

# Effect of Learner-Centred Nutritional Counselling Program on Eating Behaviours of Students in Middle Basic Education Classes

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Received July 6, 2022; Revised August 10, 2022; Accepted September 19, 2022

## Cite This Paper in the Following Citation Styles

(a): [1] Chiedu Eseadi, Vera Victor-Aigbodion, "Effect of Learner-Centred Nutritional Counselling Program on Eating Behaviours of Students in Middle Basic Education Classes," *Food Science and Technology*, Vol. 10, No. 4, pp. 127 - 134, 2022. DOI: 10.13189/fst.2022.100402.

(b): Chiedu Eseadi, Vera Victor-Aigbodion (2022). *Effect of Learner-Centred Nutritional Counselling Program on Eating Behaviours of Students in Middle Basic Education Classes*. *Food Science and Technology*, 10(4), 127 - 134. DOI: 10.13189/fst.2022.100402.

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**Abstract** The purpose of this research was to determine the effect of a learner-centred nutritional counselling program on eating behaviours of Nigerian students at the middle basic education level. This research is a pretest–posttest control group study that was conducted among 102 students in middle basic education classes with poor eating behaviours. These students were assigned to the treatment group (number of participants=51) and the no-contact control group (number of participants=51). A quantitative assessment tool – the Child Eating Behaviour Questionnaire –facilitated the data gathering process at three different time points. Results indicate that the eating behaviours of students in the treatment group (learner-centred nutritional counselling group) improved positively after the program,  $t(100) = -35.121$ ,  $p < .001$ . At follow-up, the significant positive effects experienced by the treatment group due to the learner-centred nutritional counselling program were maintained,  $t(100) = -35.72$ ,  $p < .001$ . The finding suggests that the use of learner-centred nutrition counselling program is advantageous for improving students' eating behaviours at the middle basic education level. Prospective long-term appraisal of the efficacy of learner-centred nutritional counselling intervention on students' eating behaviours with active control group is necessary.

**Keywords** Nutrition, Nutritional Counselling, Eating Behaviours, Students

## 1. Introduction

Studies show there is a higher incidence of malnutrition problems in children than adults [1][2]. As report suggests, obesity trend in children could be increasing due to poor eating behaviours [3]. Studies have also reported a causal link between obesity and children's other behaviours [4][5]. However, reports suggest that about 2.7 million individuals might be liberated annually through proper nutrition and good dietary practices [6]. According to some scholars, changes in diet-related lifestyle can help alter disease outcomes and improve management costs [6][7]. Meanwhile, dieticians and nutrition education specialists have considered the use of nutritional counselling as an important strategy for promoting a healthy lifestyle and diet-related lifestyle modifications [8][9][10].

Furthermore, studies revealed that nutritional counselling interventions can help to improve students' eating behaviours [11][12]. Past studies documented that nutritional counselling interventions helped to improve the nutritional knowledge of students [13] and promote healthy eating behaviors [14]. But there is a need to actively engage the students in a multi-component patient-centred approach to nutritional counselling intervention [15]. The use of a patient-centred approach to nutrition education and counselling for low-income individuals is supported by previous research as an effective approach [16]. Also, nutritional counselling interventions with multi-component can successfully

promote healthy eating behaviours and contribute to lessening the risk of chronic illness [7].

The learner-centred nutritional counselling program delivered in this study can be regarded as a patient-centred or pupil-centred approach to nutrition education and counselling aimed at improving the eating behaviours of students. The development of the learner-centred nutritional counselling program is based on the learner-centred education approach [16][17]. Some vital aspects of the learner-centred nutritional counselling program which are in accordance with the learner-centred education approach are making sure the learning environment is set for learning, previous learning activation, asking of questions which are open-ended, fostering interactions among students, and learning reinforcement [16][17].

There is a growing number of current studies which suggest that nutrition education and nutritional counselling are very much required to improve the eating behaviours of students at the Nigerian basic education level [18][19][20]. Hegazy et al. [21] stated that the provision of nutritional counselling might be related to substantial improvement in individual's dietary outcomes, nutritional knowledge, nutritional practices, health status and their feat in daily life activities. Sacerdote et al. [22] investigated the effect of a nutritional counselling program delivered by general practitioners on changes in daily diet of healthy adults. The study reported multiple diet changes due to the nutritional counselling program and noted that in healthy adults, this might lessen their body mass index and possibly minimize the risk of chronic illness. Dike et al. [18] also determined the efficacy of a nutritional counselling program on eating habits among children in a Nigerian rural community. The study reported a significantly positive impact of the nutritional counselling program on the children's eating habits both at posttest and follow-up. Rähä et al. [2] delivered a nutritional health counselling program to a group of grade 7 to 9 schoolchildren and reported a significantly positive improvement in their nutritional knowledge as well as eating habits.

Irvine et al. [23] studied the influence of a nutritional program which applied interactive multimedia on employees' eating habits and reported a significantly positive effect on their eating habits after the program following a 30-day exposure. After exposure to a nutritional counselling program, a study reported that the program yielded favourable mean changes in the participants' nutritional knowledge, eating behaviour as well as body composition [24]. Hegazy et al. [21] reported significant positive changes in patients' scores linked to malnutrition inflammation, Karnofsky performance and nutritional knowledge after a dietary counselling program. The dearth of empirical research regarding the impact of learner-centred nutritional counselling intervention on students' eating behaviours in Nigeria necessitated this investigation. Thus, the present research is a pretest–posttest control group design study which aimed to

examine the effect of learner-centred nutritional counselling intervention on eating behaviours of a sample of Nigerian students in middle basic education level.

### 1.1. Study Hypothesis

After exposure to a learner-centred nutritional counselling intervention, there will be a significant mean difference in the eating behaviour scores of students in Nigerian middle basic education level in the treatment group compared to a no-contact control group both at posttest and follow-up.

## 2. Materials and Methods

The sample for this pretest–posttest control group design study was 102 participants with poor eating behaviours considered adequate following a statistical power calculation of 88% at a significant level of .05 for student t-tests analysis as calculated through G\*Power 3.1.9.4 computer program [25][26]. This study was carried out among students in middle basic education classes (that is, students in primary classes four to six, age 9–11 years) in Anambra State, Nigeria. The students' average age was  $11.92 \pm 1.99$ . At baseline, 320 students were screened for eligibility on the basis of having poor eating behaviours, and completion of an informed consent form by their parents/guardians and assent form by the students. The exclusion criteria were implied where the student failed to meet any of the aforesaid criteria.

The Ethics Committee for Research at the Education Faculty of the University of Nigeria approved the study protocol. The protocol complied with the Helsinki Declaration. Parents of participants completed a consent form on behalf of their wards with the knowledge that student participation was voluntary and they had the freedom to pull out of the study whenever they wish to.

Data gathering regarding the children's eating behaviour was done thrice with the *Child Eating Behaviour Questionnaire (CEBQ)* [27], which was created to ascertain different dimensions of a child's eating behaviour. The CEBQ comprises thirty-five items spreading across eight clusters. These include, "satiety responsiveness (SR), slowness in eating (SE), food fussiness (FF), food responsiveness (FR), enjoyment of food (EF), desire to drink (DD), emotional under-eating (EUE), emotional over-eating (EOE)". The CEBQ has five-point response options ranging from never (0) to always (4). The CEBQ is a valid instrument for measuring eating behaviours in children ( $\alpha$ : 0.72 to 0.91;  $r$ : 0.52 – 0.87) [27][28]. The reliability indexes of CEBQ subscales in this research are: SR=.67 $\alpha$ ; SE=.64 $\alpha$ ; FF=.70 $\alpha$ ; FR=.63 $\alpha$ ; EF=.61 $\alpha$ ; DD=.82 $\alpha$ ; EUE=.85 $\alpha$ ; EOE=.51 $\alpha$ .

The treatment intervention was delivered by the researchers using a learner-centred nutritional counselling program manual which consisted of topics aimed at improving students' eating behaviours. A 90-minute

treatment session was held twice for 6 weeks with a 4-week follow-up conducted after three months. Additional sessions were offered to students who missed any session. Group sessions were held outside school hours. The summary of the learner-centred nutritional counselling program is shown in Table 1.

The researchers administered the pretest four weeks before the treatment began. At the conclusion of counselling sessions, the CEBQ was distributed to gather post-treatment data. At the last follow-up, the CEBQ was also distributed to gather follow-up data. At every point in time, the CEBQ was completed by each participating

student. Note also that records of group attendance were kept and dropout issue was not recorded.

Sampling was carried out using random allocation software programs [29] to assign the students to the two research groups: 51 students to the treatment group and 51 students to the no-contact control group. Two individuals who were not part of the researchers assisted with the allotment of the students to either the treatment group or control group based on the output from the random allocation software program. A blinding technique was further used to de-identify participants' sensitive information before data analyses.

**Table 1.** Summary of the learner-centred nutritional counselling program for improving eating behaviour of students

Weeks	Sessions	Session topics/themes
Week 1	Session one	Group members' becoming accustomed to one another and discussion about the concept of eating behaviours and how poor eating habits affect a healthy lifestyle
	Session two	Discussion on the importance of imbibing good eating behaviours
Week 2	Session three	Introduction to the main classes of nutrients needed by the body
	Session four	Strategies for making healthful eating choices: when to eat, what to eat and how to eat
Week 3	Session five	Introduction to label reading and identification of nutritious meals
	Session six	Understanding nutrition facts labels of locally produced foods through peer assistance
Week 4	Session seven	Peer-to-peer discussion of nutrition facts labels and nutritious meals
	Session eight	Role of self-reinforcements and self-discipline in managing one's eating behaviours
Week 5	Session nine	How parents and siblings can be of assistance in an individual's maintenance of good eating behaviours
	Session ten	Determining how peers can influence one's eating behaviours
Week 6	Session eleven	Self-resolution on healthy food intake and developing plans to implement good eating behaviour decisions
	Session twelve	Students' self-monitoring of eating patterns and group dialogue
Follow-up		Students' motivation, feedback on current eating habits and exchange of behavioural tips to further sustain learned eating behaviours

**Table 2.** Students and their parents/guardian's demographic data

Variables	Treatment group		Control group		$\chi^2$	Significance
	N	(%)	N	(%)		
<b>Gender</b>						
Male	30	58.8	34	66.7	0.671	.539
Female	21	41.2	17	33.3		
<b>Parental education</b>						
Basic education	15	29.4	20	39.2	1.354	.508
Secondary/vocational education	21	41.2	20	39.2		
Tertiary education	15	29.4	11	21.6		
<b>Parental relationship status</b>						
Parents living together	25	49.0	21	41.2	1.519	.678
Parents separated	11	21.6	15	29.4		
One of the parents alive	15	29.4	15	29.4		

N=number of participants; a = mean and standard deviation; \* = t-value

**Table 3.** Between-group comparison at pretest and posttest as evaluated by CEBQ

Data	CEBQ Subscale	Group	N	M(SD)	95% CI	t	p	Cohen's d
Pretest	Satiety responsiveness	Treatment	51	16.98(2.10)	16.39 – 17.57	.588	.558	NA
		Control	51	16.73(2.27)	16.09 – 17.36			
	Slowness in eating	Treatment	51	13.63(0.77)	13.41 – 13.85	.607	.546	NA
		Control	51	13.53(0.86)	13.29 – 13.77			
	Food fussiness	Treatment	51	19.37(2.47)	18.68 – 20.07	-1.532	.129	NA
		Control	51	20.16(2.70)	19.40 – 20.92			
	Food responsiveness	Treatment	51	16.16(1.57)	15.72 – 16.60	-1.199	.234	NA
		Control	51	16.63(2.32)	15.97 – 17.28			
	Enjoyment of food	Treatment	51	13.37(1.60)	12.92 – 13.82	-.999	.320	NA
		Control	51	13.73(1.95)	13.18 – 14.27			
	Desire to drink	Treatment	51	10.35(1.20)	10.02 – 10.69	1.120	.266	NA
		Control	51	10.10(1.10)	9.79 – 10.41			
	Emotional under-eating	Treatment	51	13.33(1.42)	12.93 – 13.73	-1.280	.203	NA
		Control	51	13.71(1.51)	13.28 – 14.13			
	Emotional over-eating	Treatment	51	13.51(1.67)	13.04 – 13.98	.424	.672	NA
		Control	51	13.37(1.60)	12.92 – 13.82			
	OVERALL	Treatment	51	116.71(8.35)	114.36 – 119.06	-.658	.512	NA
		Control	51	117.94(10.49)	114.99 – 120.89			
Posttest	Satiety responsiveness	Treatment	51	7.98(1.83)	7.47 – 8.49	-23.093	<.001	0.46
		Control	51	17.20(2.15)	16.49 – 17.70			
	Slowness in eating	Treatment	51	6.71(1.78)	6.21 – 7.21	-26.205	<.001	0.52
		Control	51	13.67(0.65)	13.48 – 13.85			
	Food fussiness	Treatment	51	10.43(2.56)	9.71 – 11.15	-19.470	<.001	0.39
		Control	51	20.51(2.66)	19.76 – 21.26			
	Food responsiveness	Treatment	51	7.51(1.16)	7.18 – 7.83	-27.330	<.001	0.54
		Control	51	16.82(2.14)	16.22 – 17.43			
	Enjoyment of food	Treatment	51	6.43(1.23)	6.08 – 6.78	-30.824	<.001	0.61
		Control	51	13.53(1.08)	13.22 – 13.83			
	Desire to drink	Treatment	51	4.65(1.13)	4.33 – 4.96	-22.903	<.001	0.45
		Control	51	10.20(1.31)	9.83 – 10.57			
	Emotional under-eating	Treatment	51	5.92(1.45)	5.51 – 6.33	-26.073	<.001	0.51
		Control	51	13.67(1.54)	13.23 – 14.10			
	Emotional over-eating	Treatment	51	6.51(2.14)	5.91 – 7.11	-19.200	<.001	0.38
		Control	51	13.33(1.35)	12.95 – 13.71			
	OVERALL	Treatment	51	56.14(7.64)	53.99 – 58.29	-35.121	<.001	0.70
		Control	51	118.82(10.2)	115.95 – 121.69			

CEBQ=Child Eating Behaviour Questionnaire; N=number of participants; M=mean; SD=standard deviation; CI=confidence interval; NA = Not Applicable.

**Table 4.** Between-group comparison at follow-up as evaluated by CEBQ

Data	CEBQ Subscale	Group	N	M(SD)	95% CI	t	P	Cohen's d																																																																																												
Follow-up	Satiety responsiveness	Treatment	51	8.51(2.19)	7.90 – 9.12	-19.73	<.001	0.40																																																																																												
		Control	51	17.04(2.11)	16.43 – 17.65				Slowness in eating	Treatment	51	7.37(2.37)	6.70 – 8.04	-14.67	<.001	0.29	Control	51	13.41(1.73)	12.92 – 13.90	Food fussiness	Treatment	51	8.57(1.40)	8.17 – 8.96	-38.02	<.001	0.75	Control	51	20.45(1.74)	19.96 – 20.94	Food responsiveness	Treatment	51	7.25(0.69)	7.06 – 7.45	-26.32	<.001	0.52	Control	51	16.80(2.50)	16.10 – 17.51	Enjoyment of food	Treatment	51	6.25(0.93)	5.99 – 6.52	-30.03	<.001	0.60	Control	51	13.59(1.47)	13.17 – 14.00	Desire to drink	Treatment	51	3.98(0.55)	3.83 – 4.13	-36.85	<.001	0.73	Control	51	10.57(1.15)	10.24 – 10.89	Emotional under-eating	Treatment	51	4.69(0.76)	4.47 – 4.90	-44.05	<.001	0.88	Control	51	13.22(1.15)	12.89 – 13.54	Emotional over-eating	Treatment	51	5.76(0.62)	5.59 – 5.94	-28.52	<.001	0.57	Control	51	13.65(1.87)	13.12 – 14.17	<b>OVERALL</b>	Treatment	51	52.39(5.79)	50.76 – 54.02	-35.72	<.001	0.71
	Slowness in eating	Treatment	51	7.37(2.37)	6.70 – 8.04	-14.67	<.001	0.29																																																																																												
		Control	51	13.41(1.73)	12.92 – 13.90				Food fussiness	Treatment	51	8.57(1.40)	8.17 – 8.96	-38.02	<.001	0.75	Control	51	20.45(1.74)	19.96 – 20.94	Food responsiveness	Treatment	51	7.25(0.69)	7.06 – 7.45	-26.32	<.001	0.52	Control	51	16.80(2.50)	16.10 – 17.51	Enjoyment of food	Treatment	51	6.25(0.93)	5.99 – 6.52	-30.03	<.001	0.60	Control	51	13.59(1.47)	13.17 – 14.00	Desire to drink	Treatment	51	3.98(0.55)	3.83 – 4.13	-36.85	<.001	0.73	Control	51	10.57(1.15)	10.24 – 10.89	Emotional under-eating	Treatment	51	4.69(0.76)	4.47 – 4.90	-44.05	<.001	0.88	Control	51	13.22(1.15)	12.89 – 13.54	Emotional over-eating	Treatment	51	5.76(0.62)	5.59 – 5.94	-28.52	<.001	0.57	Control	51	13.65(1.87)	13.12 – 14.17	<b>OVERALL</b>	Treatment	51	52.39(5.79)	50.76 – 54.02	-35.72	<.001	0.71	Control	51	118.73(11.9)	115.37 – 122.08								
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		Control	51	20.45(1.74)	19.96 – 20.94				Food responsiveness	Treatment	51	7.25(0.69)	7.06 – 7.45	-26.32	<.001	0.52	Control	51	16.80(2.50)	16.10 – 17.51	Enjoyment of food	Treatment	51	6.25(0.93)	5.99 – 6.52	-30.03	<.001	0.60	Control	51	13.59(1.47)	13.17 – 14.00	Desire to drink	Treatment	51	3.98(0.55)	3.83 – 4.13	-36.85	<.001	0.73	Control	51	10.57(1.15)	10.24 – 10.89	Emotional under-eating	Treatment	51	4.69(0.76)	4.47 – 4.90	-44.05	<.001	0.88	Control	51	13.22(1.15)	12.89 – 13.54	Emotional over-eating	Treatment	51	5.76(0.62)	5.59 – 5.94	-28.52	<.001	0.57	Control	51	13.65(1.87)	13.12 – 14.17	<b>OVERALL</b>	Treatment	51	52.39(5.79)	50.76 – 54.02	-35.72	<.001	0.71	Control	51	118.73(11.9)	115.37 – 122.08																				
	Food responsiveness	Treatment	51	7.25(0.69)	7.06 – 7.45	-26.32	<.001	0.52																																																																																												
		Control	51	16.80(2.50)	16.10 – 17.51				Enjoyment of food	Treatment	51	6.25(0.93)	5.99 – 6.52	-30.03	<.001	0.60	Control	51	13.59(1.47)	13.17 – 14.00	Desire to drink	Treatment	51	3.98(0.55)	3.83 – 4.13	-36.85	<.001	0.73	Control	51	10.57(1.15)	10.24 – 10.89	Emotional under-eating	Treatment	51	4.69(0.76)	4.47 – 4.90	-44.05	<.001	0.88	Control	51	13.22(1.15)	12.89 – 13.54	Emotional over-eating	Treatment	51	5.76(0.62)	5.59 – 5.94	-28.52	<.001	0.57	Control	51	13.65(1.87)	13.12 – 14.17	<b>OVERALL</b>	Treatment	51	52.39(5.79)	50.76 – 54.02	-35.72	<.001	0.71	Control	51	118.73(11.9)	115.37 – 122.08																																
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		Control	51	13.59(1.47)	13.17 – 14.00				Desire to drink	Treatment	51	3.98(0.55)	3.83 – 4.13	-36.85	<.001	0.73	Control	51	10.57(1.15)	10.24 – 10.89	Emotional under-eating	Treatment	51	4.69(0.76)	4.47 – 4.90	-44.05	<.001	0.88	Control	51	13.22(1.15)	12.89 – 13.54	Emotional over-eating	Treatment	51	5.76(0.62)	5.59 – 5.94	-28.52	<.001	0.57	Control	51	13.65(1.87)	13.12 – 14.17	<b>OVERALL</b>	Treatment	51	52.39(5.79)	50.76 – 54.02	-35.72	<.001	0.71	Control	51	118.73(11.9)	115.37 – 122.08																																												
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CEBQ =Child Eating Behaviour Questionnaire; N=number of participants; M=mean; SD=standard deviation; CI=confidence interval; NA = Not Applicable.

The data analyses procedure involved the use of the student t-test statistic. Before this, tests for data normality and violations of assumptions were conducted. These were ascertained to be normal before proceeding with the analyses. Data screening showed there was no missing data. Statistical analyses at .05 significant level were carried out through IBM SPSS, version 22.

### 3. Results

The results in Table 2 showed the demographic characteristics of the students and their parents. The demographic data shows that 58.8% of the participants in the experimental group were males and 41.2% were female students. However, 66.7% of the control group participants were males while 33.3 were females. Also, 29.4% of the parents of children in the experimental group had basic education, 41.2% had secondary/vocational education, while 29.4% had tertiary education. However, 39.2% of the parents of children in the control group had basic education, 39.2% had secondary/vocational education, while 21.6% had tertiary education. Also, 49% of the parents of children in the experimental group were living together, 21.6% were living separately, while 29.4% were widowed parents. On the other hand, 42.1% of the parents of children in the control group were living together, 29.4%

were living separately, while 29.4% were widowed parents. See Table 2 for students' details.

The results of the study in Table 3 showed that there was a significantly positive improvement in students' eating behaviours after exposure to learner-centred nutritional counselling program: Satiety responsiveness,  $t(100) = -23.093$ ,  $p < .001$ ; Slowness in eating,  $t(100) = -26.205$ ,  $p < .001$ ; Food fussiness,  $t(100) = -19.470$ ,  $p < .001$ ; Food responsiveness,  $t(100) = -27.330$ ,  $p < .001$ ; Enjoyment of food,  $t(100) = -30.824$ ,  $p < .001$ ; Desire to drink,  $t(100) = -22.903$ ,  $p < .001$ ; Emotional under-eating,  $t(100) = -26.073$ ,  $p < .001$ ; Emotional over-eating,  $t(100) = -19.200$ ,  $p < .001$ ; and Overall CEBQ,  $t(100) = -35.121$ ,  $p < .001$ . Therefore, the learner-centred nutritional counselling intervention program resulted in significant mean changes in students' eating behaviours at the middle basic education level.

The results of the study in Table 4 showed that the significant mean changes in eating behaviours due to the learner-centred nutritional counselling intervention program was maintained at follow-up among students in the treatment group compared to control group: Satiety responsiveness,  $t(100) = -19.73$ ,  $p < .001$ ; Slowness in eating,  $t(100) = -14.67$ ,  $p < .001$ ; Food fussiness,  $t(100) = -38.02$ ,  $p < .001$ ; Food responsiveness  $t(100) = -26.32$ ,  $p < .001$ ; Enjoyment of food,  $t(100) = -30.03$ ,  $p < .001$ ; Desire to drink,  $t(100) = -36.85$ ,  $p < .001$ ; Emotional under-eating,  $t(100) = -44.05$ ,  $p < .001$ ; Emotional over-eating,  $t(100) =$

-28.52,  $p < .001$ ; and Overall CEBQ,  $t(100) = -35.72$ ,  $p < .001$ . Therefore, the effect of the learner-centred nutritional counselling intervention program on students' eating behaviours at the middle basic education level was also significant at follow-up.

#### 4. Discussion

The research objective was to determine the effect of a learner-centred nutritional counselling program on eating behaviours of Nigerian students at the middle basic education level. The study hypothesis stated that after exposure to learner-centred nutritional counselling intervention, there will be a significant mean difference in the eating behaviours scores of students in Nigerian middle basic education level in the treatment group compared to a no-contact control group both at posttest and follow-up. In line with our expected outcomes, the students in control group did not make positive improvements in any dimensions of eating behaviours compared to the treatment group. The positive gain for students in the treatment group after exposure to the learner-centred nutritional counselling program was maintained at follow-up compared to a no-contact control group. Consistent with previous findings [2][18][22][23][24][30][31], positive improvements in students' eating behaviours are observable in treatment group participants assigned to a nutritional counselling program. This finding concurs with previous research which indicates that among students, nutritional intervention can help promote healthy nutrition [32]. The finding suggests that while undesirable eating behaviours among Nigerian students are common [33], positive improvements in their eating behaviours can be attained via a learner-centred nutritional counselling intervention. The finding also concurs with a previous research which demonstrated that a learner-centred approach to nutrition counselling and education can improve food-related behaviours [16]. However, it is suggested that future nutritional counselling interventions whose goal is to improve children's nutrition should target the family holistically [34][35][36].

There were some limitations in this study that should be addressed. The study finding should be interpreted bearing in mind that we employed one assessment tool time after time, a method that has been criticized as leading to the practice effect [37]. Information regarding the history of school children's food intake and its impact is lacking in this research. Hence, future research would benefit from the use of multiple measurement tools simultaneously and emphasis on history of participants' food intake and its impact. The use of CEBQ in future research in addition to other measurement tools may further improve the understanding of eating behaviours across student populations and guide health education initiatives properly [38]. Like studies that rely on self-report of children's eating behaviours, there is the possibility that students may

have overreported or underreported some aspects of their eating behaviours. Future research that would aim to compare the learner-centred nutritional counselling approach to a traditional didactic approach to nutrition is essential. Future studies would without doubt profit from the use of a larger sample size and the investigation of how certain food supplements [39] can be included as a component of nutritional education program designed for school children. Finally, prospective long-term consideration of the efficacy of learner-centred nutritional counselling intervention on students' eating behaviours with an active control group is suggested and such studies can also adopt a measure of whole grains consumption and nutritional education methods of recent research [40] for assisting children in middle basic education classes.

#### 5. Conclusion and Suggestion

The use of learner-centred nutrition counselling program is valuable for improving students' eating behaviours at the middle basic education level. Also recorded at follow-up was a positively significant mean change in students' eating behaviours due to the learner-centred nutritional counselling intervention program. Therefore, prospective long-term considerations of the efficacy of learner-centred nutritional counselling intervention on students' eating behaviours with an active control group will be indispensable.

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