

A Cross-Sectional Analysis on Maternal Mental Health and Severity of Acute Malnutrition among Children Admitted in Nutritional Rehabilitation Centres of Karnali Province, Nepal

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ABSTRACT

Background: The quality of nutritional care provided to children is determined by mother's psychological involvement with children. Acute malnutrition among children plays pivotal role in causation of morbidity, mortality and intergenerational inequity. Therefore, determining determinants of maternal mental health status and its association with severity of acute malnutrition was the primary objective of the study.

Methods: A cross-sectional study was conducted from Jan 2023 to April 2023 among 105 mother and child dyad admitted in Nutritional Rehabilitation Centres (NRCs) of Karnali Province. WHO Self-Reporting Questionnaire-20 was used to assess maternal mental distress and admission record was noted to identify the severity of acute malnutrition in children. Descriptive and inferential analysis was done. Ethical principles were minded throughout the study period.

Results: Severe acute malnutrition rehabilitation was received by 69.5% of children admitted in NRCs where majority (80.6%) of them belonged to mothers having mental distress. Intimate Partner Violence was the prime factor associated with maternal mental distress ($p=0.001$) and severity of acute malnutrition ($p=0.038$) in children. Age of child ($p=0.043$) and frequency of consumption of cereals ($p=0.032$), pulses ($p=0.001$), animal products ($p=0.036$) and vegetables ($p=0.001$) were associated with severity of acute malnutrition.

Conclusions: Over two third of children were severely acute malnourished and one third of mothers had mental distress. Intimate partner violence was detrimental to maternal mental distress and severity of acute malnutrition. Tailoring mental health and One Stop Crisis Management Centre services to the mothers at Nutritional Rehabilitation Centre and promoting infant and young child feeding would be a game changer in management of acute malnutrition in Nepal.

Keywords: Acute malnutrition; Karnali province; maternal mental health; nutritional rehabilitation centre; severity of acute malnutrition

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INTRODUCTION

Globally, approximately 13% of mothers have experienced mental disorder[1]. It is alarming public health problem impacting on children's emotional, behavioral, cognitive and physical development[2]. Nutritional and socio-emotional quality of care is determined by caregiver's psychological involvement with the child[3].

In low- and middle-income countries, acute malnutrition leads to high morbidity and mortality of under-five children. It perpetuates the risk of cardiometabolic non-communicable diseases, poverty and intergenerational inequity[4]. Asia harbors more than 70% of severely acute malnourished children[5].

A large number of malnourished children in Nepal live in Karnali Province which is food insecure as well. Around 41% of 6-23 months children in the province have minimum acceptable diet[6]. Even incidence of violence were significantly higher and general stress at home among adult is highest (63.5%) in the province[7]. This may have intensified the prevalence and severity of acute malnutrition in children. Despite the continuous efforts of Nepal government, acute malnutrition is a constant challenge and a significant public health problem[6, 8]. This condition may have been aggravated by maternal mental health status. However, maternal mental health is neglected in the child nutrition programs of countries like Nepal and had scarce evidence as well[9, 10]. Therefore, study aimed at determining the determinants of maternal mental health status and its association with severity of acute malnutrition among children admitted in Nutritional Rehabilitation Centres (NRCs) of Karnali Province.

METHODS

An institution based cross-sectional study was conducted in NRCs of Karnali Province from Jan 2023 to April 2023. The sample size was 105 mother and child dyad admitted in NRCs which was calculated using the formula, sample size (n) = z^2pq/d^2 i.e. z was level of confidence at 95% (1.96), p was prevalence of acute malnutrition in Nepal (10%) [6], q was $1-p$ and d was allowable error (6%). All three Nutritional Rehabilitation Centre of Karnali Province located at Jumla, Dailekh and Surkhet were selected for the study. The sample was taken disproportionately from each of the NRCs i.e. 35 mother child dyad from each NRC. Mothers of under-five acute malnourished children admitted in selected NRCs willing for voluntary participation were included in the study. Face to face interview was done with mother using semi-structured questionnaire to collect the information regarding socio-demographic characteristics and feeding practices. A standard tool used by Nepal Demographic Health Survey

2016 was used to collect information regarding intimate partner violence[6]. Household Food Insecurity Access Scale measurement tool developed by FAO was used for measuring the household food security status[11]. Mental health status of mother was screened using the World Health Organization Self-Reporting Questionnaire-20 (WHO SRQ-20) which is a recognized and validated proxy measure for mental distress[12]. It constituted 20 yes/no questions which were grouped into four factor structure of the SRQ-20 as decreased energy, somatic symptoms, depressive mood and depressive thoughts. In the study each item was scored 1 or 0 for the presence and absence of symptoms respectively. Median score of responses was calculated and based on score, mental health was categorized as presence of mental distress (Score \geq Median i.e. ≥ 7) and absence of mental distress (Score $<$ Median i.e. < 7). Here median score (7) of the WHO SRQ-20's responses was used as cut-off point as used in other studies done in resource constraint settings[12]. Anthropometric measurements like weight and height of under five children recorded during admission in NRCs were noted from the records of NRCs. Tools developed in English was translated into Nepali language and retranslated to English. Enumerators were well trained health professionals. Field editing and central editing of the data were carried out by researchers. The data were entered and analyzed in SPSS version 16. Descriptive (frequency, percentage and median were calculated) and inferential analysis (Chi-Square) were done. Study abided the ethical principles of health research and has obtained ethical clearance from Institutional Review Committee- Karnali Academy of Health Sciences, Jumla (Ref: 2078/2079/42).

RESULTS

Among 105 cases admitted in NRCs, 32.4% of them belonged to food insecure houses. Majority (40.0%) of mothers were exposed to Intimate Partner Violence. Among them the prevalence of physical intimate partner violence was 20.0%, sexual intimate partner violence was 5.7% and emotional intimate partner violence was 37.1%. (Table 1)

Among mothers, 36.2% had decreased energy symptoms like feel tired all the time, suffering daily work, trouble in thinking clearly and difficulty to enjoy daily activities. Poor appetite (50.5%) and often having headaches (48.6%) were the most common somatic symptoms. Under Depressive mood 49% of mothers reported of feeling nervous, tense or worried, while 48% felt unhappy and 39% informed they cry more than usual. Majority 34% mothers felt as worthless person where 32% reported of loss of interest in things and 31% were unable to play a useful part in life.

More than one fifth stated of having thought of ending life. (Table 2)

Analysis of WHO SRQ-20 responses revealed that 34.3% of the mothers had mental distress. Similarly, based on weight for height WHO criteria, 30.5% of under five-year children had moderate and 69.5% of them had severe acute malnutrition at the time of admission in NRCs. (Table 3)

Table 1: Household Food Security and Intimate Partner Violence in Mothers

Characteristics	Frequency	Percentage (%)
Household Food Security		
Food Secure	71	67.6
Food Insecure	34	32.4
Intimate Partner Violence		
Yes	42	40.0
No	63	60.0
Types of Intimate Partner Violence (IPV)		
Physical IPV		
Yes	21	20.0
No	84	80.0
Sexual IPV		
Yes	6	5.7
No	99	94.3
Emotional IPV		
Yes	39	37.1
No	66	62.9

Table 2: Classification of SRQ-20 items response of mothers into four factors structure

SRQ-Items	Symptoms Present	
	Frequency	Percent
Decreased Energy Symptoms Present		
8. Trouble thinking clearly	38	36.2
11. Difficult to enjoy daily activities	38	36.2
13. Suffering daily work	38	36.2
18. Feel tired all the time	38	36.2
12. Difficult to make decisions	33	31.4
20. Easily tired	29	27.6
Somatic Symptoms Present		
2. Poor appetite	53	50.5
1. Often have headaches	51	48.6
7. Poor digestion	24	22.9
19. Uncomfortable feelings in stomach	21	20.0
Depressive Mood Present		
6. Feel nervous, tense or worried	49	46.7
9. Feel unhappy	48	45.7
10. Cry more than usual	39	37.1
Depressive Thoughts Present		
16. Feel as worthless person	34	32.4
15. Lost interest in things	32	30.5
14. Unable to play a useful part in life	31	29.5
17. Thought of ending life	28	26.7

Table 3: Maternal Mental Health Status and Severity of Acute Malnutrition among Children

Maternal Mental Health Status (Maternal Mental Distress)	Frequency	Percentage (%)
Present (≥ 7 score)	36	34.3
Absent (< 7 score)	69	65.7
Median Score was 7 of the Responses of WHO SRQ-20		
Severity of Acute Malnutrition among Children (Weight for Height)	Frequency	Percentage (%)
Moderate Acute Malnutrition ($WFH \geq -2SD$ - $< -3SD$) ^a	32	30.5
Severe Acute Malnutrition ($WFH < -3SD$) ^a	73	69.5
^a WFH: Weight for Height, $< -3SD$ = Severe Acute Malnutrition; $\geq -2SD$ - $< -3SD$ = Moderate Acute Malnutrition (WHO Growth Standard and Cutoff value of acute malnutrition)[13]		

More than one third (35.3%) of mothers having household food insecurity had mental distress. However, there was statistically insignificant association of household food security with maternal mental distress ($p=0.880$). Significantly higher number of mental distresses in mothers were seen in cases with Intimate Partner Violence ($p=0.001$) along with its different forms like physical IPV ($p=0.014$), sexual IPV ($p=0.030$) and emotional IPV ($p=0.001$). (Table 4)

Data suggested that 80.6% of Severe Acute Malnourished children belonged to mothers having mental distress which was very high proportion in comparison to children of mothers having no mental distress (63.8%). Higher prevalence of SAM was found in children of IPV victim mothers than no IPV (81.0% vs 61.9%; $p=0.038$). Severe Acute Malnutrition was highly prevalent among male children, initiation of breastfeeding after 1 hour of birth, and less than 10 times breastfeeding in 24 hours in contrast

to their counter parts. However, there were no statistically significant associations between them. The age of children had statistically significant association with severity of their acute malnutrition ($p=0.043$) where SAM was higher among infants than young children above 1 year age.

Similarly, Frequency of consumption of cereals/roots/tubers ($p=0.032$), pulses and legumes ($p=0.001$), animal products ($p=0.036$) and vegetables ($p=0.001$) had significant association with severity of acute malnutrition among under five children. (Table 5)

Table 4: Associated Factors with Maternal Mental Health

Characteristics	Maternal Mental Distress		p-value	OR (95% CI)
	Absent (%)	Present (%)		
Household Food Security				
No	22 (64.7%)	12 (35.3%)	0.880	0.936 (0.397-2.208)
Yes	47 (66.2%)	24 (33.8%)		
Intimate Partner Violence (IPV)				
No	49 (77.8%)	14 (22.2%)	0.001*	3.850 (1.648-8.992)
Yes	20 (47.6%)	22 (52.4%)		
Physical IPV				
No	60 (71.4%)	24 (28.6%)	0.014*	3.333 (1.244-8.930)
Yes	9 (42.9%)	12 (57.1%)		
Sexual IPV				
No	68 (68.7%)	31 (31.3%)	0.030*c	10.968 (1.229-97.866)
Yes	1 (16.7%)	5 (83.3%)		
Emotional IPV				
No	51 (77.3%)	15 (22.7%)	0.001*	3.967 (1.690-9.309)
Yes	18 (46.2%)	21 (53.8%)		
*Statistically significant association= p-value<0.05, °Continuity Correction p-value, if OR>1 and CI does not include 1=statistically significant association				

Table 5: Associated Factors with Severity of Acute Malnutrition in U5 Children

Characteristics	Severity of Acute Malnutrition in Children (Weight for Height)		p-value	OR (95% CI)
	MAM (<-2SD to \geq -3SD)	SAM(<-3SD)		
Maternal Mental Distress				
Absent	25 (36.2%)	44 (63.8%)	0.076	2.354 (0.901-6.150)
Present	7 (19.4%)	29 (80.6%)		
Mother IPV Exposure				
No	24 (38.1%)	39 (61.9%)	0.038*	2.615 (1.039-6.582)
Yes	8 (19.0%)	34 (81.0%)		
Age of Child				
<12 months	12 (21.8%)	43 (78.2%)	0.043*	0.419 (0.178-0.983)
\geq 12 months	20 (40.0%)	30 (60.0%)		
Sex of Child				
Male	15 (25.0%)	45 (75.0%)	0.159	0.549 (0.237-1.271)
Female	17 (37.8%)	28 (62.2%)		
Initiation of Breastfeeding				
Within 1 Hour	22 (34.4%)	42 (65.6%)	0.278	1.624 (0.674-3.914)

After 1 Hour	10 (24.4%)	31 (75.6%)		
Breastfeeding Frequency in 24 Hours				
<10 times	27 (29.3%)	65 (70.7%)	0.504	0.665 (0.199-2.216)
≥10 times	5 (38.5%)	8 (61.5%)		
Animal Products Frequency				
≤3 times/week	22 (39.3%)	34 (60.7%)	0.036*	2.524 (1.049-6.070)
>3 times/week	10 (20.4%)	39 (79.6%)		
Cereals/Roots/Tubers Frequency				
Daily	25 (37.9%)	41 (62.1%)	0.032*	2.787 (1.070-7.259)
Sometimes	7 (17.9%)	32 (82.1%)		
Pulses and Legumes Frequency				
Daily	28 (44.4%)	35 (55.6%)	0.001* ^c	7.600 (2.421-23.855)
Sometimes	4 (9.5%)	38 (90.5%)		
Vegetables Frequency				
Daily	27 (54.0%)	23 (46.0%)	0.001*	11.739 (4.009-4.376)
Sometimes	5 (9.1%)	50 (90.9%)		
Fruits Frequency				
Daily	3 (60.0%)	2 (40.0%)	0.331 ^c	3.672 (0.583-23.137)
Sometimes	29 (29.0%)	71 (71.0%)		
Food Security				
Food Insecure	7 (20.6%)	27 (79.4%)	0.128	0.477 (0.182-1.250)
Food Secure	25 (35.2%)	46 (64.8%)		
Meal Frequency				
<4 Times	30 (30.0%)	70 (70.0%)	1.000 ^c	0.643 (0.102-4.046)
≥4 Times	2 (40.0%)	3 (60.0%)		
*p-Value<0.05=statistically significant association, ^c Continuity Correction p-value, if OR>1 and CI does not include 1= statistically significant association				

DISCUSSIONS

One third of the children admitted in NRCs of Karnali Province had moderate and two third had severe acute malnutrition which was many fold higher (MAM-5.1% and SAM-10.6%) than that found by study done in BP Koirala Institute of Health Sciences in eastern Nepal[14]. This difference in burden of acute malnutrition may be due to higher food insecurity and poverty in Karnali Province than in eastern Nepal[15]. Another reason for higher proportion of acute malnourished children may be because of bias in admission criteria of children in NRCs.

More than one third mothers of children admitted at NRCs in Karnali province were having mental distress which was greater than prevalence of probable cases of maternal distress in Banke District of Nepal (20.0%), Ethiopia (33.0%), India (30.0%), Peru (30.0%) and Vietnam (21.0%)[10, 16].

A study done in mothers of rural Nepal found the statistically significant association between food security status and maternal mental distress but in our study there

was no significant association between these two variables[17]. However, in present study maternal mental distress was highly prevalent among mothers having household food insecurity. About one third of participants had household food insecurity in this study which resembles with the prevalence of food insecurity in Karnali Province reported by NDHS 2022[18].

In this current study, physical, sexual and emotional intimate partner violence had statistically significant association with maternal mental distress. These findings are supported by the study done in Bangladesh[19]. The prevalence of these forms of intimate partner violence suggests higher prevalence of physical and emotional partner violence among mothers of acutely malnourished children in Karnali Province than indicated by NDHS 2022 (physical-17.4%, sexual-8.7% and emotional-12.7% of intimate partner violence)[18].

There was no significant association between maternal mental distress and severity of acute malnutrition in under five children of Karnali Province

which is supported by a study done in Bangladesh, Vietnam and Ethiopia[20]. However, present study had shown greater prevalence of severe acute malnutrition among children having mothers with mental distress. A study done in developing countries has shown significant association between maternal mental distress and severity of acute malnutrition in children[10]. This is because when mother's mental health is compromised, child's nutrition is adversely affected interfering her ability in child caring and rearing. Present study stated that mothers being exposed to IPV have higher proportion of SAM children than mother having no exposure to IPV which is echoed by a rapid evidence assessment on exposure to gender based violence and child nutrition conducted by UNICEF[21]. Current study demonstrated, age of the child had statistically significant association with severity of acute malnutrition among children which is equally reiterated by the facility based study done in Bangladesh[22], and eastern Nepal[14]. In this study, the child feeding indicators like frequency of consumption of animal products, cereals, pulses and vegetables feeding to children had significant association with severity of acute malnutrition which is also restated by a study done in Ethiopia[23]. This may be because of the fact that cereals are rich source of energy, pulses and meat are rich source of protein and vegetables are rich source of vitamin A, vitamin C, iron and zinc which protects children from acute malnutrition[24].

Limitation of the Study: Small sample size of the study may have influenced the association between variables. Social desirability bias may have influenced the result though interview was done in confidential setting. Limited variables were studied. General population was not included.

CONCLUSIONS

Approximately two third of children had severe and one third had moderate acute malnutrition among children admitted in NRCs of Karnali Province. More than one third mothers of acutely malnourished children have maternal mental distress. Notably, intimate partner violence and different forms of intimate partner violence like physical, sexual and emotional intimate partner violence were the factors associated with maternal mental distress. Greater percentage of children were having severe acute malnutrition belonging to mothers having mental distress which emphasize that the rearing and caring of children is affected by mothers' mental health status. Exposures of mother to IPV have detrimental effect on severity of acute malnutrition in children. Child feeding practices have

statistically significant association with severity of acute malnutrition. Thus, while providing nutritional rehabilitation to acutely malnourished children in Nutritional Rehabilitation Centre, it is essential to assess and address their mothers' mental health status to prevent reoccurrence of malnutrition. Similarly, intimate partner violence against women should be discouraged and brought in legal premises, and positive infant and young child feeding practices should be encouraged for better nutritional outcomes.

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Author's contribution: SKC & NL conceptualized, designed the study and finalized the manuscript. BP, ML, PN & RG helped in Literature review. PP & NL analyzed and interpreted the data.

Conflict of interest: None

Ethical Approval: Authors have strictly followed ethical principles to prevent ethical issues like plagiarism, data fabrication and dual publication. Ethical approval was obtained from IRC- Karnali Academy of Health Sciences, Jumla in 15 July 2022 (Ref: 2078/2079/42).

Consent: The purpose of this study was explained in participant's level of understanding and informed written consent was taken from all the participants.

Date Availability: Data will be available on reasonable request.

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Layman Summary: Malnutrition is one of major public health issue in low- and middle-income country like Nepal. Caregivers especially mother's psychological state has found to influence the child's growth and development including nutritional status. This study revealed more than one third of mother had maternal mental distress and 69.5% children had severe acute malnutrition. Intimate partner violence was the main reason behind maternal psychological wellbeing. The study revealed mothers with distress tend to have their children suffer from severe acute malnutrition. Hence, we recommend families to care mental health of mother especially by their husbands and maintain a healthy and harmonious Centre environment for betterment of children's growth and development.

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