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## Development of Awareness Assessment Scale for the mothers of Severe Acute Malnourished Children treated under the Nutrition Rehabilitation Centre

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### ABSTRACT

Journey of a child's life starts directly from mother's womb. It has been observed in many studies that the health of child is directly correlated with mother's health, education and awareness. The study aimed to develop and validate a 2-point (yes/no) questionnaire to measure the awareness of mothers of severely malnourished children. 58 mothers of children admitted to nutrition rehabilitation centre were taken as sample. All the essential steps for the standardization of the questionnaire, like reliability and validity and cut off of total score have been taken into account. These statistical calculations were done through SPSS version 28 and the reliability and validity were found satisfactory. Developed a 38-item, 2-point (yes or no) scale for assessment of awareness of mother of SAM child.

**Keywords:** Questionnaire, Reliability, Validity, Content validity ratio.

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## Introduction

A child spends nine months of his/her life in the mother's womb; this period holds a significant importance for his/her future. Not only this, but in our country, India, this intimate relationship between the child and the mother has also been explained in Vedas and scriptures. A research study (Tripathi et al., 2023) conducted in India, found that mother's

awareness, education, and health are positively associated with child's health. <sup>[1]</sup> Another similar study (Tandon et al., 2019) found that mothers who had good knowledge about nutrition had healthier children. <sup>[2]</sup>

According to WHO (2024), Globally in 2022, 149 million children under 5 were estimated to be stunted (too short for age), 45 million were estimated to be wasted (too thin for height). <sup>[3]</sup>

On the other hand, the United Nations adopted the 2030 Agenda for Sustainable Development. It sets out 17 Goals, which include 169 targets. The third Goal is to ensure healthy lives and promote well-being for all at all ages. WHO (2019) <sup>[4]</sup>

A study (Bhatnagar et al. 2007) found that the Nutrition Rehabilitation Center (NRC) is a children ward where severely acute malnourished children are treated after admission to the centre. This centre basically uses therapeutic diets, called formula diets, for the treatment of children. <sup>[5]</sup> In this centre, mothers of the children are also made aware about the malnutrition and how they should take care of their children. (Participant Manual for Facility Based Care of Severe Acute Malnutrition, 2013) <sup>[6]</sup> So, in order to assess the awareness of mothers how had their children admitted to NRC, we developed a tool in the form of questionnaire. By assessing the awareness of mothers through this questionnaire necessary improvement can be made easily towards improvements of child's health.

A study of questionnaire development (Tsang et al., 2017) revealed all the essential steps for the standardization of the questionnaire, like reliability, validity and cut off of total score and all these steps have been done in the present study. <sup>[7]</sup>

## **Materials and Methods**

A 38 item 2-point (yes/ no) Scale in Indian language has been prepared to determine the mothers' awareness in the field of severe acute malnutrition treated under the nutrition rehabilitation center. Reliability and Validity of this scale has been tested on 58 subjects using SPSS -28 version. The questionnaire consists of the following 5 areas namely breastfeeding, complimentary feeding, basic nutrition, therapeutic diet related knowledge (NRC Formula diet), hygiene & sanitation. Reliability has been tested by two methods viz: Cronbach's Alpha and Guttman split-half method. Face validity, content validity and factor

analysis have been calculated for validation of the scale. The cut-off of the total score of 38 items has also been determined.

**Ethical Approval:** Approval was obtained from Institutional Ethical committee (No Dean/2021/EC/2856), before starting the study. Informed consent was obtained from all the subjects who participate in the study.

## Results

The data collected on basic characteristics of the 58 subjects for the validation of the scale has been summarized in the table given below:

Characteristics		Number (Percentage) (n=58)
Age	14-19	2 (3.4)
	20-24	23 (39.5)
	25-29	21 (36.2)
	30-34	7 (12.1)
	35-49	5 (8.5)
Habitat	Rural	34 (58.6)
	Urban	24 (41.4)
Religion	Hindu	50 (86.2)
	Muslim	8 (13.8)
Category	General	4 (6.9)
	OBC	26 (44.8)
	SC	26 (44.8)
	ST	2 (3.4)
Education	Illiterate	10 (17.2)
	Primary	25 (43.1)
	Upper Primary	6 (10.3)
	High School and above	17 (29.3)
Occupation	Working	9 (15.5)
	House- Wife	49 (84.5)
Economic Status	Above Poverty Line	98 (96.6)
	Below Poverty Line	2 (3.4)

Number of Children	1-2	15 (25.8)
	3-4	29 (50)
	5 & above	14 (24.1)
Abortion	Yes	18 (31)
	No	40 (69)

### Reliability

Reliability (Internal consistency) has been determined by Cronbach's Alpha. The value of Cronbach's Alpha on all 38 items is 0.883 which is regarded as satisfactory. None of the items if deleted increases the value of Cronbach's Alpha substantially. Therefore all 38 items are retained. (Table-1)

**Table-1: Reliability Statistics**

Reliability Statistics	
Cronbach's Alpha	N of Items
0.883	38

**Table-2: Reliability Statistics (Split- half Method)**

Reliability Statistics			
Cronbach's Alpha	Part 1	Value	0.824
		N of Items	19 <sup>a</sup>
	Part 2	Value	0.778
		N of Items	19 <sup>b</sup>
	Total N of Items		38
Correlation Between Forms			0.710
Spearman-Brown Coefficient	Equal Length		0.830
	Unequal Length		0.830
Guttman Split-Half Coefficient			0.827

a. The items are: Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18, Q19.
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b. The items are: Q20, Q21, Q22, Q23, Q24, Q25, Q26, Q27, Q28, Q29, Q30, Q31, Q32, Q33, Q34, Q35, Q36, Q37, Q38.
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Further, the reliability is also tested by split-half method which is also satisfactory. The following table shows the reliability statistics. (Table-2)

### Validity

**Face Validity-** For face validity the questionnaire has been shown to the subject experts and all of them found the questionnaire as valid for assessing mother's awareness in the field of severe acute malnutrition under treatment of nutrition rehabilitation center.

**Content Validity-** For content validity of the 38-item scale the questionnaire was sent to 10 experts for rating each item as essential or not essential. The content validity ratio (CVR) of each item has been calculated based on data received from 10 experts using the following formula.

$$CVR = (N_e - N/2) / N/2$$

Where,  $N_e$  is Number of experts found the items essential

$N$  is Number of Experts.

The required minimum cut off score of CVR for 10 experts is 0.62.

The CVR value of all the 38 items are found above 0.62. So, all the items are retained in the scale.

**The Content Validity Index (CVI)**, of the overall scale is 0.968.

$$CVI = \sum CVR / N_{cvr}, \text{ Where } N_{cvr} \text{ is number of items}$$

### Factor Analysis-

Factor analysis has been done on all 38 finalized items on 58 subjects. The value of K.M.O. test was 0.684 and the Bartlett's test of sphericity is highly statically significant. (Table-3)

**Table-3: KMO and Bartlett's Test**

<b>KMO and Bartlett's Test</b>		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.684
Bartlett's Test of Sphericity	Approx. Chi-Square	2084.715
	Df	703
	Sig.	0.000

The anti-image correlation matrix showed 80% of the diagonal values being more than 0.5.

The factor analysis identified 10 factors (eigen value greater than 1) with total cumulative variance explained as 78%.

As the rotated factor matrix had 4 dimensions having only 1 or 2 variables therefore, the number of factors has been reduced to 6 and analysis was carried out again.

The total cumulative variance explained on fixed 6 factors was 64.436%.

**Table-4: Rotated Component Matrix**

<b>Rotated Component Matrix<sup>a</sup></b>						
	Component					
	1	2	3	4	5	6
Q1	0.102	0.347	0.248	-0.084	-0.469	0.392
Q2	0.041	0.376	0.545	-0.018	-0.049	-0.042
Q3	0.033	0.752	0.235	0.202	0.048	0.266
Q4	0.049	0.728	0.229	0.302	0.132	0.018
Q5	-0.304	0.293	0.350	-0.006	0.369	-0.190
Q6	0.826	0.045	0.073	-0.056	-0.016	-0.061
Q7	0.749	0.068	-0.045	0.032	-0.107	0.004
Q8	0.076	0.655	0.223	0.375	0.170	0.026

Q9	0.103	0.651	0.186	0.468	0.172	-0.169
Q10	-0.045	0.453	0.455	-0.001	0.201	0.172
Q11	-0.039	0.044	0.302	0.732	0.166	-0.346
Q12	0.110	0.434	0.424	0.266	0.093	0.534
Q13	0.793	0.016	0.095	-0.025	-0.019	-0.005
Q14	0.197	0.678	-0.124	0.131	0.047	-0.097
Q15	-0.023	0.527	0.236	0.470	0.084	0.030
Q16	0.749	0.006	-0.096	-0.144	0.087	-0.027
Q17	-0.064	0.025	0.147	0.019	0.768	0.128
Q18	0.114	0.277	-0.036	-0.024	0.784	0.127
Q19	0.035	0.311	-0.372	0.161	0.328	-0.530
Q20	-0.050	0.081	0.025	0.778	-0.282	-0.038
Q21	-0.004	0.119	-0.056	0.851	0.032	0.258
Q22	-0.092	0.192	0.060	0.832	0.041	-0.013
Q23	0.946	-0.052	0.045	0.071	-0.024	0.064
Q24	0.922	0.101	0.032	-0.003	-0.027	0.027
Q25	0.931	0.106	-0.034	-0.068	-0.021	0.052
Q26	0.949	-0.008	-0.001	0.113	-0.014	0.034
Q27	-0.082	0.099	-0.102	0.130	0.379	0.396
Q28	0.040	-0.472	-0.003	0.198	0.000	0.013
Q29	0.034	0.176	0.016	0.067	-0.153	-0.627
Q30	0.022	0.347	0.567	0.071	-0.396	0.010
Q31	0.110	0.221	0.688	0.098	0.277	0.011
Q32	-0.012	-0.328	0.805	0.130	-0.034	0.082
Q33	-0.042	0.140	0.876	0.112	0.125	0.088

Q34	-0.013	0.192	0.445	-0.134	0.120	0.641
Q35	0.000	0.468	0.516	0.147	0.055	0.196
Q36	-0.070	0.151	0.348	-0.010	0.669	0.163
Q37	0.090	0.159	0.100	0.463	0.189	0.466
Q38	0.343	0.130	-0.124	0.319	0.100	0.441
Extraction Method: Principal Component Analysis.						
Rotation Method: Varimax with Kaiser Normalization. <sup>a</sup>						
a. Rotation converged in 10 iterations.						

On the basis of the table-4 the dimensions with their items and dimension wise reliability have been shown below:

Dimensions	Items	Reliability Cronbach's Alpha
D1	Q6, Q7, Q13, Q16, Q23, Q24, Q25, Q26	0.951
D2	Q3, Q4, Q8, Q9, Q14, Q15, Q28	0.844
D3	Q2, Q10, Q30, Q31, Q32, Q33, Q35	0.828
D4	Q5, Q11, Q20, Q21, Q22	0.741
D5	Q1, Q17, Q18, Q36	0.540
D6	Q12, Q19, Q27, Q29, Q34, Q37, Q38	0.451

### Cutoff Score of the Scale

To determine the cutoff of the overall 38 items 2-point scale the score of all subjects is added to get the total score. Thus, the minimum total score can be 0 (zero) and maximum score can be 38.

The normality of the data of total score has been tested by Kolmogorov – Smirnov test, which was not statistically significant ( $p > 0.05$ ).



As the data follows normal distribution the mean  $\pm 1SD$  has been taken as criteria for determining cutoff score. Mean of the total score was 23.16 and SD was  $\pm 5.728$ . Thus, the mean  $\pm 1SD$  will be 17.432 to 28.888.

The cutoff overall scale is as given below

Total Score	Awareness Status
0-17	Low
18-29	Average
30-38	Good

## Discussion

As we already know that the health of children is directly impacted by mother's health even before the birth, in the same way even after birth, a child's health is correlated with the awareness of mother regarding health. This questionnaire has been made in order to measure the awareness of mothers regarding the prevalent malnutrition among the children. On the basis of the cut-off score of the questionnaire we can assess the level of awareness among mothers regarding malnutrition. Ultimately, we can conclude that this scale can help in our mission of combating malnutrition.

## Conclusion

Once we measure the level of awareness of mothers some measures can be taken for improvement of awareness which may in turn will have good effect on child nutrition.

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## Conflict Of Interest

The authors have no conflicts of interest associated with the material presented in this paper.

## Ethical Approval

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