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ABSTRACT

Purpose: The main objective of this study was to establish the difference in the dietary diversity for school children enrolled in and those not enrolled in the home grown school feeding programme (HGSFP), in Makueni County, Kenya.

Methodology: A school based cross-sectional study design was used, Makindu sub-County in Makueni County was purposively sampled, and stratified into school with HGSFP and schools without HGSFP. Using G Power 3.1.2, Sample size calculator, 288 school children were sampled, 144 children randomly selected from three schools offering HGSFP and 144 children randomly selected from three schools without HGSFP, translating to 48 school children per school. Further the study sampled six (6) children per class from class one to standard eight using respective daily class attendance registers where the first respondents in each class were selected at random and the subsequent ones systematically. Researcher administered questionnaire was used to collect data from child/caregiver pair. The information collected was analyzed and the results were presented in tables and percentages.

Findings: A significant difference was observed in children religion, as more children not in HGSFP were protestants compared to Catholics (p= 0.004). Mothers' education level, mothers' occupation and fathers' education level across the groups were statistically significant, P-value <0.05. The main source of cooking fuel for households with children in the HGSFP was firewood (50.0%) and for children not in the HGSFP preferred firewood (47.9%). All (100%) of the children had consumed staple foods, followed closely by consumption of legumes, nuts and seeds by children in (98.6%) the HGSFP and those not in (75.7%) the programme. Vitamin a rich fruits and vegetables (13.9%, 11.8%), organ meat (1.4%, 4.9%) and eggs (2.8%, 2.1%) were poorly consumed by children in the HGSFP and those not in the programme respectively, these differences in food consumption pattern were statistically significant, p-value <0.05, thus children in HGSFP had better dietary diversity compared to those not in the programme.

Conclusion and recommendation: Given the positive outcome that children in the HGSFP had a better diversified diet, the study recommends scaling up the programme in all schools especially in the food insecure areas. In addition, there is need for a longitudinal study which includes all the seasons of the year so as verify the results of this study as well as determine the sustainability of the program for a better policy formulation.

Key words: *Home Grown School Feeding Programme (HGSFP), School children, Dietary diversity.*

1.0 INTRODUCTION

Home grown school feeding programme (HGSFP) constitute a school meals model that provides a mid-day, safe, diverse and nutritious food, sourced locally from smallholders, to children in schools (Langinger, 2011). Like the case in Kenya, Funds are transferred from the National Treasury to the Ministry of Education and then to school accounts. Each school constitutes a meals programme committee, composed of four teachers and four parents, issues a call for tenders and buys food from local suppliers (traders or farmers) from the school meals bank account. This model is used in both rural and urban areas, linking smallholder farmers and traders to schools in both contexts (United States Department of Agriculture Foreign Agricultural Service, 2009). This program was first piloted in a number of countries from sub-Saharan Africa (SSA) from 2005 (NEPAD, 2003). Twelve pilot countries (Angola, Democratic Republic of Congo, Ethiopia, Ghana, Kenya, Malawi, Mali, Mozambique, Nigeria, Senegal, Uganda and Zambia) were invited to implement the Home Grown School Feeding Programme (HGSFHP) and so far, Ghana, Kenya, Mali and Nigeria are already implementing the HGSFP, using an on-site school meal in specifically targeted areas, such as arid or semi-arid regions and major towns' slums (Partnership for Child Development, 2012 & WFP, 2007).

In July 2009, the Ministry of Education (MoE) in Kenya launched the Home Grown School Meal (HGSM) programme with a beneficiary level of 38000 children in 1,777schools in 66 semi-arid districts (Langinger, 2011). In 2011,the programme had reached a beneficiary level of 592,638 children in approximately 1,800 schools in 72 semi-arid districts(Technical Development Plan, 2012 and Langinger, 2011). School feeding programme has had notable improvement in increasing school enrollment, attendance, retention, and educational achievement and alleviation of short term hunger (Bundy et.al. 2009). The extent to which it has contributed to consumption of diversified diet among school aged children has less been documented.

Dietary diversity scores consist of a simple count of food groups that a household or an individual has consumed over the preceding 24 hours, (Food and Nutrition Technical Assistance, FANTA, 2006). School-age children in developing countries are mainly consuming plant-based diets which are predominantly from cereals, roots and tubers with limited animal source foods (Ochola & Masibo, 2014). The HGSFP currently encourages the purchase of various foods like sorghum, millet, cowpeas and use of horticulture and livestock products within the school feeding programs (United States Department of Agriculture Foreign Agricultural Service, 2009). However, Kenyan Ministry of Education-MoE has adopted the World Food Programme-WFP's daily hot lunch ration composed of cereals, pulses, and oil where a bean and maize mix that includes oil is encouraged and largely implemented throughout schools (The Technical Development Plan, 2012). Although the school meal management committees are free to purchase various locally available foods, the flat rate stipend from the government limits the purchase of horticulture and livestock products for use within the school feeding programs (Langinger, 2011). A better understanding of the impact of HGSFP on consumption of a diversified diet could help fill the nutritional gap created by recurring droughts and ever rising food costs that have threatened the viability of diverse meals in food-scarce areas.

LITERATURE REVIEW

Homegrown school feeding programme in Kenya

Kenya began school feeding programmes in 1979 with a government and WFP assistance (Langinger, 2011). The primary role was to increase enrollment and retention children in school thus contributing to realization of universal primary education, (Bordi, et. al., 2002). The programme heavily relied on foreign aid and management, which is often conditional (Langinger, 2011). During this time 71% of programme costs were provided by World Food Programme-WFP, 15% was local communities' obligation and only 14 % came from the Kenyan government (Galloway, 2009). This limited the Kenyan government's role in the direction and stewardship of the programme. In an effort to transit to a more sustainable alternative school feeding programme and with a shift in the financial responsibility Kenya was involved in the piloting of NEPAD supported HGSFP in 2009 (Langinger, 2011). In the process, 500,000 primary school children were transferred over from WFP programme to HGSFP, and promised to add 50,000 students each year until reaching full coverage (Finan, 2010). Through school feeding in Kenya notable changes have been seen especially in school attendance rates where schools that provide meals show higher attendance rates and lower initial dropout rates than schools that do not (Espejo, 2009). School meal programmes have had considerable effect on increasing overall student health (Galloway, 2009), but less efforts have been put on diversified food consumption pattern which also have a key role in the overall health of school children.

Dietary Diversity of school meals

Intakes of Energy rich foods

Kenya school feeding programme menu contain approximately 30% of energy requirements of the Recommended Dietary Allowance-RDA (United States Department of Agriculture Foreign Agricultural Service, 2009). It is however important to realize that, the school meal provided tends to be the biggest, or even the only meal, for many school children on a given day (Walingo and Musamali, 2008; WFP, 2010). An impact evaluation of School Feeding Programmes in Kenya (WFP, 2010), revealed that the school meal contributed between 30-90% of the attained RDA for over 90% of the children. Nearly 20% of the children from Arid and Semi-Arid Land-ASAL relying on almost all of the attained RDA from school meals. Energy expenditure in school children especially from the ASAL is high because most of the long distance walk to school, many also have to work before or after school hours in order to support the family and also pay for school fees (WFP, 2010). Parents of children from these areas, cannot afford to purchase high-energy foods because of poverty, (Aliyar et al., 2015).

Intakes of protein rich foods

Some studies have shown that protein intake among school children is adequate. Among the Bahraini students, the mean intake of protein exceeds the reference nutrition intake for all age groups and sex by between 1.5 and 2.5 times (Gharib and Rasheed, 2011). In Libya, the mean intake of protein among school children is 226% of the RDA (Elhisadi, 2013). In Ghana, school children, both boarders and non-boarders, attained 100% of the RDA for protein across age groups and sex (Intiful et.al. 2013). Protein intake provision in school menu for a Kenya school is 50% of the RDA (United States Department of Agriculture Foreign Agricultural Service, 2009). This can be explained by the mix of bean and maize that is largely implemented throughout Kenyan schools (Technical Development Plan, 2012). This is a positive factor for school feeding beneficiaries who are from extremely poor families that are largely

unable to provide the minimum recommended daily allowances (RDA) of protein to their children (Langinger, 2011). In the ASAL areas almost 30 % of the school children are totally dependent on the school meal for protein (WFP, 2010). Inadequate protein intake may irreversibly stunt the mental and physical development of young children, resulting in wasted potentials and lifelong difficulties (Galal, 2000).

Intakes of fat

Fats act as an energy store and can be metabolized to produce large amounts of energy which is required in higher amounts during school (Aliyar et al., 2015). Some studies reveal a higher intake of fats than recommended, especially for school children from middle- and high-income settings, particularly from urban areas (Shroff et. al., 2013; Venter & Winterbach, 2010), whereas some children consumed less fat than the recommended amounts like in the case with rural Beninese school aged children (Mitchekpe et. al., 2009). A study conducted in Accra, Ghana, among schoolchildren showed that the mean intake of fats was 44.74 ± 20.22 g, which was higher than the RDA for this age group of children (Intiful et. al., 2013), and another study in Bahrain indicated that 36–50% of the children exceeded the energy limits for fats, both saturated fats and cholesterol (Gharib and Rasheed, 2011). The intake of fats depends on the foods commonly consumed, for example, the typical Kenyan daily ration per child enrolled in school feeding programme is 5 grams of oil (Technical Development Plan, 2012).

Iron rich foods

It is estimated that 53% or 210 million school-age children in the world suffer from Iron Deficiency Anaemia (IDA), (WHO, 2000). Few Studies and surveys have investigated the prevalence of IDA in school children: in a survey of nearly 14,000 rural school children in Africa and Asia, the prevalence of IDA was more than 40% in five African countries (Mali, Tanzania, Mozambique, Ghana, and Malawi) and 12% in Vietnam and 28% in Indonesian amongst children aged 7-11 years olds (Partnership for Child Development, 2001). In Kenya 19.5% of children 5-19 years are iron deficient (Ministry of Health, 2011).

In Kenya school feeding contributes to only 24% of RDA (FAO/WHO/UNU, 2004) and more specifically contributing to 91-100% of the iron needs for about one-third of the children in Kenyan arid region school children dwellers (WFP, 2010). The point of contention surrounding inadequate provision of iron rich diet in Kenya school meal programme is the limited funds from the government towards HGSFP hence unable to purchase horticulture and livestock products for use within the school feeding programs (Langinger, 2011).

Intakes of Vitamin A rich foods

It is estimated that 85Million school-age children are at increased risk of acute respiratory and other infections because they are deficient in vitamin A (Del Rosso, 1999). An assessment of the vitamin A status of school children in Tanzania, Ghana, Indonesia and Vietnam found that that VAD was a severe public health problem in Tanzania as 30% of the children were deficient in vitamin A (Partnership for child development, 2000). In Cameroon, a study with 261 school children reported sub-clinical vitamin A deficiency in over 80% of the children (Zambou et. al., 1999). A study of the prevalence of vitamin A deficiency in northern Ethiopia among 824 school-age children reported low Serum retinol concentrations in 51.1% of the children (Kassaye, 2001). Based on the Kenya National Micronutrient Survey, (2011) the prevalence of Vitamin A Deficiency (VAD) and marginal VAD among school-aged

children is 3.6% and 33.9% respectively, meaning one third of children in this age group are at risk of VAD (Ministry of Health, 2011).

2.0 MATERIALS AND METHOD

This was a school based cross-sectional study, purposively done in Makindu sub-County, Makueni County because of its characteristic of arid and semi-arid zones with low potentials in development (Makueni County Integrated Development Plan, 2013) and implementation of Home Grown School Feeding Programme (Personal interview with sub County Education Officer, 17thMarch 2018). Two strata (schools implementing HGSFP and those not implementing the programme) were established based on a pre-determined criterion by the County Government of Makueni. Using G Power 3.1.2 (Faul, et. al, 2007), sample size calculator, the study sampled 288 school children, 144 children were from three randomly selected schools implementing HGSFP and 144 children were from three randomly selected schools without a school feeding programme. This translated to 48 school children per school. Further to this, the study sampled six (6) children per class from class one (1) to standard eight (8) using respective daily attendance registers where the first respondent in each class was selected at random and the subsequent ones systematically. Researcher administered questionnaire was used to collect data from child/caregiver pair. A section of the questionnaire on socio-demographic characteristics was adopted and modified from the standard Demographic and Health Survey (DHS) questionnaire. The other part of the questionnaire adopted FAO (2010) guidelines; where nine food groups dietary diversity scale was used to assess the number of foods consumed in the preceding day of the survey (FAO, 2010). FAO's 24-hour recall, Food Frequency Questionnaire (FFQ) having 9 food groups was used to compare the frequency of consumption of each food group between children enrolled in the HGSFP and those not enrolled in the programme. The information collected was analyzed and the results were presented in tables and percentages. Several tests were used to explore statistical significant differences across the two groups, a significance level was established at $P< 0.05$ in all statistical tests.

3.0 RESULTS

3.1Characteristics of the children in and not in the HGSFP

There was equal representation of male (50%) and female (50%) children in and not in the school feeding programme. Almost one third, 29.9% of the children in HGSFP were firstborn with the least, 0.7% being eighth born, on the hand those not in HGSFP, a quarter 25%, were third born with the least, 0.7% being ninth born. Very few, 1.4% children in the HGSFP belonged to Muslim and traditional ways of worship but a number (42.4%, 54.2%) and (28.5%, 66.0%) of the children in and out of HGSFP were Catholics and protestants respectively, the difference was significant $p< 0.05$

Children's age was not normally distributed (skewed to the right, majority being age 10 years and above) as assessed by Shapiro Wilk test of normality, P-value<0.01. Therefore, median with interquartile range was calculated to compare average age of children across the group. Children in HGSFP were older than their counter parts not in HGSFP however, as assessed by Mann-Whitney U test these differences observed were not statistically significant, P – value > 0.05, as shown in Table 3.1 below.

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Table 3. 1: Demographic characteristics of the school children in and not in the HGSFP

Variables	In the HGSFP (N=144)		Not in HGSFP (N=144)		Chi-square/ Fisher's exact value	P – value
	N	**%**	**N**	**%**		
Sex of the child						
Male	72	50	72	50	0.0001	0.999
Female	72	50	72	50		
Rank in the family:						
First	43	29.9	32	22.2	7.7954	0.438
Second	31	21.5	32	22.2		
Third	24	16.7	36	25		
Fourth	20	13.9	13	9		
Fifth	15	10.4	20	13.9		
Sixth	6	4.2	5	3.5		
Seventh	4	2.8	3	2.1		
Eighth	1	0.7	2	1.4		
Ninth	0	0	1	0.7		
Child's religion:						
Catholic	61	42.4	41	28.5	13.0921	0.004
Protestant	78	54.2	95	66		
Muslim	1	0.7	7	4.9		
Traditional	1	0.7	1	0.7		
None	3	2.1	0	0		
	Median	IQR	Median	IQR	Mann-Whitney U value	
Average children's age	11	5	10	5	9678.5	0.322

*Significant difference at p-value <0.05

3.2 Characteristics of parents with children in and not in the HGSFP

Demographic and socio-economic characteristics of parents with children in and not in HGSFP were summarized into frequencies and percentages as shown in 3.2 below. Over three quarter (79.9%) of the parents in both groups were married, followed by 13.2% and 7.6 %, as single parents of children in and no in the HGSFP respectively the rest were either widowed, divorced and separated.

The study noted children mothers had mostly attained primary certificate education (39.9%, 28.0% for children in and not in the HGSFP respectively). It was also worth noticing that more mothers of children not in HGSFP, 13.3% than in HGSFP, 2.8% had not gone to school. Most mothers of children in HGSFP, 32.2%, were housewife, followed by a quarter (24.5%) of them who were on salaried employment. On the other hand, mothers of children not in HGSFP, close to one third 31.5%, were petty traders, followed by slightly above one fifth (24.5%) of them who were housewives.

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Above third, 35.0% of fathers to children in HGSFP had completed primary school, followed by a quarter, 25.8%, who had completed secondary school with the least, about 1% who had not gone to school. Similarly, a third, 31.4% of fathers to children who were not in HGSFP were secondary graduates followed by about 19.5% who had completed primary school with only 1% who had certificate training. Majority of fathers, 43.3% and 41.0%, of children in and not in HGSFP respectively were casual waged laborers.

As assessed by chi-square goodness of fit or fishers exact test only proportions of mothers' education level, mothers' occupation and fathers' education level across the group were statistically significant, P-value <0.05, see table 3.2.

Table 3.2: Demographic and Socio-economic profiles of the parents with children in and not in HGSFP

Demographic characteristics	In the HGSFP (N=144)		Not in HGSFP (N=144)		Chi-square/ Fisher's exact value	P-value
	N	**%**	**N**	**%**		
Parents Marital status						
Married	114	79.2	115	79.9	5.071	0.28
Single	19	13.2	11	7.6		
Divorced	3	2.1	7	4.9		
Separated	2	1.4	1	0.7		
Widowed	6	4.2	10	6.9		
Mothers education level (n=143)			n=143			
None	4	2.8	19	13.3	24.7056	0.002
Completed primary	57	39.9	40	28		
Primary dropout	9	6.3	15	10.5		
Completed Secondary	25	17.5	38	26.6		
Secondary dropout	11	7.7	5	3.5		
Certificate	9	6.3	3	2.1		
Diploma	4	2.8	5	3.5		
Technical	4	2.8	6	4.2		
University	20	14	12	8		
Main occupation of the mother (n=143)			n=143			
Waged labour (Casual)	20	14	31	21.7	36.8006	<0.01
Waged labour (Salaried)	35	24.5	12	8.4		
Petty trade	20	14	45	31.5		
Housewife	46	32.2	35	24.5		
Agricultural Labour	23	9.1	10	7		
Livestock Herding	13	7.7	10	7		
Student	6	0.7	0	0		
Father education level (n=120)			n=118			
None	1	0.8	17	14.4	33.642	<0.01
Completed primary	42	35	23	19.5		
Primary dropout	6	5	10	8.5		

Completed Secondary	31	25.8	37	31.4		
Secondary dropout	9	7.5	3	2.5		
Certificate	9	7.5	1	0.8		
Diploma	4	3.3	3	2.5		
Technical	2	1.7	7	5.9		
University	16	13.3	17	14.4		
Main occupation of the father (n=120)			n=118			
Waged labour (Casual)	52	43.3	48	41.0	3.4506	0.84
Waged labour (Salaried)	27	22.5	23	19.7		
Petty trade	27	22.5	27	23.1		
Unemployed	6	5	7	6		
Agricultural labour	5	4.2	5	4.3		
Livestock Herding	3	2.5	5	4.3		
Student	0	0	2	1.7		

*Significant difference at p-value <0.05

3.3 Household profiles for children in and not in the HGSFP

More fathers for households of children in HGSFP, 66%, were the main income earners than fathers of households of children not in the HGSFP (53%). On the other hand, more mothers, 47%, with children not in HGSFP were the main income earners than mothers with children in the HGSFP, 34%. This differences observed in proportions of main provider for households in and out of HGSFP were statistically significant, P-value = 0.023.

Majority of the families with children in and not in the HGSFP, 94% and 93% lived in concrete/brick houses, followed by those in traditional/mud houses (4.9%, 4.2%) and least (1.4%, 2.8%) living in semi-permanent houses respectively. The differences observed were not statistically significant, p – value =0.865. See table 3.3

Table 3.3 : Socio-economic characteristics of households for children in and not in the HGSFP

Household Socio-economic characteristics	In the HGSFP **N = 144**		Not in HGSFP **N = 144**		Chi-square/ Fisher's exact test value	**P-value**
	N	%	N	%		
Main income earner for the household						
Father	95	66	76	52.8	5.197	0.023
Mother	49	34	68	47.2		
Type of house family live in:						
Brick/Concrete	135	93.8	134	93	0.772	0.865
Traditional/Mud	7	4.9	6	4.2		
Semi-Permanent	2	1.4	4	2.8		
Main source of lighting						
Solar	72	50	61	42.4	2.615	0.448
Electricity	39	27.1	42	29.2		
Kerosene	31	21.5	36	25		
Candle	2	1.4	5	3.4		

Main source of cooking fuel						
Firewood	72	50	69	47.9	18.687	<0.001
Charcoal	35	24.3	60	41.7		
LPG	27	18.8	12	8.3		
Kerosene	10	6.9	2	1.4		

*Significant difference at p-value <0.05

The main source of lighting in the respective households owned by parents with children in and not in the HGSFP was solar (50% ,42%) followed by the use of electricity (27%, 29%), a few (1.4%, 3.4%) were using the candle. These differences observed in proportions were not statistically significant, P – value= 0.448.

Finally, main source of cooking fuel for households with children in the HGSFP was firewood (50.0%) and charcoal (24.3%), a few (6.9%) were using kerosene. Similarly, households with children not in the HGSFP preferred firewood (47.9%) and charcoal (41.7%), with a least (1.4%) number using kerosene as the cooking fuels. However, the differences observed in proportions in main source of cooking fuel for the two groups were statistically significant, p-value<0.01, as described in table 3.3 above.

3.4 Dietary diversity of children in and not in the HGSFP

Table 3. 4: Food consumption pattern among children IN the HGSFP

Food consumption pattern among children IN and NOT in the HGSFP	**N=288**			
	Children in the HGSFP n=144		Children not in the HGSFP n=144	
	n	%	n	%
Starch staples	144	100	144	100
Vitamin A rich fruits and vegetables	20	13.9	17	11.8
Dark green leafy vegetables	52	36.1	74	51.4
Other fruits and vegetables	128	88.9	101	70.1
Organ meat	2	1.4	7	4.9
Meat and fish	33	22.9	17	11.8
Eggs	4	2.8	3	2.1
Legumes nuts and seeds	142	98.6	109	75.7
Milk and milk products	60	41.7	32	22.2
Oil	144	100	84	58.3

Dietary diversity was established based on the number of food groups a child consumed in the previous 24 hours prior to the data collection. Based on FAO (2010) guidelines; nine food groups as recommended internationally were considered in the study. The food groups were:1) starch staples (cereals and white roots and tubers), 2) dark green vegetables, 3) vitamin A rich fruits and vegetables, 4) other fruits and vegetables, 5) organ meat, 6) meat and fish 7) eggs, 8) legumes, nuts and seeds 9) milk and milk products.

All (100%) of the children had consumed staple foods, followed closely by consumption of legumes, nuts and seeds by both children in (98.6%) the HGSFP and those not in (75.7%) the programme. There was a noting number of children in the programme and those in the HGSFP who consumed other fruits and vegetables 88.9%, 70.1% respectively. Vitamin a rich fruits and vegetables (13.9%, 11.8%), organ meat (1.4%, 4.9%) and eggs (2.8%, 2.1%) were among the poorly consumed foods by children in the HGSFP and those not in the programme respectively. See table 3.4 above

3.5 Dietary diversity levels

Classification of dietary diversity was classified as; low dietary diversity, those who consumed less than 3 food groups, medium dietary diversity, as those who consumed between 4 to 5 food group and finally high dietary diversity as those who consumed more than 6 food groups, (FAO guidelines, 2010). So further analysis was performed to identify specific food groups that were consumed under each dietary diversity level for children in and not in HGSFP, shown below, table 3.5

Table 3.5: Food consumption pattern for children in and not in the HGSFP categorized by dietary diversity level

Dietary diversity and food groups	In the HGSFP (N=144)		Not in HGSFP (N=144)	
	N	**%**	**N**	**%**
Low dietary diversity level				
Starch staples	144	100	144	100
Dark green leafy vegetables	5	100	8	17.39
Other fruits and vegetables	5	100	18	39.13
Meat and fish	0	0	2	4.35
Eggs	0	0	1	2.17
Legumes, nuts and seeds	0	0	28	60.87
Milk and milk products	0	0	1	2.17
Oil	0	0	9	19.57
Medium dietary diversity level				
Starch staples	144	100	144	100
vitamin A rich fruits and vegetables	7	7.69	8	10.39
Dark green leafy vegetables	20	21.98	45	58.44
Other fruits and vegetables	80	87.91	64	83.12
Organ meat	1	1.1	5	6.49
Meat and fish	11	12.09	7	9.09
Eggs	2	2.2	1	1.3
Legumes, nuts and seeds	91	100	61	79.22
Milk and milk products	22	24.18	17	22.08
Oil	91	100	55	71.43
High dietary diversity level				
Starch staples	144	100	144	100
vitamin A rich fruits and vegetables	13	37.08	9	42.86
Dark green leafy vegetables	32	66.67	21	100

Other fruits and vegetables	48	100	19	90.48
Organ meat	1	2.08	2	9.52
Meat and fish	22	45.83	8	38.1
Eggs	2	4.17	1	4.76
Legumes, nuts and seeds	46	95.83	20	95.24
Milk and milk products	38	79.17	14	66.67
Oil	48	100	20	95.24

Majority of children in HGSFP, about 64%, fell in the medium dietary diversity group followed by a third (33.3%), who had a high dietary diversity with about 3.5% in low dietary diversity. On the other hand, majority, more than half (53.55%), of children not in the HGSFP were in medium dietary diversity followed by 31.9% of children in low dietary diversity with the least being 15.5% in high dietary diversity.

3.6 Dietary diversity score

To settle the discrepancy of the observed differences in the food consumption pattern by children in the HGSFP and those not in the programme a goodness of fit test was performed and there was a statistical significant difference, p-value <0.01, Children in HGSFP had better dietary diversity compared those not in the programme, see Table 3.6

Table 3.6: Dietary diversity for children in and out of HGSFP

Dietary diversity	In the HGSFP N = 144		Not in HGSFP N = 144		Chi-square value	
	N	**%**	**N**	**%**		**P-value**
Low dietary diversity	5	3.5	46	31.9	44.6927	<0.01
Medium dietary diversity	91	63.2	77	53.5		
High dietary diversity	48	33.3	21	15.5		

*Significant difference at p-value <0.05

4.0 DISCUSSION

The study had equal respondents of male and female pupils of 6-13 years, this was achieved with the help of class teachers in sampling and the caregivers/ parents during the researcher administered questionnaires. The study participants were school aged children 6-13 years, this is in line with Kenya's primary school enrollment age which is 6-13 years (Government of Kenya, GoK, 2007). In this study many of the households had up to three children, comparable to reports of Kenya Demographic Health Survey (Kenya National Bureau of Statistics (KNBS) and ICF Macro. Kenya Demographic and Health Survey, 2014) were majority of women and men (77% each) preferred to have two to four children. Notably, households with large families and many dependents may not be able to provide sufficient quantity and the right quality of food intake for each member of the family (African Women's Studies Centre& Kenya National Bureau of Statistics-AWSC, (2014). Further, this study was dome in a rural set up and it is a known fact that large families living in the rural areas contribute in the farming activities

and hence in household food production. The joint family effort in labor provision can help to increase food production as long land and reliable rains are available.

In the present study, majority of the parents were in a married union which is an advantage over a single, divorced or widowed woman/man when it comes providing food for the family since two are better than one. Further, majority of the mothers had completed either primary or secondary school and were working in petty trade, casual/ salaried jobs. Unemployment is an indicator of poor food intakes; women are known to spend a greater percentage of their income on food than men; in a study by AWSC (2014) employed women's income is used for food purchases. According to a study by Kiriti(2003), women play a major role in dietary diversity. Unfortunately, women are more likely to be unemployed than men since they spend a lot of their time doing unpaid domestic work and caring for children and other household members (housewifery).

Fathers were engaged in various casual and salaried labors, petty trade, in addition they were the main income earners in most households, which is a traditionally acceptable trend; that fathers are the primary financial providers for their families (Kenney, 2008). To add on, multiple studies have found that the father's income has a significant impact on children food intakes and food consumption patterns, inconsistent financial support from the father is associated with more significant poor household diets. (Garasky & Stewart, 2007; Nepomnyaschy et al.,2014).

Housing quality, that is the quality of material used in a housing structure, is a good proxy indicator of the respondent's wealth (Nzuma &Ochola, 2010). Measures of housing condition include roofing, flooring, walling materials as well as primary energy source for cooking and household lighting sources and sanitation facilities (Doocy et al., 2006). Poor communities use natural materials like grass for roofing and walling their dwellings while the well-off communities use stones or brick for wall, tiles or corrugated iron sheets for roofing and concrete floors. The wealthy households, as may be indicated by housing quality, source of lighting and cooking fuel are expected to have preferred and variety of food intakes than the poor households. In this study, majority of households owned a concrete or brick build house this predicated adequate household incomes thus possibility of nutritious diverse diets. However, this was contradicted by the high prevalent of solar lighting in the households and use of firewood and charcoal as fuels which are associated with low income hence inadequate food intakes.

Children in and not in the HGSFP were be ranged to have had a medium dietary diversity (consumed between 4 to 5 food group, as per FAO guidelines, 2010), worth noting was, the high consumption of diets rich in staples/ starch and low intakes of animal products. This is comparable to studies by; Ochola and Masibo (2014),which found out that school-age children in developing countries are mainly consuming plant-based diets which are predominantly from cereals, roots and tubers with limited animal source foods; Ndungu and Chege, (2019) study with school aged children in Nairobi City found high (99.7%) grains, root and tubers consumption with low intakes of animal products. This can also be related to the fact; maize is the basic staple of the Kenyan diet, where Ugali, the most common main dish, a thick porridge of maize meal that is usually eaten with a sauce of vegetables or meat, or simply accompanied with fermented milk. Further, Kenyan Ministry of Education has adopted the World Food Programme-WFP's daily hot lunch ration composed of cereals, pulses, and oil where a bean and maize mix that includes oil is encouraged and largely implemented throughout schools (The Technical Development Plan, 2012). In addition, and as described by Makueni County Integrated Development Plan, (2013), Makindu Sub-county, is largely arid and semi-arid and usually prone to frequent droughts

with only one main river. It is also very dry and receives little rain to sustain the major staple food of maize and beans and with minimal livestock rearing.

In this study children in HGSFP had better dietary diversity compared those not in the programme, school meals appear to improve the dietary diversity of school children. A study on dietary intake of school-aged children (6-19 years) in developing countries reported that dietary diversity was positively associated with improved adequacy of nutrient intake. Furthermore, varying the diet intake from the HGSFP can be a better approach in the fact that school meal provided tends to be the biggest, or even the only meal, for many schoolchildren on a given day (Walingo & Musamali, 2008, WFP, 2010) and for over 90% the school children in the ASAL relay on it (WFP, 2010).

5.0 CONCLUSION

More children in the Home Grown School Feeding Programme had consumed high diversified diet compared to those not in the programme. This significant difference could probably be as a result of the daily hot lunch ration of bean and maize mix with some oil added. The feeding programme could also have been a positive factor for the beneficiaries who almost and totally dependent on the school meal. Children not in the program could have suffered low dietary diversity because their food availability was limited by chronic droughts and rising food costs characteristics of Makueni District.

6.0 RECOMMENDATIONS

The study recommends scaling up Home Grown School Feeding programme in all schools especially in the food insecure areas and if possible vary food ingredients both within and among the different food groups purchased by the school meal management committees. This can be achieved by allocating more funds to purchase a wide range of food stock or assisting the schools with a vegetable garden project.

There also need for a longitudinal study which includes all the seasons of the year so as verify the results of this study as well as determine the sustainability of the program for a better policy formulation.

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