College of Medicine

The Impact of Demographic and Socio-economic Characteristics on Feeding and Caring Practices for Children under Two Years in Rural Malawi

By

Josephine Kalepa

BSC in Nutrition and Food science

(M201770074069)

A Dissertation Submitted in Partial Fulfilment of the Requirements of the Master of Public Health Degree

March 2020

Certificate of Approval

The Dissertation of Josephine Kalepa is approved by the Dissertation Examination Committee

_____

Associate Professor Fanuel Lampiao

(Chairman, Post Graduate Committee)

_____

Professor Kenneth Maleta

(Supervisor)

_____

Professor Peggy C. Papathakis

(Internal Examiner)

_____

Dr Charles Mangani

(Head of Department)

Declaration

I, Josephine Kalepa, hereby declare that this dissertation is my original work and has not been presented for any other awards at the University of Malawi or any other University.

Name of Candidate Josephine Kalepa

Signature _____

Date March 2020

Acknowledgements

I would like to express my gratitude to Professor Kenneth Maleta for the support and guidance throughout the research process.

A special thank you to iLiNS -DOSE Trial Project Management for their consent to use the project's data.

I would also like to take this opportunity to thank the following people who also made a contribution: Humphrey Kalepa, Jane Kalepa, Joan Kalepa, Joyce Kalepa, Jessie Kalepa, Jessie Khaki, Noel Patson and Arnold Kapachika.

Abstract

Introduction and Objectives: UNICEF conceptual framework on the causes of malnutrition shows clear link between socio-economic and demographic characteristics with inadequate dietary intake and diseases which are immediate causes of malnutrition. This study was carried out to determine the impact of caregiver's demographic and socio-economic characteristics on child dietary intake and health seeking behaviour for children less than two years in rural Malawi to inform the design of health and nutrition programs targeting rural population.

Methods: This was a cross-sectional study based on secondary analysis of data collected through International Lipid-Based Nutrient Supplements (iLiNS-DOSE) Project from June 2009 to December 2013. A total of 1932 caregivers and children were included in analysis. Logistic regression model was used to investigate the effect of socio-economic and demographic characteristics on minimum dietary diversity and care-giver's health seeking behaviour for common childhood illnesses.

Results: Only 2.5% of the children were able to meet minimum dietary diversity (≥4food groups) at 6 months. Care givers that had attained complete primary education were 2 times more likely to meet child minimum dietary diversity as compared to caregivers with no education [OR 2.5 (95% CI:0.27,24.8)]. The odds of practicing appropriate care seeking behaviour increased by 0.07 for caregivers aged 18 to 24 years [OR 1.07 (95% CI: 0.40,2.83)

Conclusion: Interventions aimed at improving the socio-economic status of rural households in Malawi can greatly improve children dietary diversity.

Table of Contents

List of tables

List of figures

Abbreviations and Acronyms

ARI	Acute respiratory infection
COMREC	College of Medicine Research Ethics Committee
CHWs	Community Health Workers
DALYs	Disability Adjusted Life Years
HFIAS	Household Food Insecurity Access scale
ICCM	Integrated community case management
ILiNS- DOSE	International Lipid - Based Nutrient Supplement
IRS	Indoor residual spraying
ITNS	Insecticide Treated Nets
MAD	Minimum acceptable diet
MDD	Minimum dietary diversity
MDHS	Malawi Demographic and Health Survey
ORS	Oral rehydration therapy
SD	Standard deviation
SUN	Scaling Up Nutrition
UNICEF	United Nations Children's Fund
URPC	University Research and Publication Committee
WHO	World Health Organization
WLZ	Weight for Length Z score

Chapter 1 Introduction and study objectives

1.1 Background and literature review

Maternal and child undernutrition is the underlying cause of 3.5 million deaths, 35% of the disease burden in children younger than 5 years and 11% of total global Disability Adjusted Life Years (DALYs) [1]. Childhood nutritional status is influenced by three broad factors: food, health and care [2]. Optimal nutritional status results when children have access to affordable, diverse, nutrient-rich food; appropriate maternal and child-care practices; adequate health services; and a healthy environment including safe water, sanitation and good hygiene practices [2]. These factors directly influence nutrient intake and the presence of disease [2]. The interaction between undernutrition and infection creates a potentially lethal cycle of worsening illness and deteriorating nutritional status[2].

Food, health and care are affected by social, economic and political factors [2]. The combination and relative importance of these factors may differ in different contexts [2]. Understanding the immediate and underlying causes of undernutrition in a given context is critical to delivering appropriate, effective and sustainable solutions and adequately meeting the needs of the most vulnerable people [2]. From a life-cycle perspective, the most crucial time to meet a child's nutritional requirements is in the first 1,000 days including the period of pregnancy and ending with the child's second birthday[2] . During this time, the child has increased nutritional needs to support rapid growth and development, is more susceptible to infections, has heightened sensitivity to biological programming and is totally dependent on others for nutrition, care and social interactions [2].

There is a direct relationship of infant and young child feeding practices and nutritional status of children under two years of age and ultimately, impact child survival [3] . Improving infant and young child feeding practices in children 0 to 23 months of age is therefore critical to improved nutrition, health and development of children [3]. Results from Malawi Demographic and Health Survey (MDHS) 2015-2016 indicate that 60% of children under six months are exclusively breastfed and that feeding practices of only 8% of children aged 6-23 months meet the minimum acceptable dietary standard [4]. The World Health Organization (WHO) minimum acceptable diet recommendation, which is a combination of dietary diversity and minimum meal frequency means feeding the child food from at least four food groups and a meal frequency of 2 times for breastfeeding infants 6 to 8 months, 3 times for breast feeding children 9 to 23 months, and 4 times for non- breast fed children 6 to 23 months [3]. In addition to minimum meal frequency and dietary diversity, other core infant and young child feeding indicators developed by World Health Organization include: early initiation of breastfeeding, exclusive breastfeeding under six months, continued breastfeeding for one year, the introduction of solid, semi-solid or soft foods and consumption of iron-rich or iron fortified foods from the age of 6 months [5]. Studies have shown that inadequate minimum acceptable diet is significantly associated with stunting [6]. A study conducted in 14 low income countries revealed that meeting the minimum acceptable was significantly associated with lower probability of stunting and underweight among children aged 6 to 23 months [6]. Dietary diversity has shown to be associated with increased nutrient adequacy [7–9] and meal frequency is proxy for energy intake from foods other than breast milk [3].

The government of Malawi launched the Scaling Up Nutrition movement (SUN) in 2011 with the goal of improving maternal and child nutrition with focus on reducing stunting [10]. Optimal

infant and young child feeding is one of the key area of focus under Scaling UP Nutrition interventions. Malawi has registered significant progress in the prevention, treatment, care, and support for malnutrition as evidenced by the reduction of stunting from 47% in 2010 to 37% in 2016 [10]. However, the prevalence of malnutrition remains high according to global standards [10] and infant and young feeding practices are one area identified to have challenges as evidenced by results from 2015 - 2016 Malawi Demographic and Health Survey that showed that only 8% of the children 6-23 months are able to meet the minimum acceptable diet.

A study conducted in 2015 in Kenya found that there was an association between caregivers socio-economic characteristics specifically education and income and child's nutritional status whereby higher underweight prevalence was observed in children whose caregivers had no education and low income compared to caregivers with secondary education and high income [11] . These results are consistent with another study by Makoka in Malawi, Tanzania and Zimbabwe; the results showed that child nutritional status significantly improved with increased levels of mother's education [12]. The analysis also showed that, after controlling for other factors, maternal education reduced the odds of stunting by 15 to 44%, wasting by 25 to 66% underweight by 22 to 55% in all three countries [12] . Despite the strong association of maternal education and child nutrition status statistical significance was only observed at higher education levels; 9years of schooling significantly improved stunting and underweight in Malawi and 11years in Tanzania and Zimbabwe [12].

Disease is another immediate cause of malnutrition and mortality among children under-five [2]. Globally, the under-five mortality rate dropped from 93 deaths per 1,000 live births in 1990 to 41 in 2016 [13] . Progress in reducing child mortality has been accelerated in the 2000–2016 period compared with the 1990s [14]. Despite the substantial progress in reducing child mortality, child

survival remains an urgent concern [14]. Sub-Saharan Africa still experiences unacceptably high child mortality rates [13]. In 2016, the region had an average under-five mortality rate of 79 deaths per 1,000 live births [13]. This translates to 1 child in 13 dying before his or her fifth birthday and this is 15 times higher than the average ratio of 1 in 189 in high-income countries [13]. To promote access to timely treatment for common conditions affecting child health, Malawi adopted the integrated community case management for childhood illnesses (ICCM) in 2007, a policy aimed at community-level treatment of malaria, diarrhoea and pneumonia for children [14].

Reviews have shown that ICCM has the potential for reducing under-five mortality [15]. However, it also critically depends on the support community health workers (CHWs) receive [15] . The availability of supplies like oral rehydration therapy (ORS), antibiotics, Zinc, insecticide treated nets (ITNs) and indoor residual spraying (IRS) but also parents awareness of the symptoms and danger signs required to seek care affect management of the ICCM program [15]. Although the organization, training and performance of CHWs is certainly critical for the success of the ICCM strategy, parental care seeking behaviour is also essential for achieving desired impacts [15]. Caregiver's health seeking behaviour is crucial to ensuring timely treatment of childhood illnesses and this in-turn has an impact on child survival [16] . Several studies have shown that poor care seeking behaviour for neonates and under-five children contribute to high mortality rate [16,17].

According to Malawi Demographic and Health Survey 2015-2016, children are less likely to be taken for advice or treatment if their mothers have no education (58%), compared to children whose mothers have a primary (68%) or secondary education (65%)[4] . Several studies have

established that place of residence, educational status of care givers, age of care givers, distance of the health facility, availability of private drug shop owners/pharmacies, wealth index, sources of health information, and perceived illness severity are crucial predictors of caregivers health seeking behaviours for childhood illnesses [18–23]. This study will therefore elucidate the association of demographic and socio-economic factors on care givers health seeking behaviours for common childhood illnesses in rural areas. It will also look at those factors in relation to dietary intake. Results from this study will provide important information in understanding the association of demographic and socio-economic characteristics on feeding and caring practices for children less than two years in rural Malawi which can be used for tailoring related interventions to achieve maximal impact.

1.2 Statement of the Problem

According to the UNICEF conceptual framework on the causes of malnutrition, there is clear link between socio-economic characteristics and child caring practices such that the socio-economic and demographic factors lead to inadequate dietary intake and diseases which are immediate causes of malnutrition [2]. Despite this clear link, there is limited population data on the extent to which the factors affect feeding and caring practices for children under two years, particularly in rural Malawi.

1.3 Justification of the study

Effective nutrition specific interventions have a direct impact on prevention and treatment of undernutrition. However, for interventions to work they have to be context-specific so that the intervention design directly addresses issues that are more likely to impact child nutrition in that context [2]. Generic nutrition interventions developed for wider audiences may be less applicable to certain population sub-groups, hence the need to understand sub-population factors that may

influence nutrition and care seeking behaviours amongst care takers of children between 6-23months. Therefore, this study was undertaken to elucidate how demographic and socio-economic characteristics affect infant feeding and care seeking practices in rural Malawi so that interventions can be population tailored to achieve maximal impact.

1.4 Objectives of study

1.4.1 Broad objectives of study

To determine the impact of caregiver's demographic and socio-economic characteristics on feeding and care practices for children under- two years in rural Malawi.

1.4.2 Specific objectives

1. To determine the relationship between caregiver's demographic and socio-economic characteristics and child dietary intake in rural Malawi.

2. To determine the relationship between caregiver's demographic and socio-economic characteristics and caregiver's health seeking behaviour for infant and child morbidity in rural Malawi.

Chapter 2 Methodology

2.1 Type of research study

A quantitative, cross-sectional study was carried out using existing data from iLiNS- DOSE project.

2.2 Study place

ILiNS-DOSE project was conducted in the Mangochi district; rural Malawi. The project was carried out in the catchment areas of the Mangochi district hospital and Namwera, a government health centre in Mangochi district, southern Malawi. Mangochi district hospital outpatient clinic served an estimated population of 72,000 while Namwera health centre served approximately 22, 000 people. The hospital catchment area was partly semi-urban, as it is the headquarters of the district, while Namwera was predominantly rural. Both sites were serviced by all-weather roads. The population was mostly Chiyao speaking and subsisted largely on farming and fishing. According to the recent Malawi demographic and health survey, the proportion of children meeting the minimum acceptable diet for children aged 6 to 24 months is estimated at 6.4%; this is lower than the national proportion estimated at 8% [4].

2.3 Study population

Data was based on a population-based cohort study that sought to test the impact of different formulations and doses of Lipid based nutrient supplements (LNS) on linear growth. In the primary study, children were supplemented with LNS and data on anthropometry, baseline characteristics, morbidity , and infant feeding practices (at 6,12, 24 and 36 months) were collected. In the original study, the inclusion criteria included: signed informed consent from at least one guardian, age: 5.50 months to 6.49 months, availability during the period of the study,

permanent resident of Mangochi District Hospital or Namwera health centre catchment area. The exclusion criteria included: Weight for Length Z score (WLZ) < 2.0, presence of oedema, severe anaemia (Hbf<50 g / l), severe illness warranting hospital referral, history of allergy towards peanut, history of anaphylaxis or serious allergic reaction to any substance, requiring emergency medical care, and concurrent participation in any other clinical trial. This secondary analysis used the same inclusion and exclusion criteria as the original study.

2.4 Study period

The main study was conducted over 3.5 years; June 2009 to December 2013. This secondary analysis took 12 months (August 2018 to August 2019), including proposal preparation, data extraction and analysis, and report writing up to dissemination.

2.5 Sample size

The secondary analysis sample size was based on data from 1932 participants. The sample size was calculated using Cochran formula: $n = Z^2pq/d^2$ [24]. Where n was sample size, Z was 1.96 (the statistic for level of confidence), p was 0.08; derived from an estimate of proportion of children aged 6–23 months who met minimum acceptable diet in 2016 in Malawi according to demographic and health survey [4], q was 1-p, and d was the desired level of precision which was 0.05. The sample size computations showed that 113 participants would be enough to discard the hypothesis at 95% confidence and 90% power. This being a secondary analysis all individuals with baseline socio-economic and demographic data and child feeding and care seeking data were included.

2.6 Data collection

The study used existing data collected from International Lipid-Based Nutrient Supplements (iLiNS) Project, iLiNS-DOSE The project collected data on the following variables: age of care

giver, caregiver marital status, household income, household size, and caregiver's education background, child dietary intake and child's morbidity. The secondary analysis used the following explanatory and response variables:

Explanatory variables

Demographic characteristics

i. **Age** – Care giver's age in years categorized into four; 18 to 25 years, 25 to 35 years, 35 to 49 years and 50 years and above.
ii. **Marital status** – State of being married or not. Marital status was categorized as follows; single, married, divorced, widowed and not known.
iii. **Household size** – Number of persons in the household. In reference to 2015- 2016 MDHS average household size for Malawi is 4.5 members [4]; using this household size was categorized into two; < 5 members and ≥5 members.

Socio economic characteristics:

i. **Income** – Household income diversity and food security situation. Data was collected on household earnings encompassing rain-fed crop sales, dry season crop sales, tree crop production sales, livestock production sales, household enterprises, savings interest or investment and gifts but also information on household food security. Income was measured in two dimensions; household income diversity and household food insecurity situation using the Household Food Insecurity Access Scale (HFIAS). Household income diversity was measured as follows: 0 source, 1 source, 2 sources, 3 sources, 4 sources, 5 sources, and greater than 5 sources. Household Food Insecurity Access Scale (HFIAS) was categorized as follows:

1) food secure, 2) mildly food insecure, 3) moderately food insecure and 4) severely food insecure [25].

ii. **Education** – level of education attained through formal education system. Education was classified into four categories; none, incomplete primary, complete primary, incomplete secondary, complete secondary.

Response variables

i. **Child dietary intake**

Child dietary intake was measured using dietary diversity. Dietary diversity was measured as minimum dietary diversity and individual dietary diversity score using data collected through food frequency questionnaire. The data was collected by trained Research Assistants. Seven food groups were used to tabulate dietary diversity which included: 1) grain, roots and tubers, 2) legumes and nuts, 3) dairy products (milk, yogurt, cheese), 4) flesh foods (meat, fish, poultry and liver/organ meats) 5) eggs, 6) vitamin-A rich fruits and vegetables and 7) other fruits and vegetables. Minimum dietary diversity was defined as the proportion of children, 6–23 months of age, who received foods from 4 or more food groups in the previous day; whilst individual dietary diversity score (IDDS) was calculated for each child at 6, 15 and 18 months based on consumption over a period of seven (7) days as follows: child who had consumed foods from a particular food group for more than five days in the past week was scored 1and they received a score of 0 if they ate from a particular food group less than five times in the past 7 days. The total number of scores each child had received was added up to equal their individual dietary diversity score. The highest dietary diversity score possible was 7. The reference period was chosen according to Food and Agriculture Organization (FAO) guidelines for measuring household and individual dietary diversity [26].

ii. **Health seeking behaviour**

Health seeking behaviour was measured using morbidity data for common childhood illnesses (Acute Respiratory Infection, fever and diarrhoea) collected at first home visit. In the Original study morbidity data was collected at several time points; the present study used the time point with the highest cases. Appropriate care seeking for under-five health care services is defined as seeking care from a health provider within 24hours of onset of childhood symptoms [27]. In this study, appropriate health care seeking behaviour was defined as care sought from qualified medical professionals in government health facilities and private clinics whilst inappropriate health care seeking was defined as other types of care such as purchasing medicines from the pharmacy, home remedies, temples, and traditional healers.

2.7 Data Management and analysis

A copy of original data with variables for this secondary analysis was created in a separate workbook in Stata. Data were cleaned and analysed using Stata version 14.0 (Stata Corp, Texas, and USA). Frequency distribution tables were used to summarize categorical variables. Means and standard deviation (SD) were computed for continuous variables and percentages were computed for categorical variables. Pearson chi-square and Fisher's exact test were used for testing association between the binary outcome and the explanatory variables.

Univariate and multivariate logistic regression models were used to determine the effect of care giver's demographic characteristics (caregiver's age, marital status and household size) and socio-economic characteristics (income and education) on child dietary intake and health seeking behaviour.

2.8 Ethical Considerations

The primary data was collected following ethical approval by COMREC, protocol approval number P.01/09/722 originally approved on August 5th, 2009 and consent was obtained from the participants (see form 10). For the secondary analysis, de-identified participants data was used. The objectives of this analysis were submitted to COMREC for approval of the secondary data analysis and approval was provided (P.10/18/2489) . The secondary analysis did not generate results that were immediately usable by individual participants hence no consent was sought from original trial participants to utilize their secondary data.

Chapter 3 Results

3.1 Socio-economic and demographic characteristics of respondents at baseline

Data was collected from 1932 caregivers; of the 1932 participants included in the study the mean age at study entry of the caregivers was 29.6 years (SD: 17.4) and 638 (33.0%) of the caregivers were between the age of 18 and 24. Among the 1932 children enrolled in the cohort study, 969 (50.2%) were males whilst 963 (49.8%) were females. Majority (70.2%) of the caregivers were married, and 56.2% had attained incomplete primary education. The mean household size of the study participants was 5.7 (SD: 5.6) and more than half of the households (66.87%) had a household size of greater than 5 members. In general, 40.0% of the households were severely food insecure. Table 1 gives the background characteristics of the participants

Table 1: Baseline Socio-economic and Demographic Characteristics of Respondents

Variable	Frequency (N=1932)	Percentage
Care giver's age		
18-24	638	33.0
25-34	616	31.9
35-49	158	8.2
≥50	446	23.1
Not known	74	3.8
Care giver's marital status		
Single	71	3.7
Married	1357	70.2
Divorced	115	6.0
Widowed	16	0.8
Not known	373	19.3
Household size		
<5	642	33.2
≥5	1290	66.8
Care giver's education		
None	334	17.2
Incomplete primary	878	45.5
Complete primary	139	7.2

Incomplete secondary	144	7.5
Complete secondary	70	3.6
Missing	367	19.00
Household income		
0	276	14.3
1	109	5.6
2	46	2.4
3	20	1.0
4	5	0.3
Missing	1476	76.4
Household food security		
Food secure	310	16.1
Mildly food insecure	111	5.8
Moderately food insecure	313	16.2
Severely food insecure	772	40.0
Missing	426	22.0

3.2 Level of dietary diversity and health seeking behavior

The proportion of children that met minimum dietary diversity at 6months (consumption of foods from ≥ 4 food groups) was 2.5%, children had inadequate dietary diversity as shown in figure 1. According to caregivers 7 days recall, the most consumed food group on daily basis by infants at 6 months was grain, roots and tubers (76.8%) whilst daily consumption of legume and nuts, dairy products, flesh foods, vitamin A rich fruits and vegetables was low. . Table 2 gives detailed frequency consumption of foods from the 7 food groups over the past seven days for infants at 6 months.

Overall there was an increase in dietary diversity from 6 months and the period between 12 to 17months as shown in table 3; the mean Individual dietary diversity score at 6 months was 1.1 (SD: 0.6), 2.9 at 15 months (SD: 1.2) as shown in table 3. A slight drop in dietary diversity was observed between the age ranges of 18 to 24 months. Comparison of child individual dietary

diversity score at different ages included 320 children from the control group that did not receive any food supplements from the iLiNS project.

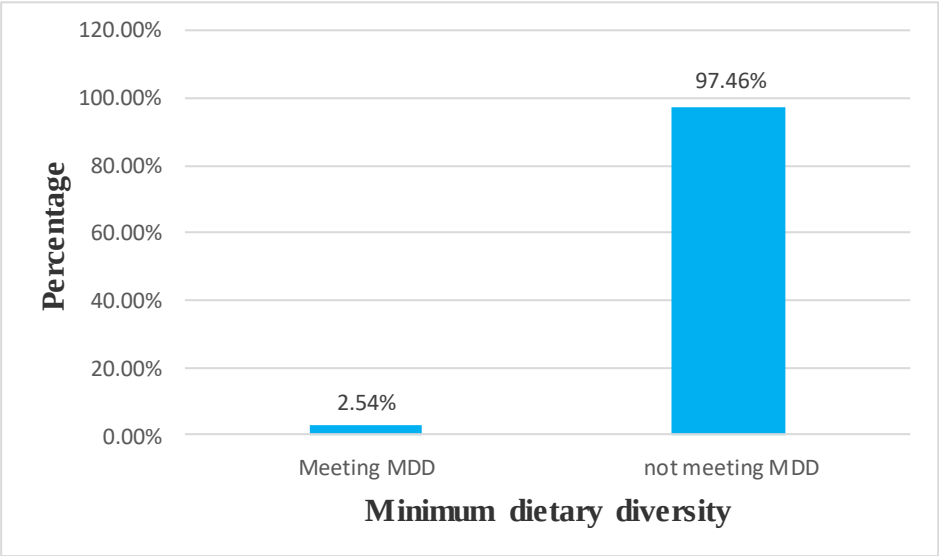

Figure 1: Prevalence of Minimum Dietary Diversity among Children at 6 Months

Table 2: Frequency of Consumption of Foods in the Previous Week by Children at 6 months

Food group	Frequency of consumption per week (N =1932)			
	Never	1-2 times	3- 5 times	6-7 times
Grain, roots and tubers	155 (8.0%)	82 (4.2%)	212 (11.0%)	1483 (76.8%)
Legumes and nuts	1759 (91.0%)	91 (4.7%)	38 (2.0%)	44 (2.3%)
Dairy products	1666 (86.2%)	109 (5.6%)	64 (3.3%)	93(4.8%)
Flesh foods	1816 (94.0%)	64 (3.3%)	32 (1.7%)	20 (1.0%)
Eggs	1896 (98.0%)	28 (1.5%)	7 (0.4%)	1(0.1%)
Vitamin A rich fruits and vegetables	1812 (93.8%)	74(3.8%)	31 (1.6%)	15 (0.8%)
Other fruits and vegetables	1642 (85.0%)	133 (6.9%)	116 (6.0%)	41(2.1%)

Table 3: Individual Dietary Diversity Scores of Children at 6, 15 and 18 months

Scores	Age groups		
	6-11months N = 320 N (%)	**12- 17 months N = 216 N (%)**	**18-24 months N= 244 N (%)**
0	57 (17.8%)	1 (0.5%)	4 (1.6%)
1	231 (72.2%)	17 (1.4%)	17 (7.0%)
2	24 (7.5%)	57 (26.4%)	86 (35.2%)
3	7 (2.2%)	95 (44.0%)	88 (36.07%)
4	1 (0.3%)	30 (13.9%)	41 (16.8%)
5	0	10 (4.6%)	7 (2.9%)
6	0	1 (0.5%)	1 (0.4%)
7	0	5 (2.3%)	0
Mean IDD	1.0 (SD: 0.6)	2.9 (SD: 1.2)	2.7 (SD:1.0)

3.3 Health seeking behaviour

Of the 1932 children included in analysis, 157 children reported to have had either diarrhoea, fever or acute respiratory infection in the past week during the first home visit. Figure 2 shows care seeking behaviour practiced by caregivers in the incidence of common childhood illnesses.

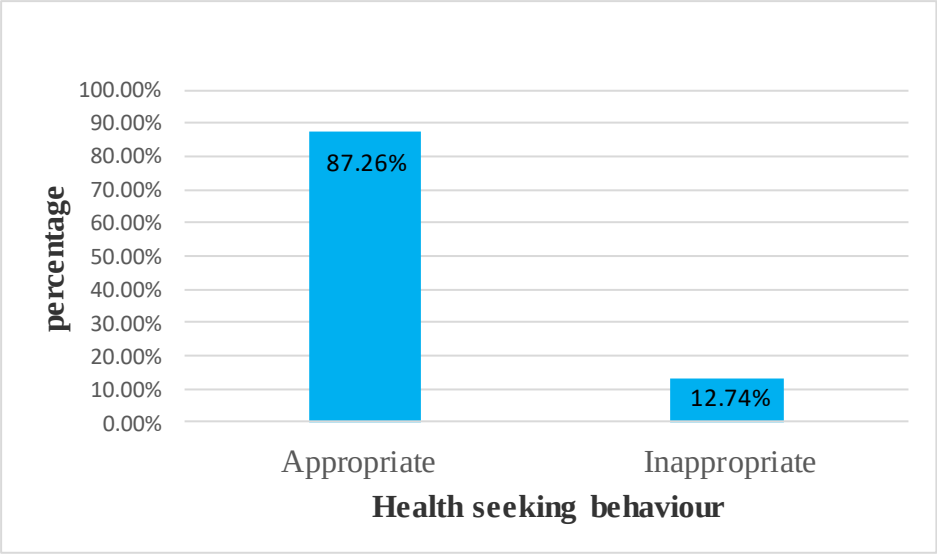

Figure 2: Caregivers Health Seeking Behaviour for Common Childhood Illnesses at 6months

3.4 Univariate association of dietary diversity with demographic and socio-economic factors

1858 participants were included for analysis. Overall none of the demographic factors had a significant association with child's minimum dietary diversity at 6 months, (P> 0.05) as shown in table 4. However the odds of meeting child minimum dietary diversity was 2 times for caregivers that were single as compared to married care givers [OR 2.11 (95% CI:0.46,9.56]. Children from a household size of greater than 5 members were more likely to meet minimum dietary diversity compared to children from household size of less than 5 members [OR 1.13 (95% CI: 0.61,2.09)].

Among the socio-economic characteristics in unadjusted analysis; household food insecurity was found to have a significant association with child minimum dietary diversity. Moderate food insecurity decreased the odds of a child meeting minimum dietary diversity by 66% [OR 0.34

(95% CI: 0.12, 0.96)]. On the other hand there was no statistical significance of care-givers education on child minimum dietary diversity, however having complete primary increased the odds of meeting minimum dietary diversity [OR 2.08 (95% CI: 0.23,18.98)]. Household income diversity was excluded from the analysis due to 75% missing variables.

Table 4: Unadjusted Association between Demographic and Socio-economic Characteristics and Minimum Dietary Diversity at 6 months

	Child dietary intake				
Variable	**Meeting minimum dietary diversity**	**Not meeting minimum dietary diversity**	**Odds ratio**	**95% CI**	**P-Value**
	N (%)	**N (%)**			
Care givers age					
18 -24	17(34.7)	621 (34.3)	0.87	0.38,2.03	0.76
25 – 34	18 (36.7)	598 (33.1)	Ref		
35 – 49	3 (6.1)	155 (8.5)	0.28	0.36,2.20	0.23
≥50	11 (22.5)	435 (24.1)	0.65	0.24,1.76	0.40
Marital status					
Single	2 (5.0)	69 (4.5)	2.11	0.46,9.56	0.33
Married	37 (92.50)	1320 (86.9)	Ref		
Divorced	1 (2.5)	144 (7.5)	0.63	0.82,4.79	0.65
Widowed	Empty	16 (1.1)	1		
Household size					
<5	15(30.61)	627 (33.30)	Ref		
≥5	34 (69.39)	1256 (66.70)	1.13	0.61,2.09	0.70

Caregiver education					
None	5 (12.5)	329 (21.6)	0.26	0.22,3.0	0.28
Incomplete primary	22 (55.0)	856 (56.1)	0.85	0.10,6.83	0.88
Complete primary	7 (17.5)	132 (8.7)	2.08	0.23,18.98	0.52
Incomplete secondary	5 (12.5)	139 (9.1)	1.67	0.18,15.85	0.66
Complete secondary	1 (2.5)	69 (4.5)	Ref		
Household food security					
Food secure	14 (36.8)	296 (20.1)	Ref		
Mildly food insecure	1 (2.6)	110 (7.5)	0.19	0.02,1.48	0.11
Moderately food insecure	5 (13.2)	308 (21.0)	0.34	0.12,0.96	0.04
Severely food insecure	18 (47.4)	754 (51.4)	0.50	0.25, 1.03	0.06

Logistic regression

OR: Odds ration
CI: Confidence interval

3.5 Multivariate association of dietary diversity with demographic and socio-economic factors

All the demographic factors were dropped in multivariate analysis as no statistical significance was observed in univariate analysis. The multivariate analysis included data for 1565participants. In multivariate analysis, both caregiver's education status and household food security situation did not have a significant association with child's minimum dietary diversity, (P>0.05).

However, children from caregivers with complete primary education were ere more likely to meet minimum dietary diversity compared to children from caregivers with no education; odds of meeting child's minimum dietary diversity was 2 times for care givers with complete primary. Moderate food insecurity decreased the odds of meeting minimum dietary diversity 87%.

Table 5: Adjusted Association between Socio-economic Characteristics and Minimum Dietary Diversity at 6 months

	Child dietary intake		
Variable	**Odds ratio**	**95% CI**	**P-Value**
Care giver education			
None	0.31	0.25,3.80	0.36
Incomplete primary	0.89	0.10,7.73	0.92
Complete primary	2.5	0.27,24.8	0.41
Incomplete secondary	1.7	0.17,18.70	0.64
Complete secondary		Ref	
Food security			
Food secure	Ref		
Mildly food insecure	empty		
Moderately food insecure	0.13	0.02,1.12	0.064
Severely food insecure	0.95	0.36,2.55	0.931
Logistic regression			
OR: Odds ratio CI: Confidence interval			

3.6 Univariate association of health seeking behavior with demographic and socio-economic factor

Univariate analysis was based on data for 157 participants that experienced either diarrhoea, fever or acute respiratory infection during the first home visit, both demographic and socio-economic factors did not have any significant effect on care giver health seeking behaviour, ($P > 0.05$). However, caregivers within the age range of 18 to 24 years were more likely to practice appropriate health seeking behaviour as compared to caregivers that were between 25 to 35 years; [OR1.7 (95% CI: 0.40, 2.83)]. Divorced care givers were more likely to practice appropriate health seeking behaviour compared to married care givers; [OR 1.58 (95% CI: 0.19, 13.09)]. Household size of 5 members and above increased the odds of practicing appropriate health care seeking by 32 % [OR 1.32 (95% CI: 0.50, 3.45)] as shown in table 6.

Despite the insignificant association of socio-economic factors with health seeking behaviour, food insecure households had the higher odds of practicing appropriate health seeking behaviour as compared to food secure households. The odds of practicing health seeking behaviour were higher in moderate food insecure households [OR 3.81 (95% CI: 0.68, 21.48)]. Household income diversity was excluded from analysis to 50% missing variables.

Table 6: Unadjusted Association between Demographic and Socio-economic Characteristics and Health Seeking Behaviour

	Health seeking behaviour				
Variable	**Appropriate health seeking behaviour** N (%)	**Inappropriate health seeking behaviour** N (%)	**Odds ratio**	**95% CI**	**P-Value**
Care giver's age					
18-24	58 (43.28)	10 (52.63)	1.07	0.40,2.83	0.90
25-34	49 (36.70)	9 (47.37)	Ref		
35- 49	13 (9.70)	0 (0.00)	Empty		
≥50	14 (10.45)	0 (0.00)	empty		
Marital status					
Single	4 (3.13)	1 (5.00)	0.63	0.07,5.97	0.69
Married	114 (89.66)	18 (90.00)	Ref		
Divorced	10 (7.81)	1 (5.00)	1.58	0.19,13.09	0.67
Household size					
<5	46 (33.58)	8 (40.00)	Ref		
≥5	91 (66.42)	12(60.00)	1.32	0.50,3.45	0.57
Care giver education					
None	24 (18.75)	5 (25.00)	1.92	0.29,12.86	0.50
Incomplete primary	72 (56.25	8 (40.00)	3.6	0.60,21.67	0.16
Complete primary	12 (9.38)	1 (5.00)	4.8	0.35,65.7	0.24

Incomplete secondary	15 (11.72)	4 (20.00)	1.5	0.21,10.82	0.69
Complete secondary	5 (3.91)	2 (10.00)	Ref		
Household food security					
Food secure	21 (17.36)	5 (25.00)	Ref		
Mildly food insecure	6 (4.96)	1 (5.00)	1.43	0.14,14.70	0.77
Moderately food insecure	32 (26.45)	2 (10.00)	3.81	0.68,21.48	0.13
Severely food insecure	62 (51.24	12 (60.00)	1.2	0.39,3.90	0.73

Logistic regression

OR: Odds ratio
CI : Confidence interval

3.7 Multivariate association of health seeking behaviour with demographic and socio-economic factors

The analysis was based on data from 118 participants. Demographic factors showed no statistical significance on health seeking behaviour. However, care givers aged 18 to 24 years were 2 times more likely to practice appropriate health care seeking behaviour as compared to caregivers within the age range of 25 to 35 years. The odds of practicing appropriate health seeking behaviour increased by 22% for caregivers that were single as compared to married caregivers. Household size of greater than 5 members decreased the odds of appropriate care seeking by 33%. Socio-economic factors were not included in the multivariate analysis due to 85% missing variables that lead to imprecision of results.

Table 7: Adjusted Association between Demographic Characteristics and Health-Seeking Behaviour

	Health seeking behaviour		
Variable	**Odds ratio**	**95% CI**	**P-Value**
Care giver's age			
18 -24	2.09	0.49,8.93	0.32
25 – 34	Ref		
35 – 49	empty	1	
≥50	empty	1	
Marital status			
Single	1.22	0.11,13.59	0.87
Married	Ref		
Divorced	empty	1	
Household size			
<5	Ref		
≥5	0.67	0.15,3.05	0.60

Logistic regression

OR: Odds ratio
CI : Confidence interval

Chapter 4 Discussion

This study investigated the effect of demographic and socio-economic factors on child dietary diversity and care givers health seeking behaviour for common childhood illnesses. Study findings showed that diet of majority of the children lacked diversity at 6 months; only 2.5% met minimum dietary diversity. Overall daily consumption of legume and nuts, dairy products, flesh foods, vitamin A fruits and vegetables, other fruits and vegetables was very low at 6 months; an increase was observed at 15 months and a slight drop at 18 months. Minimum dietary diversity reflects the quality of food given to children [28] hence the higher the diversification, the higher the likelihood of a child meeting their nutrient requirement [28]. A study conducted in Benin revealed a positive association between minimum dietary diversity with child's age such that dietary diversity increased with increase in child's age [28]. The findings obtained in the present study were expected considering the fact that 6 months is the beginning of introducing semi solid and solid foods, however in most cases children are provided with foods from the grain, roots and tubers only as such their diet lack diversity and may not be sufficient to meet their nutrient requirement. Two studies in Benin and Tanzania also found low minimum dietary diversity among children aged 6 to 11 months as compared to children between 12 to 23 months which increased their risk of being underweight [28,29].

This is clear evidence of the need to improve the quality of food provided to children at initiation of complementary feeding to ensure that they meet their nutrient requirement. Participation of caregivers in cooking demonstrations has proven to improve the provision of diversified diet to children by providing caregivers with hands on experience in preparation of nutritious diets using locally available recipes [30]. Furthermore access to home gardens and ownership of small livestock have be associated with high dietary diversity among rural households [31].

Using caregiver's age as a predictor for child's minimum dietary diversity, the study found that caregiver's age was not significantly associated with child's minimum dietary diversity. However, children from caregivers between the age range of 25 to 34 years old met minimum acceptable diet compared to children with caregivers with the age range of 18 to 24, 35 to 49 and ≥ 50 years old . These results are consistent with a study conducted in Pakistan where children from mothers between the age range of 25 to 34 were more likely to meet minimum acceptable diet compared to children from care givers that were 36 years old and above [32]. This could be due to the fact that caregivers between the age range of 25 to 34 years old may be experienced in feeding compared to younger care givers (18 to 24 years old) and as the age increases caregivers are less active in ensuring appropriate feeding as the responsibility is left to older siblings .

Children from food secure households were more likely to meet minimum dietary diversity as compared to food insecure households. Food insecurity limits the access to appropriate dietary diversity such that households may be forced to consume same type of foods. Strengthening the link between agriculture and dietary diversity can be proposed as one of the solutions to improve infant and young child nutrition [28]. Completing primary school alone was another important predictor that the study found had an effect on child's minimum diversity. Children with caregivers that had attained complete primary were more likely to meet minimum dietary diversity as compared to children whose care givers had no education. There is evidence in literature that suggests attainment of formal education by care givers has a positive impact on child feeding [30]. This is supported by the fact that caregivers education has a strong role in increasing confidence and command over resources including adherence to appropriate infant and young child feeding [30,33]. Education is a proxy for socio-economic wellbeing such that

caregivers with better education tend to have more work opportunities and wealth as compared to those with lower education and this increases their purchasing power hence it is easy practice diversification [30].

This study revealed that majority (87.26%) of the care givers practiced appropriate health-seeking behaviour for childhood illness from the health facility or private clinic. The study further found that caregiver's age, caregiver's marital status, caregiver's education status and household food insecurity situation were not statistically significant with caregiver's health seeking behaviour for common childhood illnesses. Despite this finding, younger caregivers (18 to 24 years old) were more likely to practice appropriate health seeking behaviour as compared to caregivers within the age range of 25 to 34 years old. The reason for this may be the fact that the experience of such illnesses may be new to younger caregivers' on the other hand older caregivers may utilize alternative treatments obtained from previous exposure and experience.

Using food security as proxy for household economic status, there was no association between food security and appropriate health seeking behaviour. Review of literature has demonstrated positive effect of the increase in income with health seeking behaviour with a comparison of rural and urban area where by care seeking was high in the urban area as compared to rural area [34,35]; these two studies conducted were a comparison of rural and urban area. The present study did not find any association between economic status and health seeking behaviour; similar findings were reported in another study in rural Ethiopia where household monthly income had no significant association on caregiver's health seeking behaviour [36]. This shows that caregivers in rural areas do seek care for child illness irrespective of economic status.

The present study had the following limitations and strengths: it was a cross- sectional study hence the associations made were estimations rather than causality, data were obtained based on caregiver recall hence bringing concerns of bias. However, the strength of this study is that sample size calculation was based on 90% power to detect the impact of caregiver's demographic and socio-economic factors on child dietary intake and heath seeking behaviour in rural Malawi which is adequate to determine statistical significance making the results obtained from this study reliable to be generalized to the rural population of Malawi.

Chapter 5 Conclusion and Recommendation

5.1 Recommendations

This study has highlighted some of the demographic and socio-economic factors that have influence on child dietary intake for children under two in rural Malawi; evidence demonstrated in this study could be used to design health and nutrition programs that meet the needs of the rural population. Nutrition programs aimed at improving Infant and young child feeding and health in rural areas should include interventions such as diversified food production, economic empowerment, hands on experience in preparation of nutritious diets and targeted educational messages to improve access to diverse nutritious foods.

5.2 Conclusion

There was no significant association between demographic factors and socio- economic factors with child's minimum dietary diversity. However, caregiver's age, household size of greater than 5 members, and caregiver's education status were positively associated with child's minimum dietary diversity. Overall, caregivers practiced appropriate health care seeking behaviour for common childhood illnesses. Younger caregivers (18 to 24) were more likely to seek care compared to other caregivers.

References

1. Bravi F, Wiens F, Decarli A, Pont AD, Agostoni C, Ferraroni M. Impact of maternal nutrition on breast-milk composition : a systematic review 1 , 2. Am J Clin Nutr. 2018;104(May):646–62.

2. UNICEF. Improving child nutrition: The achievable imperative for global progress. .Division of Communication, UNICEF. 2013 [Accessed 10 March 2018]. Available from: https://www.unicef.org/publications/index_68661.html

3. WHO/UNICEF. Indicators for assessing infant and young child feeding practices. 2010 [Accessed 15 May 2018]. Available from: https://www.who.int/nutrition/publications/infantfeeding/9789241599290/en

4. Office NS. Malawi Demographic and Health Survey. Natl Stat Off DHS Progr. 2016 [Accesed 10 March 2018]. Available from: http://dhsprogram.com/pubs/pdf/FR319/FR319.pdf

5. World Health Organisation. Indicators for assessing infant and young child feeding practices. 2010.

6. Marriott BP, White A, Hadden L, Davies JC, Wallingford JC. Original Article World Health Organization (WHO) infant and young child feeding indicators : associations with growth measures in 14 low-income countries. Matern Child Nutr. 2015;8:354–70.

7. Moursi MM, Arimond M, Dewey KG, Tre S, Ruel MT, Delpeuch F. Dietary Diversity Is a Good Predictor of the Micronutrient Density of the Diet of 6- to. J Nutr. 2008;138(July):2448–53.

8. Potts AC and Potts CS. An Assessment of Dietary Diversity and Nutritional Status of Preschool Children. J Food Nutr Sci. 2014;2(7):1–4.

9. Bandoh DA, Kenu E. Dietary diversity and nutritional adequacy of under-fives in a fishing community in the central region of Ghana. BMC Nutr. 2017;3(2):1–6.

10. Government of Malawi Department of Nutrition H and Aid. National Multi-Sector Nutrition Policy 2018 -2022. 2018.

11. Ndambuki SK. Caregiver Feeding practices and Socio-economic factors that influence the nutrition status of children under-five in Mlolongo, Kenya. 2015;42–57.

12. Makoka D. DHS working paper; The Impact of Maternal Education on Child Nutrition : Evidence from. 2013;(February):15–22.

13. UN Inter-agency Group for Child Mortality Estimation' UNCF. Levels & Trends in Child Mortality: Report Estimates. 2017;1–5.

14. Banda H, Namakhoma I. Integrated community case management in Malawi : an analysis of innovation and institutional characteristics for policy adoption. Health Policy Plan. 2015;30:74–83.

15. UNICEF. Integrated Management of Childhood Illness (IMCI) in the 21st Century. 2016.

16. Geldsetzer P, Williams TC, Kirolos A, Mitchell S, Ratcliffe LA, Kohli-lynch MK, et al. The Recognition of and Care Seeking Behaviour for Childhood Illness in Developing Countries : A Systematic Review. PLoS One. 2014;9(4).

17. Herbert HK, Lee ACC, Chandran A, Rudan I, Baqui AH. Care Seeking for Neonatal Illness in Low- and Middle-Income Countries : A Care Seeking for Neonatal Illness in Low- and Middle- Income Countries : A Systematic Review. PLos Med. 2012;9(3):1–15.

18. Orora CN, Obiri JF, Ombachi NK. Health Seeking Behaviour Determinants among Caregivers of Children Facing Diarrhoea in Homabay County , Kenya. Int J Soc Sci Humanit Res. 2017;5(3):223–36.

19. Aigbokhaode AQ, Isah EC, Isara AR. Health seeking behaviour among caregivers of under-five children in Edo. SEEJPH. 2015;(41):1–10.

20. Olanrewaju DM. Socio-demographic Factors and Appropriate Health Care-seeking Behavior for Childhood Illnesses. J Trop Pediatr. 2010;56(6):379–85.

21. Simieneh MM, Mengistu MY, Gelagay AA, Gebeyehu MT. Mothers ' health care seeking behavior and associated factors for common childhood illnesses , Northwest Ethiopia : community based cross-sectional study. BMC Health Serv Res. 2019;4:1–7.

22. Baba M, Ajoke Z. A cross-sectional survey of parental care-seeking behavior for febrile illness among under-five children in Nigeria. Alexandria J Med. 2017;53(1):85–91.

23. Sisay S, Endalew G, Hadgu G. Assessment of Mothers / Care Givers Health Care Seeking Behavior for Childhood Illness in Rural Ensaro District , North Shoa Zone , Amhara Region , Ethiopia 2014. Glob J Life Sci Biol Res. 2015;1(1):20–34.

24. Cochran WG. Sampling techniques 2. 2nd ed. Newyork: John Wiley and Sons Inc; 1963.

25. Coates, Jennifer AS and PB. Household Food Insecurity Access Scale (HFIAS) for Measurement of Household Food Access: Indicator Guide (v. 3). Washington, D.C: Food and Nutrition Technical Assistance Project, Academy for Educational Development,; 2007. p. 10–22.

26. Organisation F and A. Guidelines for measuring household and individual dietary diversity. Kennedy G, Ballard T, Dop M E, editor. 2011. p. 53.

27. Organisation WH. Counsel the mother: management of childhood illnesses. Geneva; 1997.

28. Mitchodigni IM, Hounkpatin WA, Ntandou-bouzitou G. Complementary feeding practices : determinants of dietary diversity and meal frequency among children aged 6 – 23 months in Southern Benin. Food Secur. 2017;9:1117–30.

29. Victor R, Baines SK, Agho KE, Dibley MJ. Original Article Factors associated with inappropriate complementary feeding practices among children aged 6 – 23 months in

Tanzania. Matern Child Nutr. 2014;10(Who 2000):545–61.

30. Dangura D, Gebremedhin S. Dietary diversity and associated factors among children 6-23 months of age in Gorche district , Southern Ethiopia : Cross-sectional study. BMC Pediatr [Internet]. 2017;17(6):1–7. Available from: http://dx.doi.org/10.1186/s12887-016-0764-x

31. Taruvinga A, Muchenje V, Mushunje A. Determinants of rural household dietary diversity : The case of Amatole and Nyandeni districts , South Africa. Int Jouranal Dev Sustain. 2013;2(4):2233–47.

32. Khan GN, Ariff S, Khan U, Habib A, Umer M, Suhag Z, et al. Determinants of infant and young child feeding practices by mothers in two rural districts of Sindh , Pakistan : a cross-sectional survey. Int Breastfeed J. 2017;12(40):1–8.

33. Mekbib E etal. Magnitude and factors associated with appropriate complementary feeding among mothers having children 6 - 23 months of age in northern Ethiopia: a community based cross- sectional study. J Food Nutr Sci. 2014;2:36–42.

34. Sreeramareddy CT, Sathyanarayana TN, Kumar HNH. Utilization of Health Care Services for Childhood Morbidity and Associated Factors in India : A National Cross-Sectional Household Survey. 2012;7(12):30–4.

35. Alene M, Yismaw L, Berelie Y, Kassie B. Health care utilization for common childhood illnesses in rural parts of Ethiopia : evidence from the 2016 Ethiopian demographic and health survey. BMC Public Health. 2019;19(57):1–12.

36. Kolola T, Gezahegn T, Addisie M. Health Care Seeking Behavior for Common Childhood Illnesses in Jeldu District , Oromia Regional State , Ethiopia. PLoS One. 2016;11(10):1–11.

Appendices

Appendix 1: Data extraction tool

Country	Survey/module	Variable names/questions from survey	Time point(s)
Demographic characteristics			
Malawi	iLiNS Dyad Trial, Form 00 (2.4)	Age of child	Enrolment
Malawi	pilins Dyad Trial, Form00 (2.5)	Sex of child	Enrolment
Malawi	iLiNS Dyad Trial, Form 19a (2.5, 2.6, 2.7, 2.21, 2.22,2.23)	Care giver's Age	1s, SES visit
Malawi	iLiNS Dyad Trial, Form 19a (2.9)	Marital status of care giver	1s, SES visit
Malawi	iLiNS Dyad Trial, Form 19a (2.34)	Number of persons in the household	1s, SES visit
Socio-economic Characteristics			
Malawi	iLiNS Dyad Trial, Form 19a (2.11, 2.12)	Highest level of education attained by the care giver	1s, SES visit
Malawi	iLiNS Dyad Trial, Form 14(2.1 to 4.1)	Food security	1s, SES visit
Malawi	iLiNS Dyad Trial, Form 20b (7, 9, 10, 11, 12, 13, 14)	Income earned by the household	2s, SES visit

Child feeding Practices			
Malawi	iLiNS Dyad Trial, Form 13a (2.3.1 to 2.4.19)	Minimum dietary diversity	Enrolment ,40th home visit, 52nd visit (HC visit)
Health Seeking Behaviour			
Malawi	iLiNS Dyad Trial, Form 18 (2.15 to 2.18)	Place for seeking advice for advice or treatment for childhood common illnesses (Acute respiratory infection (ARI), fever and diarrhoea).	1st home visit
Malawi	iLiNS Dyad Trial, Form 18 (2.15 to 2.18)	Type of illness	1st home visit

Appendix 2 : Study Budget

Item	**Quantity**	**Unit cost**	**Subtotal**
Airtime	10	5000	50000
Reams of paper	4	3500	14000
Printing and binding reports	4	5000	20000
COM overhead fees (10%)			8,400
Contingency (10%)			8,400
Grand total			**MK100,800**

Appendix 3: Original study certificate of ethical approval

UNIVERSITY OF MALAWI

Principal

Prof. R.L. Broadhead, MBBS, FRCP, FRCPCH, DCH

College of Medicine
Private Bag 360
Chichiri
Blantyre 3
Malawi
Telephone: 877 245
877 291
Fax: 874 700
Telex: 43744

Our Ref.:

Your Ref.: P.01/09/722

5th August 2009

Dr K. Maleta
Community Health Department
P/Bag 360
Blantyre 3

Dear Dr Maleta,

RE: P.01/09/722 – LNS DOSE Trial: Randomised single blind controlled trial testing the growth promoting effect of long term complementary feeding of infants with different doses and formulations of high energy micronutrient fortified Lipid based Nutrient Supplements (LNS)

I write to inform you that COMREC reviewed your proposal which you resubmitted. I am pleased to inform you that your proposal was approved after considering that you addressed all the issues which were raised in earlier reviews.

As you proceed with the implementation of your study we would like you to take note that all requirements by the college are followed as indicated on the attached page.

Yours Sincerely,

Prof J.M Mfutso-Bengo
CHAIRMAN - COMREC

JMM/bck

Appendix 4 : Present study certificate of ethical approval

COLLEGE OF MEDICINE

Principal
M. H. C. Mipando MSc PhD

College of Medicine
Private Bag 360
Chichiri
Blantyre 3
Malawi
Telephone: 01 871911
01 874107
Fax: 01 874 700

Our Ref:

Your Ref: P.10/18/2489

09-Oct-18

Josephine Kalepa
Project Concern International
P.O. Box 542
Balaka

Dear Josephine Kalepa

RE: P.10/18/2489 - The Impact of socio-economic and demographic characteristics on feeding and caring practices for children under two years in rural Malawi.

I write to inform you that COMREC exempted the above submission from review as it is not human subject research. This is on the basis that investigators will only receive de-identified data from the parent study.

If there are any issues raised and you are responding to them, you need to do/note the following:

1. Respond question by question on the cover letter i.e start with the query raised by COMREC then your response.
2. On the cover letter refer to the pages where you have made the changes and highlight in the protocol / show in tracked changes
3. Please cite COMREC number on the cover letter and put version number and date on the revised proposal
4. Submit 4 hardcopies
5. Submit an e-mail softcopy to comrec@medcol.mw using a fresh email with the following subject: **comrecsubmissions@** followed by the PI surname plus comrec number (if available) plus the title of your study and version number. Please submit all relevant documents in one email e.g. if you realize that some documents have been missed, please resend the whole package including the additional items.
6. Please note that currently parts of the review process are based on email documents only. The expedited review process is expected to take 14 days from the day of an email response/complete submission. Please note that if you later use a "Reply….." button on your previous email response/submission, your previous email submission moves to the current date creating a new COMREC ""feedback by" date from the day of your latest email communication. In addition, your previous submission email may now have become more difficult to locate resulting in delays in processing your submission.
7. **Regarding delayed expedited review responses from COMREC, the COMREC guidelines state: "The review period shall not exceed 14 days from day of re-submission. In the event that this deadline cannot be met, the secretariat shall communicate the decision to the applicant by the fastest possible means and follow up with a written communication". In addition, in case of delays in obtaining feedback beyond the stipulated 14 days, investigators may inquire via email to comrecchair@medcol.mw.**

Yours Sincerely,

Dr. YB. Mlombe
COMREC CHAIRPERSON