Original Research Article

NUTRITIONAL ASSESSMENT AND GROWTH MONITORING OF CHILDREN AGED 0-5 YEARS IN ANGANWADI CENTRES OF MEDCHAL DISTRICT

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A B S T R A C T

Background: In India, undernutrition is recognized as a serious health and nutritional issue and a significant contributor to childhood mortality and morbidity. Pre-schoolers being the most vulnerable group in the community, their nutritional condition are a sensitive predictor of community health and nutrition. In order to determine the nutritional status, prevalence, and risk factors for undernutrition in children aged 0–5 years who attend Anganwadi centers (AWC) in the villages of the Medchal district, this study was conducted.

Material and Methods: A cross sectional study was carried out among 375 children aged 0-5year in Anganwadi centres of Medchal district during August 2017–November 2017. Demographic data, socioeconomic status, child and mother data were collected. Data was gathered using a pretested questionnaire that was primarily based on the World Health Organization's (WHO) standard questionnaire on infant and young child feeding (IYCF) practices. The Statistical Package for Social Sciences (SPSS version 17.0) was used to analyze the data. To determine how risk factors were related, Binary Logistic Regression analysis was used. A P-value of less than 0.05 was deemed significant.

Results: The overall percentage of underweight, wasting and stunting were 29.3%, 16.53% and 45.8% respectively. Independent risk factors associated with underweight were poor maternal education, low maternal Body Mass Index (BMI), lower level of socio-economic class sand low birth weight of the baby. IYCF practices such as starting breastfeeding within 24 hours and exclusively breastfeeding were 62.8% and 81% respectively.

Conclusion: The prevalence of undernutrition appears to be high among 0-5 years in the population. Undernutrition was linked to the mother's health and educational attainment. Mothers' education regarding the health state of their children may aid in rectifying.

Key Words: Under 5years, Undernutrition, anganwadi centres, nutritional status, wasting, stunting, underweight, BMI, growth faltering.

INTRODUCTION

In India, undernutrition is recognized as a serious health and nutritional issue. Childhood morbidity (impairment of physical and mental growth) and death are not the only significant causes of it.[1-4] The most susceptible group in any community is preschoolers. A relevant measure of the nutrition and health of the community is their nutritional status.[5] The primary cause of death and Disability Adjusted Life Years (DALYs) for children under five is underweight, which is followed by insufficient nursing. These risk factors frequently coexist and contribute to the same disease consequences as other dietary problems, infections,

and poverty.[6] Malnutrition makes infections more likely to occur and makes them more severe.[6,7]

Burden of the problem: In 2017, an estimated 155 million children under five were stunted (too short for age), 52 million were wasted (too thin for height), and 41 million were overweight or obese globally.[8,9] The highest rates of stunting were found in South-East Asia and Africa (34%). In addition to having the highest frequency of wasting (15.3%), the WHO South-East Asia Region had 27 million wasted children. It is estimated that undernutrition accounts for 2.7 million child deaths annually or 45% of all child deaths.[8,9] Among children under five in India, the prevalence of nutritional deficiencies is 35.5% stunted, 19.3% wasted, 7.7% severely wasted, and 32.1% underweight, whereas in Telangana state, the prevalence is 33.1% stunted, 21.7% wasted, 8.5% severely wasted, and 31.8% underweight.[10,11] All together, dietary risk factors were responsible for an estimated 3.9 million fatalities (35% of all deaths) and 144 million DALYs (33% of all DALYs) among children under five.[12] Malnutrition increases the risk of death from some of the most prevalent illnesses in children.[13,14]

Nutritional practices: The World Health Organization's Infant and Young Child Feeding Guidelines state that breastfeeding should begin within an hour of birth, be the sole source of nutrition for the first six months of life, and be maintained for at least two years. Moreover, it has created important evaluation indicators.[15-19] Breastfeeding benefits individual families as well as the nation overall by improving infant growth and reducing health care costs.[20] Nutrition for infants and early children is one of the most crucial strategies to promote proper development and growth and improve the longevity of children. Initial couple of years of a child's life are referred to as the "Golden Period" because they are when excellent nutrition reduces morbidity and mortality, decreases the likelihood of long-term illness, and promotes greater growth in general.[16] If children under five are given the best possible nutrition, about 820,000 lives may be spared annually. In addition to increasing IQ and school attendance, breastfeeding is linked to greater adult earnings.[16]

Nutrition and Growth assessment: In order to promote health, the Integrated Child Development Services (ICDS) Scheme chose growth monitoring as an operational method. This allows mothers to visualise if their children are growing or not. When it comes to evaluating nutritional status, Anganwadi employees are said to perform exceptionally well.[21,22] But it's been noted that growth, and growth faltering in particular, aren't given the necessary attention. Growth monitoring is defined by the National Institute of Public Cooperation and Child Development (NIPCCD) as routinely weighing the child, recording the weight on a graph named as Growth Chart that allows one to track variations in weight, and providing the mother with guidance based on these weight changes.[21,22] To evaluate the nutritional status, Measurements of anthropometry such as height or length, weight, and BMI were taken. Nutritional status is determined using the Z-scores for the several nutritional parameters: weight-for-age, height-for-age, and weight-for-height.

Objectives

1. To assess the nutritional status of the children aged 0-5years attending anganwadi centres in villages of Medchal district.
2. To estimate the prevalence of undernutrition among 0-5years children.
3. To identify the risk factors associated with undernutrition.

MATERIALS AND METHODS

Study Design: Community based Cross sectional study.

Duration: August–November 2017 (4 months).

Study Setting: Eight Anganwadi Centres (AWC) of Medchal Mandal in Medchal district of 40 centres randomly.

Sample Size: Using the formula $n = Z2pq/d2$, where P = Prevalence, q = (1 - p), Z = 1.96 (considering 95% confidence interval), and d = Relative Allowable Error, an estimate of prevalence of 33.3% as reported in the National Family Health Survey (NFHS-4),[23] is made

$$= \frac{1.96 \times 1.96 \times 33.3 \times 66.6}{5 \times 5}$$

= 340.7

= 375 (adding 10% for nonresponse)

Inclusion criteria – Every child aged 0–5 who came to the Anganwadi center on the day of the vaccination in the Medchal district.

Exclusion criteria – Children with congenital anomalies and endocrine abnormalities were excluded. These are assessed based on past records and present examination clinically

Methods: After taking the ethical committee clearance, children 0-5years of age in Anganwadi centres of Medchal district who were availing immunization services were taken during the period of August–November 2017. Explained, written consent from mothers of 0-5years children was obtained, after explaining the studies nature and scope. Selected socio demographic features, infant feeding practices and nutritional status data taken. Socio economic status has been assessed by using BG Prasad classification.

Data is gathered using a pretested questionnaire that is primarily based on IYCF practices questionnaire provided by the IMCI integrated mother and child illness module 9 and the WHO.[17] The data required to compute the ten IYCF key indicators is provided by these questions. Information regarding the diet chart of the child before day, including the food diversity they had eaten and how often they had eaten them, was gathered in accordance with WHO

guidelines. Cereals, legumes and nuts, dairy products, meat products, eggs, fruits and vegetables high in vitamin A, and other fruits and vegetables were the seven categories into which food items were divided.

Using a standiometer, children over two years old had their height measured to the closest 0.1 cm, while children under two years old had their length measured in a reclining position using an infantometer. The weighing scale was used to take the weight, and it was adjusted before each measurement. When weighing children who were unable to standing beside their mothers, the mother's weight was deducted. IMCI guidelines were followed for taking measures. A weighing scale was used to measure the weight in kilograms (kgs), with a 0.1 precision, while wearing the least amount of clothing and no shoes. Three monthly weight assessments were recorded over the three-month follow-up period. When children acquire less than 300 grams in three consecutive months, it is referred to as growth faltering. Children who cannot stand were weighted with mother and mother's weight was deducted. A weighing scale was used to measure weight in kilograms (kgs) to the nearest 0.1 kg while wearing the least amount of clothing and no shoes.while taking measurements IMCI recommendations were followed. Followed for 3 months three readings of weight monthly one reading was taken. Growth faltering is defined as children gain weight <300gms in three consecutive months.[24]

Statistical Analysis Plan: SPSS was used for the statistical analysis of the data.

For descriptive analysis numbers and percentages were used. Mean values and standard deviations were calculated for other parametric data collected. To determine the relationship between risk factors and underweight, a binary logistic regression analysis was used. Based on univariate analysis if the p value was < 0.15 then were included in the multivariable model. P values less than 0.05 were regarded as significant.

RESULTS

A total of 375 children and their mother's data were included in the present study. Age and gender wise equal distribution of participants was taken up among each age group as shown in the Table 1.

Fig:2 depicts the distribution of age group wise distribution of the undernutrition with highest level of stunting, wasting and underweight were seen among 25-36months (26.16%), 49-60months (40.32%) and 37-48months (29.09%) respectively.

Severe stunting, wasting and undernutrition were highest among 49-60 months (13.37%), 37-48 months (3.23%) and 25-36 months (3.64) respectively (Table 2). Least undernutrition was seen in 0-12months age group. The overall percentage of underweight, wasting and stunting were 29.3%, 16.53% and 45.8% respectively.

The overall faltering percentage was 16.27% with highest in 13-24 months (5.33%) followed by 49-60 months of age group (5.03%). (Figure 1) In univariate analysis low socio-economic status, poor maternal education, low maternal BMI, low birth weight, late initiation of supplementary food, minimum frequency of meal and food diversity were significant. Independent risk factors associated with underweight were low birth weight of the baby, low socio-economic status, poor level of education and low BMI of the mother. [Table 3]

The core indicators of WHO Infant and Young Child Feeding practices breast feeding initiation within an hour was seen only 62.8% of them, while majority (81% and 88.6% respectively) of them exclusively breastfed and continued breast feeding for one year. [Table 4]
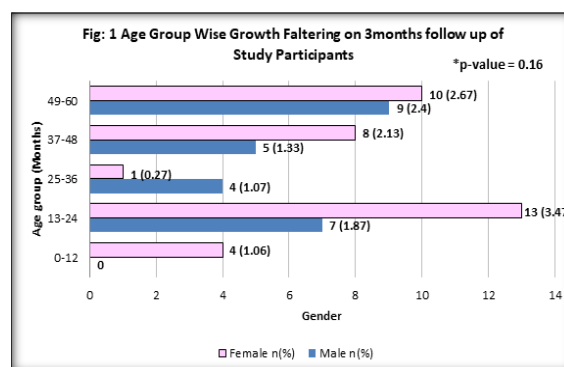

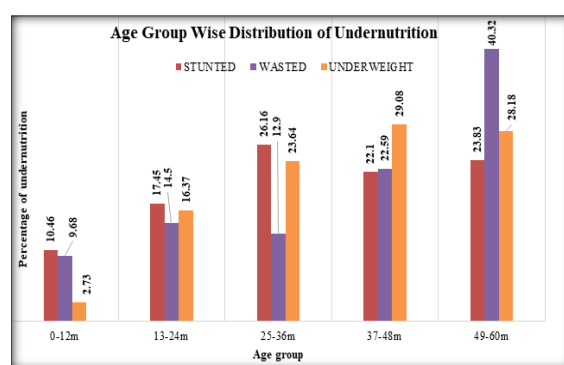**Figure 1: Age Group Wise Growth Faltering on 3months follow up of Study Participants (N = 375)**

Figure 2: Showing Age Group Wise Distribution of Undernutrition among Study Participants (N = 375)

Table 1: Age Group Wise Distribution of Demographic Data of Study Participants (N = 375)

Age (Months)	Gender M:F(%)	Age(Months) (Mean±SD)	Weight(Kgs) (Mean±SD)	Height(Mts) (Mean±SD)	BMI(Kg/M²) (Mean±SD)
0-12	52:48	6.04 ±3.51	6.96 ±1.75	0.65 ±6.79	16.58 ±2.04
13-24	48:52	17.05 ±3.16	9.27 ±1.43	0.74 ±5.49	16.49 ±2.75
25-36	55:45	29.13 ±3.28	10.7 ±1.42	0.82 ±4.43	15.79 ±2.04

37-48	52:48	40.96 ±3.50	12.24 ±1.6	0.90 ±5.8	15.26 ±2.13
49-60	41:59	54.33 ±3.70	13.49 ±1.8	0.94 ±7.02	15.49 ±2.95
Total	50:50	29.5 ±17.41	10.53 ±2.8	0.81 ±12.1	15.92 ±2.34

Table 2: Age Group Wise Distribution of Undernutrition of Study Participants (N = 375)

Age (Months)	Stunted (Length/Age) (n=172)(%)		Wasted (Weight/Length) (n=62) (%)		Underweight (Weight/Age) (n=110) (%)	
	<-2SD	<-3SD	<-2SD	<-3SD	<-2SD	<-3SD
0-12	16(9.3)	2(1.16)	6(9.68)	0(0)	3(2.73)	0(0)
13-24	18(10.47)	12(6.98)	8(12.9)	1(1.61)	16(14.55)	2(1.82)
25-36	31(18.02)	14(8.14)	8(12.9)	0(0)	22(20)	4(3.64)
37-48	27(15.7)	11(6.4)	12(19.36)	2(3.23)	29(26.36)	3(2.73)
49-60	18(10.46)	23(13.37)	17(27.42)	8(12.9)	20(18.18)	11(10)
Total	110(63.95)	62(36.05)	51(82.26)	11(17.74)	90(81.82)	20(18.18)

Table 3: Independent Risk Factors for Underweight of Study Participants

Variables	Adjusted Odds Ratio	95%Confidence Interval	p-Value
Low Birth Weight	2.30	1.09-4.85	0.028
Low Maternal BMI	7.13	3.94-12.92	<0.001
Low Socio-economic Status	2.31	1.17-4.54	0.015
Poor Maternal Education	2.0	1.14-3.51	0.016

*Adjusted for low socio-economic status, poor maternal education, low maternal BMI, low birth weight, minimum diversity of food, late initiation of supplementary food and minimum meal frequency were significant on univariate analysis

Table 4: Infant and young child feeding practice among study participants as per WHO crieria (Core Indicators)

Core Indicators	n (%)
Initiation of breast feeding within1hour (0–23months) (n=148)	93 (62.8)
Exclusively breastfed (0–6months) (n=21)	17 (81)
Continued breastfeeding at one year (12–15months) (n=35)	31 (88.6)
Started solid, semi-solid or soft foods at 6month (6–23months) (n=109)	68 (62.4)
Receive Minimum dietary diversity(6–23months) (n=109)	64 (58.7)
Receive Minimum meal frequency(6–23months) (n=109)	41 (37.6)
Receive Minimum acceptable diet (6–23months) (n=109)	39 (35.8)
Consumed iron-rich foods (6–23months) (n=109)	53 (48.6)

DISCUSSION

Assessing the nutritional status of children aged 0–5 who visit anganwadi centers in Medchal district villages was the objective of the current study. The overall children's mean height, weight, and BMI were 10.53 ± 2.8 kg, 0.81 ± 12.1 mts, and 15.92 ± 2.34 kg/m2, respectively

. Contrast results were seen in the study by PushpaLataTigga et al,[25] (12.18 ± 2.37 kgs, 0.89 ± 0.1 mts and 15.03 ±1.51 Kg/M2) conducted among tribal under five children This could be because the study conditions differed and children under one year old were not included.

The prevalence of underweight was 29.3% in the present study which is lesser than the national average,[10] (35.5%) and state average,[11] (31.8%). Studies by Pathak et al,[26] Sathya P. Manimunda et al,[27] and Mary Glover-Amengor et al,[28] showed very identical results. According to Bhimisett et al.'s,[29] study illiteracy, low economic position, poor behaviour when seeking medical attention, lack of access to health care facilities, and insufficient resources among the tribal community are the main causes of the high (60%) prevalence of underweight. The percentage of wasting was lower at 16.53% than the national,[10] (10%) and state,[11] averages, which were 21.7% and 19.3%, respectively.

Stunting prevalence was 45.8%, much higher than the state,[11] and national,[10] rates of 33.1% and 35.5%, respectively. Studies by Mary Glover-Amengor et al,[28] Sathya P. Manimunda et al,[27] and Zemenu Yohannes Kassa et al,[30] found that prevalence of stunting was lesser than the present study.

According to a study conducted in Ethiopia,[30] which is one of the Asian and Sub-Saharan African countries that bear the greatest burden of malnutrition globally, the frequency of stunting, underweight, and wasting is generally lower there. These discrepancies might be the consequence of the short sample size and government initiatives to cut mortality among children under five. In the current study, stunting, wasting, and undernutrition were most prevalent in the 49–60, 37–48, and 25–36 month groups, respectively. In contrast, Mary Glover-Amengor et al,[28] study found that same conditions were most prevalent in the 24–35, 6–11, and 12–23 month groups, respectively.

Infant feeding practices in the current study such as starting breastfeeding within 24 hours, exclusively breastfeeding, minimum acceptable diet, minimum meal frequency and minimum dietary diversity and were 62.8%, 81%, 35.8%, 58.7%, and 37.6% respectively, whereas in a study by Amir Maroof Khan(31), they were 37.2%, 57%, 19.7%, 32.6%,

and 48.6% for the same variables.The minimum dietary diversity in a research by Demilew et al,[32] was merely 7%. The contrast findings may be explained by the fact that this study was carried out in slum regions, wherein individuals had poor incomes and educational levels.

Low birth weight of the child, lower socioeconomic status, decreased level of education and BMI of mother were risk factors for undernutrition in the present study. A study by Osman Gritly et al,[33] found that low household income was the main factor contributing to nutritional deficits among preschool age group. Zemenu Yohannes Kassa et al,[30] found that wasting was related to the mother's employment and complementary foods while level of Stunting was linked with the mother's level of education and age of the child. A study by Shreyaswi Sathyanath M et al,[34] associated undernutrition to low birth weight and inappropriate rice-based supplemental feeding. In a study by Suhitha R. Das et al,[35] undernutrition was related to age, mother's education and socioeconomic status. According to each of these studies, a mother's health and level of education affect her child's health.

Merits & Demerits: This study's merits include being the first of its kind in our field of study, being community-based, and taking the mother's nutritional condition into consideration. One drawback would be the data's generalizability because it only included children availing immunization services on the day of immunization in anganwadi centres.

CONCLUSION

Majority of the mothers exclusively breastfed and continued till 1 year. The current investigation found substantial prevalence of undernutrition. Risk factors for underweight were found to include mother education, health condition, and birth weight. There is a need to promote IYCF practices by health workers, educating mothers on improving their child's nutritional status through growth charts and emphasizing how maternal nutrition before, during, and after pregnancy directly impacts both their own health and their children's well-being.

REFERENCES

1. Barker DJ. Fetal origins of coronary heart disease. BMJ. 1995 Jul; 311(6998):171–4.
2. Sánchez A. The structural relationship between early nutrition, cognitive skills and non-cognitive skills in four developing countries. Econ Hum Biol. 2017 Nov; 27(Pt A):33–54.
3. Asfaw M, Wondaferash M, Taha M, Dube L. Prevalence of undernutrition and associated factors among children aged between six to fifty nine months in Bule Hora district, South Ethiopia. BMC Public Health. 2015 Jan; 15:41.
4. 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 (London, England). 2008 Jan; 371(9608):243–60.
5. Sachdev HPS. Assessing child malnutrition : some basic issues. In Nutritional Foundation of India archives 156. New Delhi: Nantional Foundation of India; 1996. Available from: https://digitallibrary.un.org/record/222731
6. Müller O, Krawinkel M. Malnutrition and health in developing countries. C Can Med Assoc J = J l'Association medicale Can. 2005 Aug; 173(3):279–86.
7. Ray SK. Action for Tackling Malnutrition: Growth Monitoring or Surveillance? Indian J Public Health [Internet]. 2005; 49(4). Available from: https://journals.lww.com/ijph/fulltext/2005/49040/action_for_tackling_malnutrition__growth.4.aspx
8. de Onis M, Blössner M. The World Health Organization Global Database on Child Growth and Malnutrition: methodology and applications. Int J Epidemiol [Internet]. 2003 Aug 1; 32(4):518–26. Available from: https://doi.org/10.1093/ije/dyg099
9. World health statistics 2017: monitoring health for the SDGs, Sustainable Development Goals. [Internet]. Geneva; 2017. Available from: https://iris.who.int/bitstream/handle/10665/255336/9789241565486-eng.pdf
10. International Institute for Population Sciences (IIPS) and ICF. Compendium of Fact Sheets, National Family Health Survey 5. Compend Fact Sheets, Natl Fam Heal Surv Natl Fam Heal Surv 2019-21 [Internet]. 2022;1–116. Available from: https://main.mohfw.gov.in/basicpage-14 (2022).
11. Ministry of Health and Family Welfare. Fact Sheets National Family Health Survey - 5 2019-20. 2019;2.
12. Methodology of nutritional surveillance. Report of a Joint FAO/UNICEF/WHO Expert Committee. World Health Organ Tech Rep Ser. 1976 ;(593):1–66.
13. Ritchie H, Roser M. Half of all child deaths are linked to malnutrition. Our World Data. 2024;
14. Organization WH. Child mortality (under 5 years) [Internet]. 2022. Available from: https://www.who.int/news-room/fact-sheets/detail/levels-and-trends-in-child-under-5-mortality-in-2020#:~:text=Malnourished children%2C particularly those with severe acute malnutrition%2C,deaths in children under 5 years of age.
15. Rollins NC, Bhandari N, Hajeebhoy N, Horton S, Lutter CK, Martines JC, et al. Why invest, and what it will take to improve breastfeeding practices? Lancet [Internet]. 2016 Jan 30; 387(10017):491–504. Available from: https://doi.org/10.1016/S0140-6736(15)01044-2
16. Victora CG, Bahl R, Barros AJD, França GVA, Horton S, Krasevec J, et al. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. Lancet [Internet]. 2016 Jan 30; 387(10017):475–90. Available from: https://doi.org/10.1016/S0140-6736(15)01024-7
17. Organization WH. Indicators for assessing infant and young child feeding practices: part 1: definitions: conclusions of a consensus meeting held 6-8 November 2007 in Washington DC, USA. World Health Organization; 2008.
18. Habicht J-P. Expert consultation on the optimal duration of exclusive breastfeeding: the process, recommendations, and challenges for the future. In: Protecting Infants through Human Milk: Advancing the Scientific Evidence. Springer; 2004. p. 79–87.
19. Organization WH. Report of the expert consultation of the optimal duration of exclusive breastfeeding, Geneva, Switzerland, 28-30 March 2001. World Health Organization; 2001.
20. WHO | Infant and young child feeding. [Internet]. 2023. Available from: https://www.who.int/news-room/fact-sheets/detail/infant-and-young-child-feeding
21. Child NI of PC and, Development. Growth Monitoring Manual. First. New Delhi -16: National Institute of Public Cooperation and Development; 1988.
22. Davey A, Davey S, Datta U. Role of reorientation training in enhancement of the knowledge regarding growth monitoring activities by anganwadi workers in urban slums of delhi. Indian J community Med Off Publ Indian Assoc Prev Soc Med. 2008 Jan; 33(1):47–9.

23. International Institute for Population Sciences (IIPS) and. National Family Health Survey - 4 State Fact Sheet Telangana. 2015;1–6.

24. Shekar M, Latham MC. Growth monitoring can and does work! An example from the Tamil Nadu Integrated Nutrition Project in rural south India. Indian J Pediatr. 1992; 59(1):5–15.

25. Tigga PL, Sen J. Maternal body mass index is strongly associated with children？ J Anthropol. 2016; 2016(6538235):1–10.

26. Pathak G, Forhad &, Zaman A. Assessment of Nutritional Status of Under Five Children in Urban Area of Barpeta District, Assam, India. Int J Curr Med Appl Sci [Internet]. 2016; 11(2):72–5. Available from: www.ijcmaas.com

27. Manimunda SP, Sugunan AP. Nutritional Status of Preschool Children in Andaman and Nicobar Islands and Food Insecurity, Food Groups, and Nutrient Consumption among Population. Indian J community Med off Publ Indian Assoc Prev Soc Med. 2017; 42(2):88–93.

28. Glover-Amengor M, Agbemafle I, Hagan LL, Mboom FP, Gamor G, Larbi A, et al. Nutritional status of children 0-59 months in selected intervention communities in northern Ghana from the africa RISING project in 2012. Arch Public Health. 2016; 74:12.

29. 29. Chakravarthy B, Pamarthi K, J S. NUTRITIONAL STATUS OF UNDER 5 CHILDREN BELONGING TO TRIBAL POPULATION LIVING IN VISAKHAPATNAM DISTRICT, ANDHRA PRADESH. J Evid Based Med Healthc. 2015 Aug 17; 2:4975–80.

30. 30. Kassa ZY, Behailu T, Mekonnen A, Teshome M, Yeshitila S. Malnutrition and associated factors among under five children (6-59 Months) at Shashemene Referral Hospital, West Arsi Zone, Oromia, Ethiopia. Curr Pediatr Res [Internet]. 2017; 21:172–80. Available from: https://api.semanticscholar.org/CorpusID:55285170

31. Khan A, Kayina P, Agarwal P, Gupta A, Kannan A. A study on infant and young child feeding practices among mothers attending an urban health center in East Delhi. Indian J Public Health. 2012 Oct 1; 56:301–4.

32. Demilew YM, Tafere TE, Abitew DB. Infant and young child feeding practice among mothers with 0-24 months old children in Slum areas of Bahir Dar City, Ethiopia. Int Breastfeed J. 2017; 12(1):1–9.

33. Gritly DSMO, Albashir AMM, Ibrahim A. Risk Factors of Malnutrition among Children under Five Year of Age in Mohamed Alamin Paediatric Hospital University of Bahri - Khartoum, Sudan. In 2016. Available from: https://api.semanticscholar.org/CorpusID:4656004

34. Muttathody S, Kundapur R, Kiran N. PREVALENCE AND RISK FACTORS OF UNDER NUTRITION AMONG UNDER FIVE CHILDREN IN A RURAL COMMUNITY. J Heal Allied Sci NU. 2013 Dec 1; 03:82–6.

35. Das SR, Prakash J, Krishna C, Iyengar K, Venkatesh P, Rajesh SS. Assessment of Nutritional Status of Children between 6 Months and 6 Years of Age in Anganwadi Centers of an Urban Area in Tumkur, Karnataka, India. Indian J community Med off Publ Indian Assoc Prev Soc Med. 2020; 45(4):483–6.