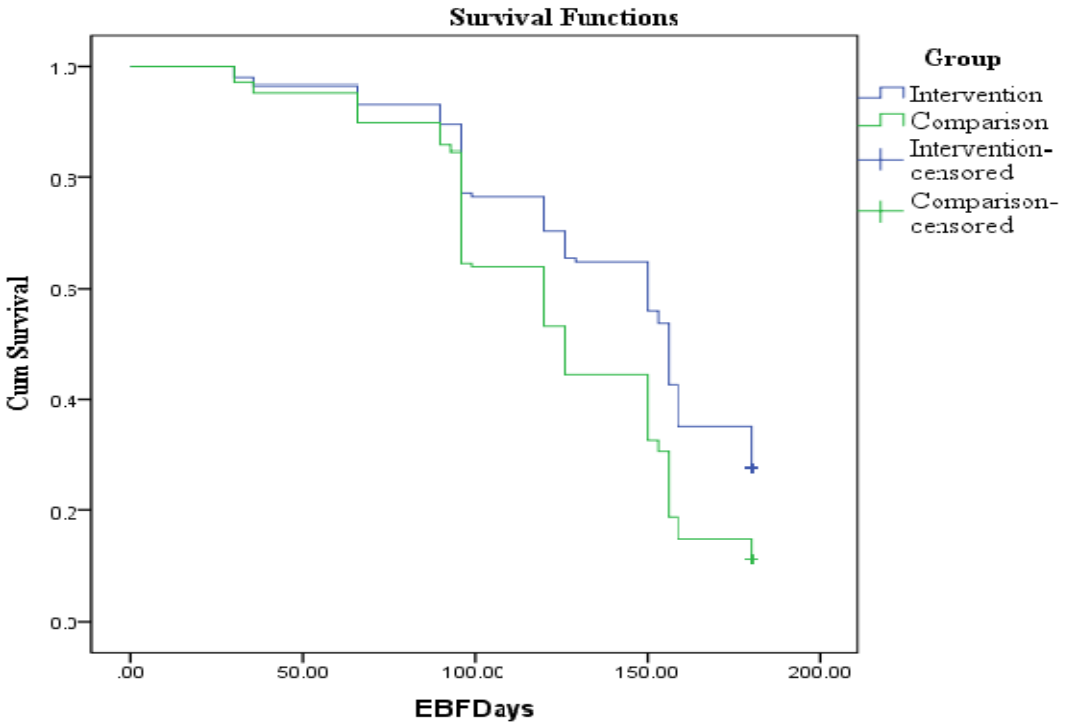

Fig 2 Kaplan Meier Survival Analysis for Duration of EBF of Comparison versus Intervention Groups in Days

Analysis using bivariate logistic regression was further carried out to determine the effect of the intervention on EBF. Covariates found to have an association with EBF at the univariate level (p=0.05), as shown on Table 2. were added into the model using a forward selection procedure. Mothers in the intervention were more likely to exclusively breastfeed for longer, with a significance of 0.008 (OR 0.17 at 95% CL of 0.045-0.62).

Table 2 Effect of Intervention on EBF Duration

					95% C.I for EXP (B)	
					Lower	Upper
Group(1)	7.13	1	0.008*	0.17	0.045	0.62
Edu_Wife(1)	3.00	1	0.083	3.74	0.841	16.62
Income (1)	0.90	1	0.342	0.54	0.149	1.94
HB level (1)	1.12	1	0.291	3.22	0.368	28.15
Pre-lacteals(1)	0.21	1	0.644	0.61	0.077	4.90
BSES	10.55	1	0.001*	0.63	0.482	0.84
Food Security(1)	0.34	1	0.561	0.60	0.105	3.40
No. of visits (1)	0.46	1	0.498	1.54	0.443	5.35
Bariers	7.89	1	0.005*	1.81	1.196	2.73
Birth weight (1)	1.82	1	0.177	0.40	0.104	1.52
Constant	9.60	1	0.002	6.75		

**P< 0.05, significant using binary logistic regression, BSES-Breastfeeding self-efficacy, HB -haemoglobin level, CI-Confidence level, Exp (B) -Odds Ratio*

DISCUSSION

This study aimed at assessing the effect of SNEI on mother's breastfeeding self-efficacy (BSE) and EBF. The Health Belief Model (HBM) framework was used as the perceptual screen for this study. Self-efficacy is a construct in the HBM which enables one to undertake a particular behavior. A mother's breastfeeding confidence is positively correlated with the length of breast feeding.[19] This variable is modifiable[31] and a more confident mother is more likely to exclusively breastfeed for a longer duration.

There were no significant differences at the 34th weeks gestation between the Intervention versus comparison groups in the BSE scores but the findings were significant both at midline and at end-line respectively by t-test for equality of means giving the implication that the intervention had meaningful effect on BSE of the mothers. It also means that the randomization process was a success since scores at baseline did not show any significant difference between the two groups. Specifically there were significant differences between baseline and end of project BSE scores for the intervention group. The results points out to the fact that the intervention had an effect on the BSE of the intervention group. Similar findings were reported in a study that sought to assess the effect of an interventional program on breastfeeding self-efficacy and duration of exclusive breastfeeding in pregnant women in Ahvaz, Iran.[32] The study was a cluster randomized controlled trial, in which 130 pregnant women over 36 weeks of their first pregnancy were recruited and their BSE Scores assessed using the breastfeeding self-efficacy scale (BSES) questionnaire consisting of 33 questions before intervention and one month after childbearing. The mean breastfeeding self-efficacy (BSE) score in breastfeeding in the last month of pregnancy in the control group did not increase during the first month after delivery. However, the mean (BSE) score in the intervention group increased after the intervention with a significant difference between the two groups regarding self-efficacy mean difference one month after childbirth ($P < 0.001$).

In this study, EBF rates were higher in the intervention than the comparison with statistically significant differences. This is an indication that the SNEI had some significant effect on EBF rates. Similar results have been recorded in other studies. For instance, used community volunteers to promote exclusive breastfeeding in Sokoto State, Nigeria and after nutrition education, all infants up to 6 months of age were exclusively breastfed in the intervention group.[33] In yet another study that involved three countries (Burkina Faso, Uganda and South Africa),[34] rates of EBF were higher in intervention groups compared to the control arms. The intervention involved home visits and nutrition education using CHWs. Furthermore a study in Manilla Philippines,[35] used CHWs with personal breastfeeding experience

to educate women (n=68) on EBF and assisted in the prevention and management of common breastfeeding complications during home visits. Exclusive breastfeeding rates were 32%, for the intervention arm, 3% for the 2nd arm that intervened on basic child-care practices with some breastfeeding attention using peer counselors during home visits and 0%, for the 3rd (control) group which received usual care.

This study confirmed that the BSE score has the ability to predict EBF duration. Both baseline and end-line mean scores were able to predict EBF duration. Numerous studies have yielded similar significant relationships between BSES score with EBF duration.[22,26,36,37] For example, in a significant relationship between breastfeeding self-efficacy and perceived insufficiency of breastfeeding was reported,[26] results that are similar to this study. In this study however, the mid-line mean scores did not predict EBF. This may be because of inpatience and indifference that was a characteristic observed with mothers during the last visit which may have been due to tiredness as they were about to deliver so they might have answered questions without much thought.

Many factors that influence EBF duration such as socio-economic and demographic factors are not easily modifiable as shown in research, and hence may not provide opportunities for interventions [38] maternal self-efficacy however is modifiable [39]. In the present study, the structured nutrition education was able to improve the respondents BSE scores and consequently improved the duration of EBF for those mothers who were in the intervention group.

CONCLUSION

The results reveal that nutrition education interventions can help in improving a mother's self-efficacy which is an important variable in EBF duration and hence, health providers should aim at designing nutrition education interventions that are geared towards improving mothers BSE in EBF promotion programmes. This may enable Kenya attain the 90% target recommended by the WHO.

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