DEPRESSION IN MOTHERS OF CHILDREN WITH SEVERE ACUTE MALNUTRITION ADMITTED IN KENYATTA NATIONAL HOSPITAL PEADIATRIC WARDS

BY:

DR. SALWA HAITHAR

H58/69082/2011

A DISSERTATION SUBMITTED IN PART FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF MEDICINE IN PSYCHIATRY OF THE UNIVERSITY OF NAIROBI SCHOOL OF MEDICINE

DECLARATION

I declare that this Dissertation is my original work and has not been presented for the award of any degree at any other University.

Signed:………………………… Date:…………………….

Dr. Salwa Haithar

This dissertation was submitted for examination with our approval as Supervisors:

Prof. M.W Kuria. MBChB, MMED (Psych), PhD (Psych) (UON) Associate Professor of Psychiatry and Chair, Department of Psychiatry, University of Nairobi.

Signed…………………….. Date: ……………………

Dr. M. Kumar. PhD**,** CPsychol Senior Lecturer, Department of Psychiatry, University of Nairobi.

Signed…………………….. Date: ……………………..

ACKNOWLEDGEMENT

After thanking The Almighty, I would like to acknowledge the support of my husband and family, as well as my supervisors and mentors for their guidance and encouragement throughout this process.

-

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

K.N.H   Kenyatta National Hospital

W.H.O World Health Organization

SAM   Severe Acute Malnutrition

PHQ-9   Patient Health Questionnaire-9

SPSS   Statistical Package for the Social Sciences

KDHS   Kenya Demographic and Health Survey

MINI   Mini International Neuropsychiatric Interview

LMIC   Low and Middle Income Countries

ABSTRACT

BACKGROUND

Depression is the leading cause of disability worldwide. In women it is a significant cause of disease related disability. Globally, an estimated 350 million people suffer from depression. The prevalence of maternal depression in developing countries varies from 15-57%. Maternal depression is associated with adverse outcomes for both mothers and their children. Worldwide, nearly 20 million children under the age of five are severely wasted, 90% of whom are in LMIC countries. South Asian studies have shown maternal depression as a risk factor for poorer infant growth. Little is known about the situation in Sub-Saharan Africa.

OBJECTIVE

The study objective was to examine the association of maternal depression and severe acute malnutrition in children aged 6 – 60 months admitted in the general paediatric wards of Kenyatta National hospital.

DESIGN

The study design was a matched case control study.

METHODS

The study was conducted in KNH general paediatric wards. Subjects were recruited through convenience sampling. The cases were children aged 6-60months admitted with severe acute malnutrition as determined by W.H.O criteria. The controls were children (6-60months) with normal weight admitted in the same wards with acute ailments. Mothers of the cases and controls who consented were enrolled in the study and assessed for depression using a PHQ-9 questionnaire. Anthropometric and socio-demographic data of the children and mothers were captured using the study proforma. The data was entered in coded proforma, and analyzed using SPSS version 17. Continuous and categorical variables were analyzed using descriptive statistics. Odds ratio were presented to estimate the risk of depression among the cases compared to the controls. Depression as a factor in severe malnutrition was determined by controlling for other risk factors of malnutrition in logistic regression model.

8

RESULTS

The mean age of mothers of the cases and controls were similar (28.7 vs 27.2 years). Most mothers were literate (97.4%) and married (76%). unemployment was similar at 73.4% vs 61.5 % while mothers of cases had significantly lower income than mothers of controls. The prevalence of depression among mothers of malnourished children was high (64.1%), and was associated with malnutrition (OR33.0 95%CI 6.9-152), as compared to 5.1% among mothers of normal weight children. In univariate analysis income and employment status was associated with malnutrition while in multivariate only depression was significantly associated with malnutrition.

CONCLUSION

Depression is common among mothers of malnourished children and is significantly associated with malnutrition. Maternal education, income, family size and employment status does not correlate significantly with child malnutrition.

1. **BACKGROUND**

2. The health and well-being of children is intimately connected with their early social, emotional and inter-personal experiences. Since mothers are the primary care givers of young infants, any poor maternal physical or mental health would have adverse effects on their child's physical and psychological well-being (1). In developed nations, the long term impact of maternal mental health on children's behavioural, cognitive and emotional problems has been well studied. However, the effects on growth and development are not as well researched, especially in developing countries where poor growth due to under-nutrition is a major problem. High levels of depression have been found in mothers in the developing countries (2) and recent studies have shown a link between poor childhood growth and maternal depression (3).

3. **LITERATURE REVIEW**

4. Childhood Malnutrition is a serious health issue, with over 50 million children under the age of five being undernourished. About half (20 million) of these malnourished children are *severely* wasted, and almost all (90%) of them reside in low and middle income countries (4,5). Malnutrition accounts for more than one third of childhood deaths worldwide. Childhood growth is a key indicator of child health and nutritional status. Rapid physical growth and development occur in early life (0-2 years) when infants are dependent on the primary caregiver for their social and nutritional needs (1). This makes young children vulnerable to the effects of their caregivers' physical and mental health problems.

5. Malnutrition prevents a child from achieving their full mental and physical potential. Inadequate growth during childhood can result in reduced adult stature, lower intelligent quotient (IQ) and low educational performance, greater behavioural problems and deficient social skills, reduced economic productivity, impaired work capacity and susceptibility to contracting diseases (6–8)

6. The causes of malnutrition are more complex than simply lacking of food. Other factors include; large family size, inadequate maternal education, infections and maternal psychiatric illness (9). It has been shown that healthy maternal attitude and behaviour are essential in sustaining adequate nutrition in childhood. (10)

7. The bulk of nutritional studies in under 5's done in sub-Saharan Africa have mainly looked at socio-demographic, cultural and economic factors related to child malnutrition (11–13) However, not much is known about the link between maternal mental health and child nutritional status. Research emerging mainly from studies in South Asia (where half of all the underweight children reside (14) suggests that poor maternal mental health, particularly maternal depression, may be a risk factor for poor growth in young children .(15)

8. Depression around childbirth is common. The prevalence of maternal depression varies from 15-57% .(16) It affects 10-15% of mothers in the West (17), and is almost twice as high in South Asia (Pakistan 28%, Goa India 23%) (18). It is a debilitating disorder, ranking 4th among disabling disorders worldwide (19) and the leading cause of disease related disability among women globally (20). WHO estimates that by the year 2030, depression will to be the biggest contributor to disease burden.

9. The causes of depression are mainly genetic and neurochemical. However, there are other risk factors, which include: poverty, domestic violence, unplanned pregnancies/ unwanted children, chronic maternal illness, large family size, low social support, conflict, disasters, lack of control over resources, migration and HIV/AIDS. (21–23).The exposure to many of these factors may explain the high levels of depression in women living in developing countries

10.

11. The studies from South Asia found that mothers who had depression had more disability than those without depression, and the majority remained ill for at least six months. The persistent risk factors for postnatal depression were marital disharmony, poverty, low education and antenatal psychiatric morbidity. The protective factors were employment, education and family support. The gender of the child also played a role; giving birth to a daughter was associated with postnatal depression in these societies, where male child preference is deeply rooted.

12. A South Indian case control study demonstrated that current major depression (OR3.2, 95% CI 1.1 to 9.5), and low maternal intelligence (OR 3.8, 95% CI 1.3 to 11.1) were significantly associated with malnutrition in children.(24). A cohort study done by Rahman et al examining the associations of maternal depression to malnutrition and illness in infants living in rural Pakistan, found that prenatal and postnatal depression predicted poorer growth and higher risk of diarrhea.

13. Adewuya *et al,* in a longitudinal case control study done in Nigeria showed that, infants born to depressed mothers had poorer growth at three and six months post-delivery than infants born to non-depressed mothers. The depressed mothers were also more likely to stop breastfeeding earlier and their infants more prone to episodes of diarrhoea and other infectious illnesses (3)

14. Closer to home, Ashaba *et al* in a case control study in western Uganda showed that mothers of malnourished children had significantly higher levels of depression than mothers of normal weight children admitted with chronic illness (42% vs 12%). On multivariate analysis maternal depression was significantly associated with malnutrition (OR 2.4 CI 1.11-5.18)(25).

15. Other studies have found that maternal depression is linked to decreased breastfeeding, non-responsive care giving and compromised parenting behaviour, all of which contribute to childhood malnutrition (26,27). The adverse effects of maternal depression on maternal morbidity and mortality cannot be overlooked. For pregnant mothers, depression is associated with increased obstetric complications, increased use of analgesics, more

pregnancy symptoms and negative childbirth experience (28). Severe depression in mothers is also associated with death, through suicide (29).

16. The combination of woman's vulnerability to depression and its debilitating effects, their responsibility for childcare and the high burden of maternal depression in developing countries mean that maternal mental health in these countries could have a substantial influence on childhood growth. Maternal mental health is yet to be incorporated in maternal and child health programs and even the elaborate 10 step WHO guidelines to manage severe acute malnutrition overlooks maternal mental health (only addressing maternal physical health)(30).

17. The aim of UN Millennium Development Goal 4 (MDG 4) was to reduce mortality of children younger than 5 years by two-thirds between 1990 and 2015, but many countries, especially in south Asia and sub-Saharan Africa, including Kenya did not meet this target (31). The under 5 mortality rate in Kenya is unacceptably high, with 1 in every 19 children dying before their 5th birthday (32). Given that malnutrition contributes to many of these deaths, even small improvements in prevention, recovery and mortality rates could mean saving thousands of lives annually.

18.

19.

20.

21.

22.

23.

24.

25.

26.

13

27.

28.

29.

30.   STUDY JUSTIFICATION

31. The burden of maternal depression and childhood malnutrition are both high, with both contributing to significant morbidity and mortality. Maternal depression in particular has adverse outcomes on the mother and her child. More often than not, maternal mental health is ignored in the management of severe malnutrition, in spite of evidence linking the two.

32. Early identification and treatment of maternal depression will have benefits for the mother, the child and the nation at large. In health care systems struggling with competing priorities, the importance of early identification of treatable conditions like depression cannot be trivialized. It will enable appropriate and cost-effective interventions. There are hardly any studies locally exploring the link between maternal mental health and child health, especially with regard to malnutrition.

33. This study attempts to link maternal mental health with child physical health thereby helping to bring maternal mental health into mainstream healthcare agenda and support the idea of a holistic approach to primary healthcare in general. The study will also provide baseline data to stimulate further research.

34.

35.

36.

37.

38.

39.

40.

41.

42.

43.   RESEARCH QUESTION

44. Is there an association between current maternal depression and severe acute malnutrition?

45.

46.   STUDY OBJECTIVES

47. **Broad Objective**

48. To determine the relationship of current maternal depression and severe acute malnutrition;

49. **Specific Objectives**

1. To determine the presence of depression in mothers of severely malnourished and normal weight children admitted for not more than 7 days, in paediatric wards of KNH;

   50.

2. To determine the severity of depression in mothers of severely malnourished and normal weight children admitted for not more than 7 days, in paediatric wards of KNH;

51.

3. To correlate the presence of maternal depression with severe acute malnutrition in children admitted in paediatric wards of KNH;

52.

53.

54.

55.

56.

57.

15

58.

59.

60.

61.

6. METHODOLOGY

62. **6.1 Study design**

63. Matched case control study design was used. Cases were malnourished children aged 6- 60 months that were admitted for severe acute malnutrition and having stayed in the ward for less than seven days. The controls were age and gender matched normal weight children admitted for acute ailments for less than seven days.

64. **6.2 Study Area**

65. This study was carried out at Kenyatta National Hospital (KNH) general paediatric wards. KNH is a National referral facility and the University of Nairobi's teaching Hospital. It has four general paediatric wards that admit on rotation every fourth day. Each ward has at least one room reserved for management of severe malnutrition

66. **6.3 Study Population**

67. The cases were children aged 6-60months admitted with severe acute malnutrition as determined by World Health Organization (WHO) criteria. The controls were children aged 6-60months with normal weight admitted for acute ailments in the same wards.

68. Case definition: A child aged between 6-60 months with severe acute malnutrition as defined by WHO criteria (severe wasting (<70% weight for length or < -3 Z score) and/ or oedema).

69. Control definition: A child aged between 6-60 months, age and sex matched to the cases with normal weight for length as defined using WHO criteria*.

70.

71. 6.4 Inclusion criteria

72.

73. **Cases**

1. Any admitted child aged 6-60 months who fulfil WHO criteria for severe acute malnutrition and having stayed not more than 7 days and

2. Whose mother gives informed consent to participate

74. **Controls**

75.　　1. Any child admitted with an acute ailment who is of similar age and sex to the cases and is of normal weight, and having stayed not more than 7 days and

76. 2. Whose mother gives informed consent to participate.

77. 6.5 Exclusion criteria

1. Children with other chronic conditions that predispose them to SAM (such as gastrointestinal abnormalities, malignancies, malabsorption syndromes, HIV wasting syndrome).

2. Children less than 6 months or above 60 months

3. Mothers who fail to give consent to participate.

78. 6.6 Sample Size.

79. Using sample size calculation formula for a matched case control study (Open Epi)(33);

80.

81.
n = sample size in the case group

82. r= ratio of cases to controls (1:1)

83. p_1= proportion of cases with maternal depression (~45%) Hussein *et al* (2)

84. p_2= proportion of controls with maternal depression (~15%)O'Hara *et al* (16)

85. Z_β= desired power (typically 0.84 for 80% power)

86. $Z_{\alpha/2}$ = desired level of statistical significance (1.96)

87. Cases: 37 Controls: 37

88. Sample size = 74 (Total)

89. 6.7 Sampling method

90. Consecutive convenience sampling was applied to obtain cases and controls until the desired sample size of 37 cases and 37 controls are achieved. Sampling for the cases and controls was done sequentially in all the pediatric wards at the ratio of one to one.

91. 6.8 Study Procedure

92. Recruitment was done daily in the 4 general paediatric wards of KNH by the principle investigator. This was done in the afternoon once ward rounds have been completed so as not to interfere with workflow.

93. The principal investigator identified all the children admitted with SAM by reviewing their files. Those children with SAM who have stayed in the ward for less than 7 days were deemed eligible for recruitment. Mothers of eligible children had Consent explanation given either in English or Swahili. A written informed consent was sought from them. Those who gave consent were deemed eligible for recruitment.

94. Once recruited, the children were undressed and their weights were measured using a digital compression scale, and recorded to one decimal point (in kilograms). The height of each child was measured with the child in prone position using a tape measure, from crown to heel. Weight for height scores was generated from WHO Normograms and used to confirm the case definition. For every case, a control of similar age and gender was recruited using similar methods.

95. Mothers of both groups were interviewed to gather socio-demographic data and assessed for depression using Patient health questionnaire-9 (PHQ-9), a locally validated self-

administered depression scale. The socio-demographic, anthropometric data and the PHQ-9 scores were entered into the study proforma. Recruitment was done consecutively until the requisite sample size is achieved.

7. PATIENT HEALTH QUESTIONNAIRE-9 (PHQ-9)

96. The PHQ-9 is a short, 9 question depression scale that is self-administered. It was developed by Kurt Kroenke et al and is made up of the 9 DSM-IV diagnostic criteria for depression (34,35). It has been validated, (and translated into Swahili) in 2 studies in Kenya.(36). The PHQ-9 can both diagnose and grade the severity of depression.

97. **Diagnosis of Depression using PHQ-9**

98. The diagnosis of major depression is made if 5 or more of the nine depressive symptom criteria have been present at least "more than half the days" in the past 2 weeks, and one of the symptoms is depressed mood or anehedonia. One of the nine symptom criteria ("thoughts that you would be better off dead or of hurting yourself in some way") counts if present at all, regardless of duration. Other depression is diagnosed if 2, 3, or 4 depressive symptoms have been present at least "more than half the days" in the past 2 weeks, and one of the symptoms is depressed mood or anehedonia.

99. Before a diagnosis of depression is made, a history of a manic episode, physical causes of depression and normal bereavement must be ruled out

100.
101.
102.
103.   **Measuring Depression Severity using PHQ-9**
104.
105.   The possible scores on the PHQ-9 scale range from 0 to 27, as each item can be scored from 0 ("not at all") to 3 ("nearly every day"). The severity thresholds of mild, moderate, moderately severe, and severe depression are represented by the cut off points of 5, 10, 15, and 20 respectively (34). Proposed treatment action plans are suggested for each level of illness (Table A).

106.   If a single screening cut off point is chosen to diagnose major depression, a score of 10 or more is recommended. This has both a sensitivity and specificity of 88% for major depression.

107.

108.

109.   **Table A: Depression Severity and Proposed Treatment**

110. **PHQ-9 Score Depression Severity Proposed Treatment Actions** 111.		
112. **PHQ-9 score**	113. **Depression Severity**	114. **Proposed Treatment Actions**
115. 1 to 4	116. None	117. None
118. 5 to 9	119. Mild	120. Watchful waiting; repeat PHQ-9 at follow-up
121. 10 to 14	122. Moderate	123. Treatment plan, considering counseling, follow-up and/or pharmacotherapy
124. 15 to 19	125. Moderately-Severe	126. Immediate initiation of pharmacotherapy and/or psychotherapy
127. 20 to 27	128. Severe	129. Immediate initiation of pharmacotherapy and, 130. if severe impairment or poor response to therapy, 131. expedited referral to a mental health specialist 132. for psychotherapy and/or collaborative management

133.

134.

135.

136.   **7.1 Variables**

137.   The main study variables include the dependent variables of severe acute malnutrition and maternal depression. The covariates include maternal age, family income, family size, and mother's education, marital status, duration of breastfeeding, number of previous admissions, and maternal HIV status.

138.

139.

140.

141.

142.

143.

144.

8. DATA MANAGEMENT AND ANALYSIS

145.   Data were collected using structured proforma and entered into a password protected Microsoft Access Database. The hard copy data forms were stored in a lockable cabinet either in the Principal Investigator's office during data collection and in the statistician's office during entry. Upon completion of Data entry, hard copy forms were compared with the entered data to identify errors and corrections made appropriately.

146.   The study population was described using socio-demographic factors where categorical variables were summarized into frequencies and percentages while continuous variables were summarized using measures of central tendency such as mean, median, mode and standard deviation. The descriptive characteristics were compared between the cases and the controls using Chi square/ Fisher's exact test for categorical variables and Student's t test for continuous data.

147.   Proportion of mothers in the cases and controls groups with depression were analyzed and presented as frequencies and percentages of mothers and also severity shown as mild, moderate, moderately severe and severe. Depression was compared between mothers with severely malnourished children and those with children with normal weights using Chi square test of associations. Odds ratio were presented to estimate the risk of depression among the cases compared to the controls.

148.   Depression as a predictor of severe malnutrition was determined by controlling for other risk factors of malnutrition in logistic regression model. All statistical tests were performed at

5% level of significance (p value≤0.05).Study findings were presented in the form of graphs, pie charts, tables and narrative.

149.

150.

151.

152.

9. Study Limitations

153.   This study being a case control study was not without limitations. The possible limitations included;

  i.   Recall bias: the symptoms of depression had to be recalled by the participants over 2 weeks and this may introduce some recall bias.

  ii.   Incidence of disease cannot be determined from this study, nor can causal association be established.

  iii.   Potential confounders including physical illness in the mother mimicking depressive illness, caregiver burden and hospital (psychological) stress cannot be excluded, and is outside the scope of this study.

154.

10. Ethical Considerations

155.   The study was carried out following approval of the Department of Psychiatry, and KNH/UON Ethics Review Board. Consent explanation was administered in English or Swahili and written informed consent was obtained.

156.   Confidentiality was maintained at all times. No study instrument bore the subjects name and information of the subjects were be shared without their express consent even if it was

for their own benefit. Study participants had the right to decline enrollment without any prejudice to their care. They also had the right to withdraw from the study at any time without any reason.

157.   Any participants diagnosed with depression were referred to the mental health department in KNH for review and management by the attending psychiatrist. There was no physical harm to the participants. There were also no financial incentives to the study participants. The principle investigator bore all the financial cost of the study. Feedback was provided to participants and necessary clinical findings were communicated to them.

11. RESULTS

Eighty mother child pairs were screened and seventy-eight were recruited into the study between May and June 2014; two declined consent. Thirty nine of them were cases, and the rest were matched controls. All participants signed and consented for the study.

11.1 Socio-Demographic Characteristics of the Mothers

The mothers of the cases had a mean age of 28.4 years (SD 7.6 years) with a mean number of children of 2.6(SD 7.6). Majority of the mothers were married (76.3% and 87.2%) and literate (100% and 97.4%) with mostly primary (56.4%) and secondary (33.3%) levels of education. In addition, the levels of education of their spouses were mainly primary (34.5%) and secondary (55.2%). There was no significant difference between the mothers of the cases and the mothers of controls in terms of the socio-demographic characteristics, except the number of children which was significantly higher for mothers of malnourished children P value<0.034 (Table 1).

Presence of chronic illnesses (such as hypertension, diabetes) was reported by 12.8% of the mothers. Additionally self-reported prevalence of HIV was 17.9% among mothers of the cases and 5.1% among mothers of the controls. The medical history of the mothers with severely malnourished children was not significantly different from those with normal weight children (Table 1).

Table 1: Socio-Demographic Characteristics

Variable	Mothers of Severely Malnourished Children (Cases)	Mothers of Normal Weight Children (Controls)	Statistic	P value
Mean age (SD)	28.4 (7.6)	27.0 (5.0)	t(75)=1.032,	0.320
Mean Number of Children (SD)	2.6 (1.6)	1.9 (1.1)	*t(75)=2.161,*	***0.034***
Marital status				
Single/divorced/ widowed	9 (23.7)	5 (12.8)	$X^2(1)=2.110$	0.217
Married	29 (76.3)	34 (87.2)		
Mother's Education Level				
None	0	1 (2.6)	$X^2(3)=3.242$	0.356
Primary	22 (56.4)	15 (38.5)		
Secondary	13 (33.3)	18 (46.2)		
Tertiary	4 (10.3)	5 (12.8)		
Spouse's Education Level				
Primary	10 (34.5)	11 (32.4)	$X^2(3)=1.968$	0.374
Secondary	16 (55.2)	15 (44.1)		
Tertiary	3 (10.3)	8 (23.5)		
Suffer from any chronic illnesses?				
Yes	5 (12.8)	5 (12.8)	$X^2(1)=0.000$	1.000
No	34 (87.2)	34 (87.2)		
Self-reported HIV status				
Positive	7 (17.9)	2 (5.1)	$X^2(2)=3.354$	0.198
Negative	31 (79.5)	35 (89.7)		
Unknown	1 (2.6)	2 (5.1)		
Duration of breastfeeding				
≤12 months	22 (56.4)	24 (61.5)	$X^2(1)=0.212$	0.645
>12 months	17 (43.6)	15 (38.5)		

11.1.2: Demographics of the children

Mean age of the Cases and controls were similar (20.4 months (SD 12.2) Vs 20.3 (SD 12.8)) respectively. The male to female ratio was 1:1 and the malnourished children were significantly shorter than the normal weight children P< 0.013.

Table 2: Demographic characteristics of the children

Variable	Cases	Controls	Statistics	P value
Mean age in months (SD)	20.4 (12.2)	20.3 (12.8)	t(76)=0.036	0.971
Gender Male Female	 19 (50.0) 19 (50.0)	 22 (56.4) 17 (43.6)	 $X^2(1)=0.318$ 	 0.573
Mean weight (SD)	7.2 (2.2)	10.1 (2.8)	t(76)=-5.168	*<0.001*
Mean height/ length (SD)	72.8 (10.4)	78.8 (10.5)	t(76)=-2.548	*0.013*

11.2 Socio-Economic Characteristics of the Mothers

Almost three quarters (73.7%) of the mothers of the cases and 51.7% of their spouses were unemployed. The spouses of mothers of the controls were significantly different with majority being employed (76.5%) p=0.021. Consequently, 96% of the families of the controls earned more than 36000 per annum compared to the 63.2% of the families of the cases. This was statistically significant. (p=0.001). Overall 39% of the mothers lived on less than a dollar a day, with 36% of these being mothers of the cases.

Majority (71.8%) of the mothers of the cases received support from other members of the family or friends. About three quarters (76.9%) had some control over family finances with 53.3% of them having total control. Social support and control of family finances was not significantly different between the two groups of mothers (Table 3).

Table 3: Socio-Economic Characteristics

Variable	Mothers of severely malnourished children (Cases)	Mothers of normal weight children (Controls)	Statistics	P value
Mother'sOccupation				
Unemployed	28 (73.7)	24 (61.5)	$X^2(1)$=1.295	0.255
Employed	10 (26.3)	15 (38.5)		
Spouse's Occupation				
Unemployed	15 (51.7)	8 (23.5)	$X^2(1)$=5.367	*0.021*
Employed	14 (48.3)	26 (76.5)		
Family Income Per Annum				
<36000	14 (36.8)	1 (2.8)	X^2=14.147	*0.001*
36000-150000	16 (42.1)	18 (52.8)		
>150000	8 (21.1)	16 (44.4)		
Social Support From Others				
Yes	28 (71.8)	33 (84.6)	$X^2(1)$=1.880	0.170
No	11 (28.2)	6 (15.6)		
Any Control Over Family Finances?				
Yes	30 (76.9)	31 (79.5)	$X^2(1)$=0.075	0.784
No	9 (23.1)	8 (20.5)		
Level Of Control Over Family Finances				
Total control	16 (53.3)	14 (45.2)	$X^2(1)$=0.407	0.523
Partial control	14 (46.7)	17 (54.8)		

11.3 Depression and Its Severity

Prevalence of depression was 64.1% (n=25) among mothers of severely malnourished children. This was significantly higher than 5.1% (n=2) identified in mothers of normal weight children, OR 33.0 (95% CI 6.9-158.2), p<0.001(Table 4 and Figure 2). Among the mothers who were depressed in the case group, 13 (33.3%) had mild depression, 9(23%) had moderate depression and 3(7.7%) had moderately severe depression. On the other hand, the control group had only two mothers with depression with one reporting mild level of severity and the other moderately severe depression (see figure 4). No case of severe depression or suicidality was reported. All depressed patients were referred to the KNH mental health unit for treatment.

Table 4: Levels of Depression

Variable	Mothers of severely malnourished children (Cases)	Mothers of normal weight children (Controls)	OR (95% CI)	P value
Presence of depression				
Depressed	25 (64.1)	2 (5.1)	33.0 (6.9-158.2)	*<0.001*
Not depressed	14 (35.9)	37 (94.9)	1.0	
Severity of depression				
None	14 (35.9)	37 (94.9)	1.0	
Mild (5-9)	13 (33.3)	1 (2.6)	34.4 (4.1-287.6)	*0.001*
Moderate (10-14)	9 (23.1)	0 (0.0)	-	0.999
Moderately severe (15-19)	3 (7.7)	1 (2.6)	7.9 (0.8-82.7)	0.084

Figure 1: Proportion of depressed mothers in cases versus controls

Figure 2: Severity of Depression in Mothers of Cases

This graph compares the severity of depression in both groups.

Figure 3: Comparison of the severity of depression among mothers of cases and controls

11.4 Multivariate Analysis: Association between Malnutrition and Mother's Depression

On multivariate analysis using logistic regression model, depression was still significantly correlated with malnutrition, after controlling for the number of children, family income and spouse's occupation (Adjusted OR 48.5(95CI:7-334.8)). All the other covariates though significant on univariate analyses were not statistically significant on multivariate analysis and were consequently not entered on the regression model (see Table 5).

Table 5: Presence of depression adjusted for number of children, family income and spouse's occupation (Logistic regression model)

Variable	Adjusted OR (95% CI)	P value
Presence of depression		
Depressed	48.5 (7.0-334.8)	*<0.001*
Not depressed	1.0	
Mean number of children (SD)	1.6 (0.8-3.3)	0.229
Spouse's occupation		
Unemployed	1.5 (0.3-8.1)	0.666
Employed	1.0	
Family income per annum		
<036000	-	0.998
36000-150000	2.4 (0.4-14.0)	0.345
>150000	1.0	

12. DISCUSSION, CONCLUSION AND RECOMMENDATIONS

12.1 DISCUSSION

The mean ages of mothers of the cases and controls were similar at 28.4 versus 27 (SD7.6). The majority were married (76.1%) and literate at 97.4% with at least primary level of education. The mean number of children was 2.6 (SD 1.6). . In addition, the levels of education of their spouses were mainly primary (34.5%) and secondary (55.2%). There was no significant difference between the mothers of the cases and the mothers of normal weight children in terms of their socio-demographic characteristics, except the number of children which was significantly higher for mothers of malnourished children (2.6(1.6) vs 1.9(1.1)) P value<0.034. These demographics are in keeping with data from the recent Kenya demographic and health survey (KDHS 2014) (32), which showed that 93% of Kenyan women have some form of education. Child bearing begins early in Kenya with over 50% of Kenyan women having a child by age 20 years (KDHS 2014). The Survey also showed that the total fertility rate was around 3.9 children per woman, which explains the average of 3 children seen among this young female population.

Almost three quarters (73.7%) of the mothers of the cases and 51.7% of their spouses were unemployed. The spouses of mothers of the controls were significantly different with majority being employed (76.5%) p=0.021, and 96% earning more than Ksh 36000 per annum compared to the 63.2% of the families of the cases. This was statistically significant at p=0.001. Overall 14 households out of 38 of the cases earned less than a dollar a day compared to only one household of the controls. Low socioeconomic status has been shown to be the strongest independent determinant of depression (37)

Both groups of mothers reported high levels of control over family finances. Although 76.5% of the mothers of cases had some level of control over their finances, with 53% having total control over financial decision making, the vast majority of these mothers and their spouses were unemployed, with 36.8 % living on less than a dollar a day. So this high level of financial control over such meager resources could not have had a positive effect on maternal depression or child nutrition as expected (17).

With respect to financial control, the KDHS 2014 also showed somewhat similar findings; 49% of Kenyan women made independent decisions over their finances, and 54% had complete decision-making authority over their health and major household expenditures. (32)

The data showed high levels of social support for the mothers in this study; 71.8% in the cases and 84.6% in the controls which was not significantly different. These high levels may be explained by African cultural practices where neighbours, extended family and community relations tend to pull together in times of difficulties. (38). Family and community support has been shown to be protective against mental illness in HIV affected cohorts.(39) . Adewuya et al showed that perceived lack of social support increased the risk of depression by almost six times(3). However in this study it's difficult to determine the relationship between social support and depression as we are not adequately powered.

The mean age of the children in this study was 20.4 months, which is usually a time of rapid growth and high nutritional demand. This is also the time around protein energy malnutrition would have the greatest effect on child's mental and physical development. Malnutrition also peaks around this age.(5)

As expected, most of the malnourished children were short for age and were wasted. The KDHS 2014 shows that up to a quarter of children under five are stunted with 4% showing wasting and 11% being underweight.(32)

Depression

 The prevalence of depression was 64% among mothers of severely malnourished children and only 5.1% among mothers of the controls. This was statistically significant with an odds ratio of 33.0, 95% CI 6.9-15, p<0.001. The prevalence of maternal depression in developing countries is estimated to vary between 15-57% (19). The highest prevalence was found in Pakistan. The prevalence of depression has risen steadily over the years; it is estimated that depression will be the second leading cause of disability by 2020 (WHO 2001) and projected to be the largest contributor to disease burden by 2030.

Ejaz et al (2012) in a hospital based case control study in Pakistan using HADS score found high psychiatric morbidity of 50% in the cases (malnourished children) and 46% of the controls

(normal weight children)(5). This high mental health morbidity in both cases and controls reflected the high prevalence of mental health problems amongst women in Pakistan.

Miranda et al (1996) in a case control study found high levels of psychiatric morbidity among South American women with malnourished children with cases having 63% levels of mental distress (40).

In East Africa, Ashaba et al (2015) in a recent case control study in Uganda found a prevalence of depression of 42% among mothers of malnourished children and 12% among mothers of normal weight children admitted for chronic illness (25).

This work was a case control study that is very similar to our study, the difference being the controls that were children of normal weight but with chronic illness and the cases being children admitted with malnutrition. The prevalence of depression in the present study was found to be higher than Ashaba et al's findings because our cases were severely malnourished children who were also acutely ill. The higher prevalence in the controls may be due the psychological effects of long hospital stay that may have confounded the findings. Our study was restricted to only those admitted for less than seven days in order to mitigate this confounder. The higher prevalence of depression in mothers of our cases may be due differences in our study populations with ours predominantly being urban slum dwellers of low socio economic status while her population was mainly rural. Ashaba also used a different tool to ours, we used the PHQ-9 which when compared to the MINI in several studies has shown higher sensitivity. Finally it's also important to note that our sample size was smaller than that in the Ugandan study.

Severity of Depression

Mild and moderate depression was more commonly noted on PHQ-9 assessment. Twenty three mothers (59%) had mild or moderate depression while only four (10.3%) had moderately severe depression. There were no mothers with severe depression. An individual with mild to moderate depressive episode will have some difficulty in continuing with ordinary work and social activities but will probably not cease not to function completely. Due to the debilitating symptoms during a severe depressive episode, it is very unlikely that a mother would be able to

continue with child care activities, and therefore would not able to bring their child to hospital. This may explain why we did not find severely depressed mothers in our study.

Depression and malnutrition

This study showed that maternal depression was significantly associated with malnutrition after controlling for income, number of children and employment. Several studies in low income countries such as Pakistan, India, Uganda and Ethiopia have shown similar findings.(24–26,41)

Surkan et al (2011) in a meta-analysis of seventeen studies from eleven different countries showed that maternal depression was associated with early childhood malnutrition and stunting with the OR for underweight being 2.2 and that of stunting being 2.0.(41).

Maternal depression may contribute to undernutrition in children by compromising parenting behavior such as nonresponsive caregiving practices. Maternal depression also decreases maternal interests in her child and reduces her woman's ability to cope with the demands of motherhood, such as breast feeding, stimulation, hygiene and overall care. This interferes with formation of a secure early attachment and bonding behaviors with the baby.(27)

This study found no associations between maternal income, level of education, employment status and malnutrition in children six months to five years in the final regression model even though income and employment were significant socio-demographic factors in initial analyses. These findings are inconsistent with other studies done in low income countries.

Makoka et al (2013) showed a negative association between maternal education and child malnutrition in a multi-centre study covering Malawi, Tanzania, and Zimbabwe. He further noted that the impact was felt more when the maternal level of education was beyond primary school (42).The more educated the mother, the more knowledgeable she is about good child nutrition practices and the more influence she has over the well-being of her children (42). In Benin, (West Africa) Reed et al (1996) found higher level of education to be associated with improved child weight for age (12), while Gwatkin and colleagues (2000) reported similar observations in Cameroon (13).

A notable difference between these studies and ours is that their study populations were rural women with low levels of education who have limited nutritional knowledge as opposed to our study which was urban based with participants that had high literacy rates.

12.1.2 Study Limitations

This study is not without limitations. The design is inherently limiting as it cannot establish causality. The setting is highly selective being a national referral facility; it is therefore difficult to generalize the findings to the general population. Hospital related psychological distress may be a confounder; however this effect was reduced by deliberate sampling of newly admitted (within seven days) cases and controls.

12.2   CONCLUSION

The prevalence of depression in mothers of children under five years of age who are hospitalized for malnutrition is significantly and markedly higher than in mothers of children hospitalized for other conditions.

12.3   Recommendations

Since the burden of depression is significantly high among mothers of malnourished children we recommend that there should be routine screening for depression among mothers of children with malnutrition so that maternal mental health which is intricately linked to child wellbeing become mainstreamed in the care of the malnourished child.

We also recommend that cohort studies of mothers in third trimester be undertaken to screen for depression and follow up their children for growth and developmental abnormalities so as to establish cause and effect relationship between depression and malnutrition.

REFERENCES

1. Bornstein MH, Zlotnik D. Encyclopedia of Infant and Early Childhood Development [Internet]. Encyclopedia of Infant and Early Childhood Development. 2008. 496-509 p. Available from: http://www.sciencedirect.com/science/article/pii/B9780123708779001183

2. Husain N, Creed F, Tomenson B. Depression and social stress in Pakistan. Psychol Med. 2000;30(2):395–402.

3. Adewuya AO, Ola BO, Aloba OO, Mapayi BM, Okeniyi JAO. Impact of postnatal depression on infants' growth in Nigeria. J Affect Disord. 2008;108(1–2):191–3.

4. Faruque ASG, Ahmed AMS, Tahmeed A, Islam MM, Hossain MI, Roy SK, et al. Nutrition: basis for healthy children and mothers in Bangladesh. (Special issue on Achieving the Millennium Development Goals in Bangladesh). J Heal Popul Nutr [Internet]. 2008;26(3):325–39. Available from: http://www.icddrb.org

5. Black RE, Allen LH, Bhutta ZA, Caulfield LE, de Onis M, Ezzati M, et al. Maternal and child undernutrition: global and regional exposures and health consequences. Lancet. 2008;371(9608):243–60.

6. Bielicki T, Waliszko H. Stature, upward social mobility and the nature of statural differences between social classes. Ann Hum Biol [Internet]. 1992;19(6):589–93. Available from: http://dx.doi.org/10.1080/03014469200002402

7. Haas JD, Murdoch S, Rivera J, Martorell R. Early nutrition and later physical work capacity. Nutr Rev. 1996;54:S41-8.

8. Victora CG, Adair L, Fall C, Hallal PC, Martorell R, Richter L, et al. Maternal and child undernutrition: consequences for adult health and human capital. Lancet. 2008;371(9609):340–57.

9. Janevic T, Petrovic O, Bjelic I, Kubera A. Risk Factors for Malnutrition in Roma Children. 2010;

10. Musaiger AO, Hassan AS, Obeid O. The paradox of nutrition-related diseases in the Arab countries: The need for action. Int J Environ Res Public Health. 2011;8(9):3637–71.

11. Owor M, Tumwine JK, Kikafunda JK. SOCIO-ECONOMIC RISK FACTORS FOR SEVERE PROTEIN ENERGY MALNUTRITION AMONG CHILDREN IN MULAGO HOSPITAL , KAMPALA Background : Despite Uganda ' s recent economic success ,

malnutrition is still an important public health problem and little information is ava. East Afr Med J. 2000;77(9):471–5.

12.   Reed BA, Habicht J, NIAMEOGO Reed A CB. The Effects of Maternal Education on Child Nutritional Status Depend on Socio-Environmental Conditions. Int J Epidemiol O Int Eptdemiotoglcal Assoc Int J Epidemiol. 1996;25(25):585–92.

13.   Gwatkin DR, Rutstein S, Johnson K, Suliman E, Wagstaff A, Amouzou A. Socio-economic differences in health, nutrition, and population within developing countries: an overview. Niger J Clin Pract. 2007;10(4):272–82.

14.   UNICEF, others. The State of the World's Children 1998: A UNICEF Report. Malnutrition: Causes, Consequences, and Solutions. Nutr Rev [Internet]. 2009;56(4):115–23. Available from: http://nutritionreviews.oxfordjournals.org/cgi/doi/10.1111/j.1753-4887.1998.tb01723.x

15.   Rahman A, Patel V, Maselko J, Kirkwood B. The neglected 'm' in MCH programmes - Why mental health of mothers is important for child nutrition. Vol. 13, Tropical Medicine and International Health. 2008. p. 579–83.

16.   O 'hara MW, Swain AM. Rates and risk of postpartum depression-a meta-analysis. Int Rev Psychiaty. 1996;8:37–54.

17.   Patel V, Rodrigues M, DeSouza N. Gender, poverty, and postnatal depression: A study of mothers in Goa, India. Am J Psychiatry. 2002;159(1):43–7.

18.   A R, Z I, R H. Life events, social support and depression in childbirth: perspectives from a rural community in the developing world. Psychol Med [Internet]. 2003;33:1161. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=10975106&site=ehost-live

19.   Murray CJL, Lopez AD. The global burden of disease: a comprehensive assessment of mortality and disability from deceases, injuries and risk factors in 1990 and projected to 2010. Harvard Univ Press. 1996;1:1–35.

20.   Kessler RC. Epidemiology of women and depression. In: Journal of Affective Disorders. 2003. p. 5–13.

21.   Stein A, Krebs G, Richter L, Tomkins A, Rochat T, Bennish ML. Babies of a pandemic. Arch Dis Child [Internet]. 2005;90(2):116–8. Available from: 10.1136/adc.2004.049361\nhttp://search.ebscohost.com/login.aspx?

direct=true&db=a9h&AN=16911374&site=ehost-live

22.   Mirza I, Jenkins R. Risk factors, prevalence, and treatment of anxiety and depressive disorders in Pakistan: systematic review. BMJ [Internet]. 2004;328(7443):794. Available from:
http://www.ncbi.nlm.nih.gov/pubmed/15070634\nhttp://www.pubmedcentral.nih.gov/artic lerender.fcgi?artid=PMC383372

23.   Dhanda A, Narayan T. Mental health and human rights. Lancet. 2007;370(9594):1197–8.

24.   Anoop S. Maternal depression and low maternal intelligence as risk factors for malnutrition in children: a community based case-control study from South India. Vol. 89, Archives of Disease in Childhood. 2004. p. 325–9.

25.   Ashaba S, Rukundo GZ, Beinempaka F, Ntaro M, LeBlanc JC. Maternal depression and malnutrition in children in southwest Uganda: a case control study. BMC Public Health [Internet]. 2015;15:1303. Available from: http://dx.doi.org/10.1186/s12889-015-2644-y

26.   Ross J, Hanlon C, Medhin G, Alem A, Tesfaye F, Worku B, et al. Perinatal mental distress and infant morbidity in Ethiopia: a cohort study. Arch Dis Child Fetal Neonatal Ed [Internet]. 2011;96(1):F59-64. Available from:
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3009468/pdf/fnn-90-01-F59.pdf

27.   McLearn KT, Minkovitz CS, Strobino DM, Marks E, Hou W. Maternal depressive symptoms at 2 to 4 months post partum and early parenting practices. Arch Pediatr Adolesc Med. 2006;160(3):279–84.

28.   Andersson L, Sundström-Poromaa I, Bixo M, Wulff M, Bondestam K, Åström M. Point prevalence of psychiatric disorders during the second trimester of pregnancy: A population-based study. Am J Obstet Gynecol. 2003;189(1):148–54.

29.   Oates M. Suicide : the leading cause of maternal death Suicide : the leading cause of maternal death *. Br J Psychiatry. 2003;279–81.

30.   Basaleem HO, Amin RM. Integrated management of childhood illness in Lahej, Yemen: a qualitative analysis from the perspective of health providers. East Mediterr Health J [Internet]. 2011;17(2):101–8. Available from:
http://www.ncbi.nlm.nih.gov/pubmed/21735943

31.   United Nations. The Millennium Development Goals Report. United Nations [Internet]. 2015;72. Available from:

https://visit.un.org/millenniumgoals/2008highlevel/pdf/MDG_Report_2008_Addendum.p
df

32. Kenya National Bureau of Statistics, ICF Macro. Kenya Demographic and Health Survey. 2014;603.

33. Dean A, Sullivan K, Soe M. OpenEpi: Open Source Epidemiologic Statistics for Public Health. Updat 2011/23/06 [Internet]. 2011;Version 2.3.1. Available from: www.OpenEpi.com

34. Kroenke K, Spitzer RL, Williams JBW. The PHQ-9: Validity of a brief depression severity measure. J Gen Intern Med. 2001;16(9):606–13.

35. Kroenke K, Spitzer RL. The PHQ-9 : A New Depression Measure. Psychiatr Ann. 2002;32(9):509–15.

36. Monahan PO, Shacham E, Reece M, Kroenke K, Ong'Or WO, Omollo O, et al. Validity/reliability of PHQ-9 and PHQ-2 depression scales among adults living with HIV/AIDS in Western Kenya. J Gen Intern Med. 2009;24(2):189–97.

37. Manuscript A. Europe PMC Funders Group Europe PMC Funders Author Manuscripts POVERTY , LIFE EVENTS AND THE RISK FOR DEPRESSION IN UGANDA. 2012;

38. Oduro AD. Formal and Informal Social Protection in Sub-Saharan Africa. 'Promoting Resil through Soc Prot Sub-Saharan Africa'. 2010;(June):28–30.

39. Casale M, Wild L, Cluver L, Kuo C. Social support as a protective factor for depression among women caring for children in HIV-endemic South Africa. J Behav Med. 2015;38(1):17–27.

40. De Miranda CT, Turecki G, De Jesus Mari J, Andreoli SB, Marcolim MA, Goihman S, et al. Mental health of the mothers of malnourished children. Int J Epidemiol. 1996;25(1):128–33.

41. Ejaz MS, Sarwat A, Aisha T. Maternal psychiatric morbidity and childhood malnutrition. Pakistan J Med Sci. 2012;28(5):2.

42. Makoka D. The Impact of Maternal Education on Child Nutrition : Evidence from Malawi,Tanzania and Zimbabwe. DHS Work Pap [Internet]. 2013;84(February):1–32. Available from: www.dhsprogram.com/pubs/pdf/WP84/WP84.pdf

APPENDIX 1: CONSENT EXPLANATION & CONSENT FORM

Introduction: My name is Dr. Salwa Haithar. I am currently undertaking postgraduate/ masters training in the department of Psychiatry, School of Medicine University of Nairobi. As part of my training, I am expected to carry out a study. I intend to do a study on depression in mothers of children aged 6months to 5 years with and without malnutrition.

Depression is a common and increasing problem as our population changes. Depression affects not only the mother but also her child's wellbeing.

By doing this study I hope to establish the burden of this problem and possibly suggest modalities of reducing it.

The role of the study participant: I would like to request your permission to be my study participant since you may meet my entry criteria.

If you agree to participate, I will ask questions about your child and your personal details such as age, occupation, level of education, income and health. Then you will answer nine questions from Patient Health Questionnaire to assess for depression.

Additionally your child will be undressed and his/her weight taken. Utmost care will be taken to reduce discomfort to the child. There will be no samples taken from your child.

I will inform you about the result of the PHQ 9 questionnaire and these will be shared with your primary care physician(s) for intervention where appropriate.

All information obtained will be strictly confidential and will not be revealed to other persons, other than your physician for whom you give direct consent.

The quality of care given to you in this hospital will not be compromised by your refusal to participate in this study.

Participation in this study is voluntary (at your own will) and you are free not to participate. You may withdraw from the study at any time without any reason and this will not compromise the care to you or your child.

Please alert me if you are upset or confused by any of the questions and I will take time to explain them to you.

There are no financial costs on you nor will you be paid to take part in this study.

Participant's benefits and risks:-

Some of the benefits expected to be passed onto the participant of this study include:

- Knowing whether (or not) you have symptoms of depression

- Should you be found to suffer from depression, you will be referred to a doctor/psychologist for treatment.

- Knowing the exact weight and height of your child

- Contributing to the generation of knowledge

On the other hand the risks involved are:

- Your child may feel uncomfortable and cry during weight & height measurement, utmost care will be taken to reduce this discomfort.

- You may be asked about sensitive questions that may make you uncomfortable. Feel free to ask for further explanations.

This study is approved by my university department and the KNH ethics board.

Incase of any need to contact me, please call me on 0722-476555.

Incase of enquiries or concerns about the study, you may also contact the secretary of K.N.H ethics committee on extension 44102.

You will be provided with a copy of this consent explanation.

Do you have any question about participating in this study?

APPENDIX 2: CONSENT FORM

I ……………………………………..of ……………………………. understand the above (purpose, participant's role, procedures, risks and benefits of this study) and give my consent to participate in this study.

Signed………………………………. Date …………………….

I confirm that I have adequately explained to the participant the above.

Investigator (signed)…………………….. Date ……………….

Witness (signed)………………………….Date………………..

APPENDIX 3: KISWAHILI VERSION OF CONSENT EXPLANATION
Maelezo Ya Idhini

Jina langu ni Dr. Salwa Haithar.

Mimi ni mwanafunzi wa masomo ya ugonjwa ya akili katika Chuo Kikuu Cha Nairobi. Nina fanya utafiti kuhusu ugonjwa wa depression katika wamama wa watoto wanao kuwa naupungufu wa lishe mwilini na wale wenye lishe bora.

Ugonjwa wa depression unaweza kudhuru afya wa mtoto na mama. Mara nyingi tukiwa tunatibu watoto walokuwa na upungufu wa lishe hatuangalii hali ya wamama.

Lengo la utafiti wetu ni kuangalia uhusiano wa upungufu wa lishe, na ugonjwa wa depression katika wamama wa hawa watoto.

Na kuomba radhi ushiriki katika hii utafiti ikiwa utaweza hitimisha masharti yakushiriki. Ukikubali kushiriki nitakuuliza maswali kuhusu wewe na mtoto wako na utajibu maswali tisa ya kidodosi juu ya afya ya mgonjwa iitwayo PHQ-9. Pia tuta pima uzito na urefu wa mtoto wako baada ya kumvua nguo. Mtoto hatachukuliwa damu au kipimo kingine.

Je, utafaidika vipi kwa utafiti hili?

Kuna uwezekano kuwa hutafaidika kwa njia yoyote. Ukipatikana na ugonjwa, utapatiwa matibabu kwa njia za kawaida bila kuchelewa. Kwa kukubali kujiunga na utafiti hili, utakuwa unatusaidia kuelewa mengi juu ya depression na itasaidia wengine ambao wako hatarini kupata maradhi haya.

Hakuna madhara yeyote tunayotarajia kukufikia kwa kujiunga na utafiti huu ila kuulizwa maswali ya kibinafsi na mtoto wako kuvuliwa nguo anapopimwa kwenye ratili.

Kujiunga na utafiti hili si kwa lazima. Unaweza kujiondowa kwa utafiti huu wakati wowote ule bila kuhatarisha matibabu yako na ya mwanao.

Ukiwa na maswali yeyote kuhusu hii utafiti usisite kuniongelesha kwa simu langu la mkono nambari 0722476555 au unaweza wasiliana na idara ya kuidhinisha utafiti ya KNH kwa extension 44102.

Ukisoma na kuelewa na kukubali kujiunga na utafiti hili, tafadhali weka sahihi kwenye fomu ya idhini.

APPENDIX 4: KISWAHILI VERSION OF CONSENT FORM

FOMU YA IDHINI

Mimi, _____, nimesoma na nimeelewa madhumuni,vipimo, madhara, na faida la utafiti hili na nakubali kujiunga kwa hiari yangu.

Sahihi _____ Tarehe _____

Mimi,_____, nimemwelezea, Miss/Mr/Mrs _____, mambo yote kuhusu utafiti hili nanishahidi kuwa amekubali kujiunga kwahiari yake mwenyewe bila kulazimishwa.

Mtafiti (Sahihi)_____Tarehe _____

Shahidi (sahihi)_____Tarehe_____

APPENDIX 5: STUDY PROFORMA /QUESTIONNAIRE
(Tick as applicable and insert appropriate code or figure)

1. **Demographic data**

Participant No.	Age(Yrs)	No. of children		Usual residence
		<5yrs	>5yrs	

Family income per annum(ksh)			Occupation		Marital status				Education level							
<36,000 (0)	36,000-150,000 (1)	>150,000 (2)	Mother (M)	Spouse (S)	S (0)	M (1)	D (2)	W (3)	0=0		1º=1		2º=2		3º=3	
									M	S	M	S	M	S	M	S

Maternal History

1. **Do you have/get support from family, friends, or neighbours in times of need?**

   YES   NO

2. **Do you have any control over the family finances?**

   YES   NO

3. **If YES, what level of control do you have?**

Total control (earn the money and determine spending)	
Partial control(do not earn money but participate in budgeting)	

4. **Do you suffer from any chronic physical illnesses?**

YES   NO

5. HIV status?

POSITIVE	NEGATIVE	UNKNOWN

PHQ- 9 Scores_____

Major depression	Other Depression	Any depression

Severity of Depression

Minimal(0-4) (0)	Mild depression(5-9) (1)	Moderate depression(10-14) (3)	Moderately severe depression(15-19) (4)	Severe depression(20-27) (5)

Infant data

Age(months)	Gender		Weight in Kgs	Height in cm	WHO Z SCORES
	M=1	F=2			

APPENDIX 6: PATIENT HEALTH QUESTIONNAIRE-9 (PHQ-9)

Over the last 2 weeks, how often have you been bothered by any of the following problems? *((Use "* ✔ *" to indicate your answer)*	Not at all	Several Days	More than half the days	Nearly Every Day
	0	1	2	3
1) Little interest of pleasure in doing things				
2) Feeling down, depressed, or hopeless				
3) Trouble falling or staying a sleep, or sleeping too much				
4) Feeling tired or having little energy				
5) Poor appetite or overeating				
6) Feeling bad about yourself – or that you are a failure or have let yourself or your family down.				
7) Trouble concentrating on things, such as reading the newspaper or watching television				
8) Moving or speaking so slowly that other people could have noticed? Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual				
9) Thoughts that you would be better of dead or hurting yourself in someway				

FOR OFFICE CODING __0__+___+___+__

= Total Score: _____

If you checked off <u>any</u> problems, how <u>difficult</u> have these problems made it for you to do your work, take care of things at home or get along with other people?*((Use "✔" to indicate your answer)*

Not Difficult at all	Somewhat difficult	Very difficult	Extremely Difficult

49