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Determinants Of Undernutrition Among Indian Children Below Five Years

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ABSTRACT

Nearly half of all deaths among children below five years in low and middle income countries are a result of undernutrition. Globally in 2020, 149 million under five years children were estimated to be stunted (too short for age), 45 million were estimated to be wasted (too thin for height). The aim of present review paper was to examine previous studies to determine the factors associated with undernutrition especially in Indian context. The PubMed and google scholar data base were used to search the studies conducted between 2010 to 2021. The studies were searched by using a combinations of key words related to determinants of undernutrition. Among the studies retrieved from the google scholar and PubMed database, three studies were conducted in Andhra Pradesh, two were in Nepal, two were in Karnataka, and one study each in Pondicherry, Tamilanadu, Assam, West Bengal, Kerala, Maharashtra, Chhattisgarh, Jammu, Luck now (Uttar Pradesh), Pune, Haryana, Gujarat, and Tribal areas of India. The sample size of these studies ranged between 150 to 14,587 above children. The factors associated with undernutrition were found to be socio - economic status, mother's education, diarrhoea, feeding practices, Acute Respiratory Infections (ARI), mother's nutritional status, and health of child. Child's birth weight and birth order, type of feeding of the children were also found to be contributing factors towards child undernutrition. Mother's education was reported in majority of the studies as the determinant of undernutrition among children. Providing nutrition education to mothers will help to improve nutritional status of mothers as well as their wards.

Key Words

Determinants of undernutrition, Underweight, Stunting, Wasting

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INTRODUCTION

The nutritional status of pre – school children is extremely important because it lays the foundation for children's lifelong health, resilience and lifelong potential. This period is very important period for laying foundation for their life time physical, social, emotional, intellectual, psychological and brain growth and development. Poor socio - economic status, education, sanitation and safe water access are some considerable socio - economic factors to determine health outcomes in many developing and underdeveloped countries.

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Malnutrition among under-five children is an important concern for the health authorities nationally and also globally. As per reports from the World Health Organization (WHO), (2020), globally 149 million under five years children were estimated to be stunted (too short for age), 45 million were estimated to be wasted (too thin for height) (Katoch, 2021). Asia has largest number of malnourished children. India accounts for 40% of malnourished children in the world (Sukarya, 2018). One in three of the world's malnourished children lives in India (Global Nutrition Report, 2018). According to the Global Hunger Index which is calculate d on the basis of total undernourishment of the population, child stunting, wasting and child mortality places India at the 107th spot among 121 countries**.** Extreme poverty in India according to Global Hunger Index, reports indicated that severe levels of poverty across the country are contributing to malnutrition among children and adults (GHI 2022).

Undernutrition among below five years children is a serious health consequences in India and also it's called as a "Silent emergency". Prevalence of under nutrition among under five children according to the National Family Health Survey - 5 (NFHS – 5) in India showed that among children below five years 32.1% were underweight, 35.5% were stunted and 21% were wasted during 2019 – 2020. (NFHS – 5). When the indicators of malnutrition recorded in NFHS – 5 was compared with the data of NFHS – 4, the underweight has reduced from 35.8% to 32.1%, stunting has reduced from 38.4% to 35.5% and the prevalence of wasting has reduced from 21% to 19.3% which is a good sign . However, as per NFHS - 5 when the data in rural and urban areas was compared 37.3% in the rural area were stunted against 30.1% in urban areas**.**

Reported studies conducted outside India have shown that there were various factors that directly and indirectly affected the nutritional status of under five children. The determinants factors were found to be Socio – economic status particularly low family income and low maternal education, predicts future behavioural problems in children (Hosokawa & Katsura, 2018). Diarrhoea and Acute Respiratory Infection (ARI) were reported as major causes of morbidity and mortality in below five years aged children (Apanga and Kumbeni, 2021). In one study reported at Ghana in West Africa, Diarrhoea and ARI among children aged 6–11 and 12–23 months was higher compared to children aged 0 - 5 months (Apanga and Kumbeni, 2021). Children below 5 years old whose mothers had a secondary or higher education had a lower prevalence of diarrhoea when compared to children whose mothers had no formal education (Apanga and Kumbeni, 2021). Olivia (2019), reported that in Uganda, children whose mothers had secondary education had lower odds of stunting and underweight compared with children whose mothers had no formal education. Children whose mothers engaged in agriculture and manual work had higher odds of stunting compared with those whose mothers engaged in professional work. Mother's employment was also one of the determinant factors associated with children's undernutrition (Olivia, 2019).

Black, (2008), reported that family food insecurity, Inadequate care of vulnerable household members sharing of food within families, unhygienic living conditions (poor water supplies and poor sanitation), inadequate health services and poverty, lack of information, political and economic insecurity, War, lack of resources at all levels, unequal status of women, and natural disasters were the main causes of malnutrition in developing countries.

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Despite significant progress and a great effort by the Government of India, the challenge remains in addressing the problem of malnutrition mainly among pre – school children. Hence, an attempt was made to review the studies focused on under nutrition among children. Reported studies conducted in India between 2010 – 2021 which focused on determinants or factors related to undernutrition, stunting, wasting, underweight etc., were searched. Following is the search strategy used for conducting systematic review on determinants of under nutrition among Indian children.

SEARCH STRATEGY

For present systematic review a list of combinations of keywords was prepared for searching the studies on the PubMed, Google Scholar database the keywords included for are as follows:

- Determinants – or – Factors associated with undernutrition among children in India,
- Determinants – or – Factors associated with malnutrition among children in India,
- Determinants – or – Factors associated with stunting among children in India,
- Determinants – or – Factors associated with wasting among children in India,
- Determinants – or – Factors associated with underweight among children in India.

The search covered research conducted between 2010 - 2021 and available on the PubMed and Google Scholar database.

Inclusion Criteria

Studies were included in the systematic review if they were conducted with children focused on factors associated with child under nutrition (Underweight, stunting, and wasting), were published in a peer – reviewed journals between 2010 to 2021 and which were conducted India and were written in English only.

Exclusion Criteria

In the current systematic review all the case studies, books, policy, thesis/dissertation and non – peer reviewed articles were excluded.

RESULTS AND DISCUSSION

Among the studies searched from the google scholar and PubMed database 270 studies were retrieved. After excluding 140 duplicates, 130 studies were retained from screening. studies were reviewed and screened, that resulted in the exclusion of another 85 studies reporting the determinants and factors associated with the under nutrition of children above 5 years were removed. The remaining 45 studies were reviewed and 24 studies that included case studies, reports and books and non – peer – reviewed articles were further excluded. Finally 21 articles, which were published in peer – reviewed journals, and met inclusion criteria were included for the present review paper.

Summary of Studies Reviewed

The articles finally selected were analysed across sample size, age group, study place, indicators of undernutrition and determinants of undernutrition and presented in table

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1. From table 1 and figure 1, it is evident that among the 21 national wide studies reviewed on determinants of undernutrition in under five children, three studies were conducted in Andhra Pradesh, two were in Nepal, two were in Karnataka, and 1 each in Pondicherry, Tamilanadu, Assam, West Bengal, Kerala, Maharashtra, Chhattisgarh, Jammu, Luck now (Uttar Pradesh), Pune, Haryana, Gujarat, and Tribal areas of India. The sample size of these studies ranged between 150 to 14,587 above children. About 60% (12 studies) of the studies reviewed reported that socio – economic status was the most significant factor associated with children's undernutrition. Mother's education which is also important factor found to be the most significant determinant of children's undernutrition and mother's education as a determinant factor was reported in 45% of studies (9 studies). In the present review it was found that around 30% (6 studies) and 20% (4 studies) reported that feeding practices and diarrhoea respectively as a determinants of children's under nutrition. Furthermore, 15% (3 studies) of studies reported that Acute Respiratory Infections (ARI), and health of child were determinants of undernutrition among children.

Birth weight and birth order were important factors in determining the nutritional status of the children (Bohn, et al., 2020). Among the studies reviewed, 15% (3 studies) supported that the birth weight and birth order were reasons for child under nutrition. One study reported that (5%) mother's nutritional status is also one of the determinants of child's undernutrition.

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Analysis of Table – 1. Review of Indian Studies Reported between 2010 – 2021 about Prevalence and Determinants of Undernutrition among Under Five Children.

Sr. No	Author (year) Reference no	Standard	Sample size	Age group	Study place	Under weight	Stunting	Wasting	Determinants
1.	Jayalakshmi, and kannan, (2021).	WHO growth standard	468 (50% girls)	Below 5 years (6-60 months)	Kerala (India)	24.4%	25.6%	14.4%	Low socio economic, vicious cycle of poverty, mothers nutritional status, vulnerability of multiple members from poor house hold
2.	Sunny, et al., (2021).	WHO growth standard (2005)	605 (306 Boys and 202 girls)	Below 5 years	Tamilanadu (India)	63%	62%	31%	Literacy of father, literacy of mother and family income
3.	Samdarshi, et al., (2020).	WHO growth standard	1032 (477 boys 555 girls)	Below 5 years	Haryana (India)	21.5%	30.2%	8.9%	Maternal and child health care, nutritional education, breast feeding and childhood malnutrition
4.	Suhitha, et al., (2020).	WHO growth	580 (Urban	6 months – 6 years	Karnataka (India)	34.14%	45.52%	35.52%	Socio demographic factors and dietary

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		standard	children)						intake
5.	Kavitha, et al., (2019).	WHO growth standard	224	Below 5 years	Pondicherry (India)	18.3%	31.6%	20.11%	Mother's education, nutrition awareness, chronic malnutrition
6.	Ruwali, (2018).	WHO growth standard	150	Below 5 years	Nepal (India)	22.1%	37.3%	25.7%	Maternal socio – economic ,child individual factors
7.	Sukla and borkar, (2018).	WHO MGRS (Multi growth reference study)	400 (rural)	Below 5 years (pre-school)	Chhattisgarh (India)	36%	35.5%	28.5%	Long term poverty
8.	Purothit and sahu, (2017).	-	650	Below 5 years	Maharashtra (India)	38.15%	40.46%	16%	Type of family, mother's education, socio economic status, birth weight and birth order
9.	Srinivasa, et al., (2017).	WHO growth standard	254	1 – 6 years	Mangalore (India)				Lower socio – economic status
10.	Srivastava, (2017).	-	250	6 months -5 years	Lucknow (Uttar Pradesh, India)	34.4%	58.8%	17.6%	ARI, diarrhoea, worm expulsion, vitamin A deficiency, poor feeding practices,

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									poor vaccination and slum susceptibility
11.	Santharam and Malleswararao, (2016).	WHO growth standard SECA (UNICEF electronic scale)	615 284(46.2%) male 331(53.8%) female	3 years	Srikakulam (AP,India)	35%	32.3%	30.1%	Protein energy, micro nutrition deficiencies, child Illness, diarrhoea and ARI
12.	Islam, et al., (2015).	WHO growth standard	485 – 500	Below 5 years	Assam (India)	29%	30.4%	21.6%	Under nutrition, socio economic status , literacy status of parents, infant and young child feeding practices
13.	Bhimisett, et al., (2015).	Water low's classification and Gomez classification	236 children, 122(51.7%) were boys and 114(48.3%) were girls. 236 children,	Below 5 years	Vishakhapatnam(AP,India)	60.1%	27.1%	31.3%	Health, education and productivity of children

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			122(51.7%) were boys and 114(48.3%) were girls. 236 children, 122(51.7%) were boys and 114(48.3%) were girls. 236 (122 boys and 144 girls)						
14.	Sahu, et al., (2015).	WHO growth standard	1212 12,506	Below 5 years	Overall India	39% to 75%	15.4% to 74%	10.6% to 42.3%	Socioeconomic inequality, poverty, illiteracy, lack of awareness regarding the quality of food items, large family and poor sanitary environment
15	Suri and	-							Growth monitoring, exclusive breast feeding,

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.	Dinesh Kumar, (2015).		750	1-5 years	Jammu (India)	43%	37%	20%	complementary feeding, standard case measurement of diarrhoea and ARI (acute respiratory infections
16.	Mamulwar, et al., (2014).	WHO growth standard	658	Below 5 years	Pune (India)	34.3%	58.7%	16.9%	Environmental condition, regardless of ethnicity, socio economic status and type of feeding
17.	Patel and Dulari Gandhi, (2014).	WHO growth standard	250	6months – 5 years	Gujarat (India)		Moderate (52.8%) Severe (15.2%)	Moderate (47.2%) Severe (19.6%	Nutrition education, low socio economic status, illiterate.
18.	Yadav, et al., (2014).	WHO growth standard SECA (UNICEF electroni	615	3 years	Nepal (India)	45%	42.3%	31.1%	Socio demographic conditions, nutrition and feeding behaviour, child seeking practices

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		c scale)							
19.	Sukhdas, et al., (2013).	WHO growth standard	1013 (544 boys 469 girls)	Below 5 years	Joint Andhra Pradesh (India)	48.37%	48.27%	23.59%	Adequate nutrition diarrhoea and other acute illnesses.
20.	Mehesra, et al., (2012).	WHO growth standard	14,587	Below 5 years	Tribal areas (India)	49-57%	51-58%	22-23%	Literacy status of mothers, house hold index and morbidity
21.	Bisai, et al., (2010).	NCHS	899 (517 Boys and 382 girls)	1 – 5 years	West Bengal (India)	63.6%	52.7%	22.0%	Poverty ,childhood health and nutritional stress

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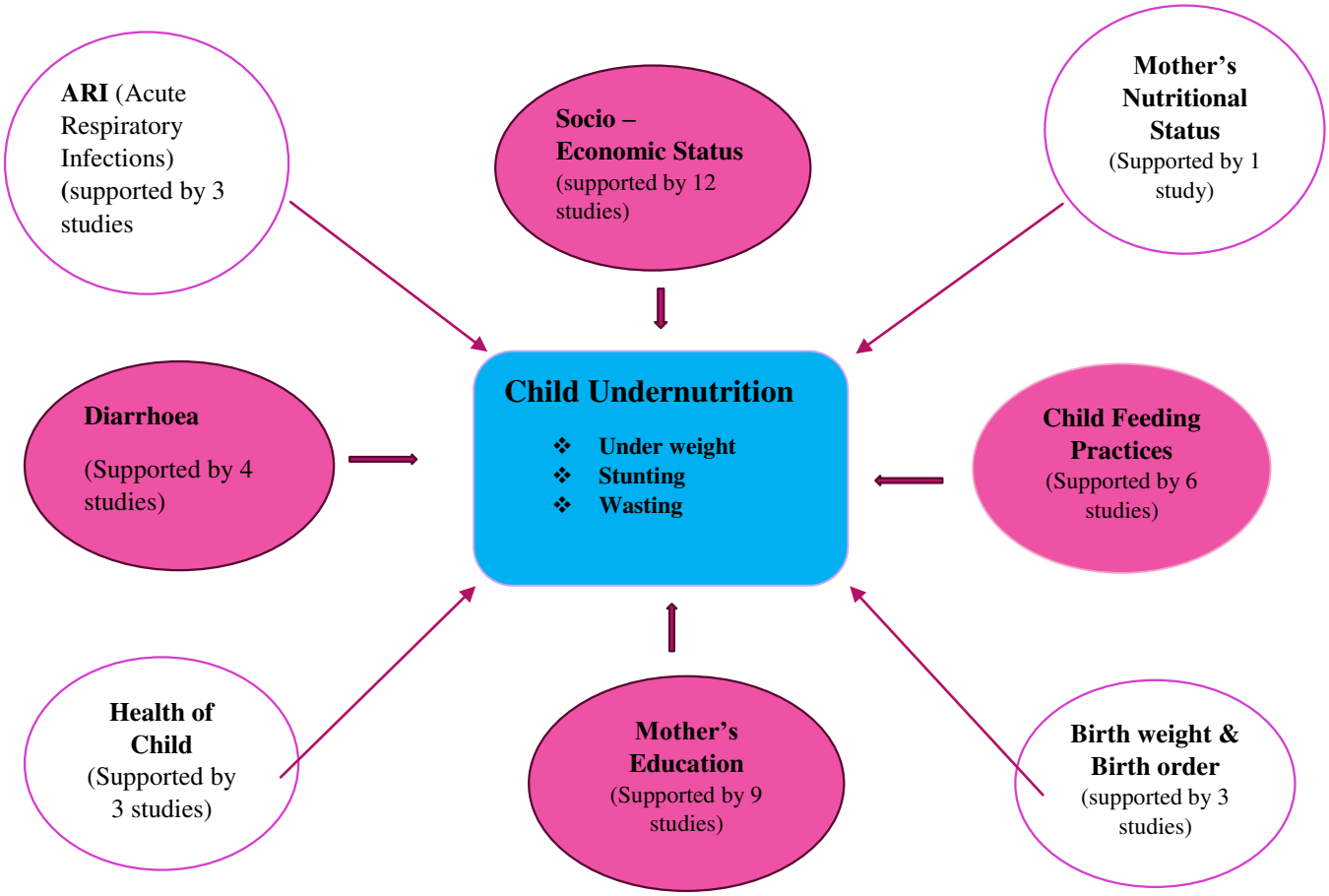
Fig – 1 Determinants of Undernutrition Sources



Conclusion

From the review of studies on under nutrition among Indian children below five years , it was found that socio – economic status, mother's education, diarrhoea, feeding practices, Acute Respiratory Infections (ARI) are the most significant determinant factors of under nutrition among children. Mother's nutritional status, and health of child, birth weight and birth order, type of feeding of the children were also found to be contributing factors towards children under nutrition.

Suggestions and recommendations

- Inspite of efforts made by Government of India, still low socio – economic status seems to be the major determinant of undernutrition among children below five years.

- Mother's education was found to be important factor for children nutritional status. Providing nutrition education to mothers not only helps to improve

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mother's nutritional status but also to improve the nutritional status of their wards.

- Diarrhoea is also one of the major determinant factors for under nutrition. Creating awareness on different methods of providing safe water to children will also help to decrease the prevalence of undernutrition among young children.

REFERENCES

1. Apanga, P.A, and Kumbeni, M.T. (2021). Factors associated with diarrhoea and acute respiratory infection in children under-5 years old in Ghana: an analysis of a national cross-sectional survey. *BMC Pediatr* 21, 78. https://doi.org/10.1186/s12887-021-02546-x
2. Aggarwal, T. and Srivastava, S. (2015). Nutritional status and its correlates in under five children of labour Population in urban slums of Lucknow, Uttar Pradesh, India. Retrieved from DOI: http://dx.doi.org/10.18203/2349-3291.ijcp20172518
3. Bhimisetti, S.C, Pamarthi, K and Srinivas, P. J. (2015). Nutritional status of under five children belonging to tribal population living in Visakhapatnam district, Andhra Pradesh. *Journal of Evidence Based Medicine and Health Car*; volume 2, issue 33, August 17, 2015; Page: 2975-4980, DOI: 10.18410/jebmh/2015/694.
4. Bisai, S. Tarapada, G. and Bose, K. (2010). Prevalence of Underweight, Stunting and Wasting among Urban Poor Children aged 1- 5 Years of West Bengal, India. *International Journal of Current Research* Vol. 6, pp.039-044, July, 2010 Retrieved from: http://www.journalcra.com
5. Black RE, Allen LH, Bhutta ZA, Caulfield LE, De Onis M, Ezzati M, Mathers C, and Rivera J. (2008). Maternal and Child Undernutrition: *Global and Regional Exposures and Health Consequences.* Maternal and Child Undernutrition Series. The Lancet; 371:243-260.
6. Bohn, C, Vogel, M, Poulain, T, et al. (2020). Birth weight increases with birth order despite decreasing maternal pregnancy weight gain. *Acta Paediatr*. 110: 1218– 1224. Retrieved from https://doi.org/10.1111/apa.15598TI
7. Das SR, Prakash J, Krishna C, Iyengar K, Venkatesh P, and Rajesh SS. (2020). 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.* 45(4):483-486. Doi: 10.4103/ijcm.IJCM_523_19. PMID: 33623206; PMCID: PMC7877415.
8. Ferdous F, Das SK, Ahmed S, Farzana FD, Latham JR, Chisti MJ, Ud-Din AI, Azmi IJ, Talukder KA, and Faruque AS. (2013). Severity of diarrhea and malnutrition among under five-year-old children in rural Bangladesh. *Am J Trop Med Hyg.* 89(2):223-8. Doi: 10.4269/ajtmh.12-0743. Epub 2013 Jul 1. PMID: 23817334; PMCID: PMC3741240.
9. GHI (2022) – Indian Global Hunger Index. Retrieved from: https://swachhindia.ndtv.com/india-ranks-107-on-global-hunger-index-2022-

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11 , Iss 8, Dec 2022

government-calls-it-an-erroneous-measure-72054/#:~:text=New%20Delhi%3A%20India%20has%20ranked,its%20GHI%20score%20is%2029.1.

10. Global Nutrition Report, (2018). 2018 Global Nutrition Report. Retrieved from: https://globalnutritionreport.org/documents/354/2018_Global_Nutrition_Report_Launch_slide_deck.pdf
11. Hosokawa, R., & Katsura, T. (2018). *Effect of socioeconomic status on behavioral problems from preschool to early elementary school – A Japanese longitudinal study. PLOS ONE, 13(5), e0197961.* Retrieved from doi:10.1371/journal.pone.0197961
12. Islam, S. Mahanta, G. T. Sarma, R. and Hiranya, S. (2015). Nutritional Status of under 5 Children belonging to Tribal Population Living in Riverine (Char) Areas of Dibrugarh District, Assam. July 2014 *Indian Journal of Community Medicine* 39(3):169-74 retrieved from: DOI:10.4103/0970-0218.137155
13. Jayalakshmi, R. and Kannan, S. (2021). Nutritional status of socioeconomically disadvantage children below 5 years: A cross sectional study from Kerala, India. *World Med. & Health policy,* 14, 19 – 101. Retrieved from: https://doi.org/10.1002/wmh3.490
14. Kavita Vasudevan, and Carounanidy Udayashankar (2019). Nutritional status of Children under Five Years of Age in a Rural Area of Pondicherry. retrieved from: https://www.ijcmr.com/uploads/7/7/4/6/77464738/ijcmr_2442.pdf
15. Mamuwar, Megha & Rathod, Hetal & Jethani, Sumit & Dhone, Anjali & Bakshi, Tanu & Lanjewar, Balkrishna & Jadhav, Sudhir & Bhawalkar, Jitendra. (2014). Nutritional status of under-five children in urban slums of Pune. *International Journal of Medicine and Public Health.* 4. 10.4103/2230-8598.137710.
16. Meshram, I. I., Arlappa, N., Balakrishna, N., Rao, K. M., Laxmaiah, A., & Brahmam, G. N. V. (2012). Trends in the prevalence of undernutrition, nutrient and food intake and predictors of undernutrition among under five year tribal children in India. *Asia Pacific Journal of Clinical Nutrition,* 21(4), 568–576. Retrieved from: https://search.informit.org/doi/10.3316/ielapa.806051945397823
17. Nankinga, Olivia., Kwagala, Betty; Walakira, Eddy J.; Navaneetham, Kannan (2019). Maternal employment and child nutritional status in Uganda. *PLOS ONE, 14(12), e0226720–*. doi:10.1371/journal.pone.0226720
18. NFHS – 5 (2020). National Family Health Survey, India. Fact Sheets. Retrieved from: http://rchiips.org/nfhs/factsheet_NFHS-5.shtml.
19. Om Raj Katoch, (2021). Determinants of malnutrition among children: A systematic review, retrieved from: https://doi.org/10.1016/j.nut.2021.111565.
20. Paschal Awingura Apanga, and Maxwell Tii Kumbeni; (2021). Factors associated with diarrhoea and acute respiratory infection in children under-5 years old in Ghana: an analysis of a national cross-sectional survey. *BMC Pediatrics,* .doi:10.1186/s12887-021-02546-x
21. Purohit, L. Sahu, P. and Godale, L. B. (2017). Nutritional status of under- five children in a city of Maharashtra: a community based study: *International Journal of Community Medicine and Public Health.* 4(4):1171-1178

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11 , Iss 8, Dec 2022

http://www.ijcmph.com Retrieved from DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20171344

22. Santha Ram, A. and Malleswara Rao, M (2016). Assessment of nutritional status in children less than 4 years in rural areas of AndhraPradesh retrieved from: https://www.academia.edu/24236223/Assessment_of_nutritional_status_in_children_less_than_4_years_in_rural_areas_of_Andhra_Pradesh
23. Sahu SK, Kumar SG, Bhat BV, Premarajan KC, Sarkar S, Roy G, and Joseph N. (2015). Malnutrition among under-five children in India and strategies for control. *J Nat Sci Biol Med.* 6(1):18-23. Doi: 10.4103/0976-9668.149072. PMID: 25810629; PMCID: PMC4367032.
24. Samdarshi, Narottam; Virk, Amrit; Saini; Parmal; Prabhakar; and Vikrant (2020). Nutritional Status of One to Five Year Old Children in Rural Haryana: A Community Based Study. (14), Doi - 10.7860/JCDR/2020/45635.14045 *Journal of Clinical and Diagnostic Research.*
25. Srinivasa B, Dnyaneshwar, and U, Ajay. (2017). Anthropometric Measurement of Weight for Assessment of Nutritional Status of Anganwadi Children in Urban Mangalore - A Cross Sectional Study. *Anatomy & Physiology*. 07. 10.4172/2161-0940.1000259. retrieved from DOI:10.4172/2161-0940.1000259
26. Sukhdas, Gangam & Challa, Sairam & Bhatia, Prakash & Rao, A. (2013). Nutritional status of tribal children in Andhra Pradesh. *International Journal of Medical Research & Health Sciences.* 3. 10.5958/j.2319-5886.3.1.015.
27. Sukla, P, and Borkar, A. (2018.) Nutritional status of pre-school children [1-5 years] in rural area of Chhattisgarh state. Retrieved from DOI:10.18203/2394-6040.IJCMPH20181730
28. Sunny, R. Elamana, J. and Olickal, J. J. (2021). Determinants of Nutritional Status among Under-Five Children in the Tribal Population of the Nilgiris, Southern India: A Cross-Sectional Study. Retrieved from DOI: 10.4103/ijcm.IJCM_118_21
29. Suri, S. and Dinesh, K. (2015). Nutritional status and the factors associated with it among children aged 1-5 years in a rural area of Jammu. Retrieved from DOI: 10.17354/ijss/2015/27.
30. World health Organization. Fact sheets; Malnutrition. Retrieved from: https://www.who.int/news-room/fact sheets/detail/malnutrition#:~:text=Globally%20in%202020%2C%20149%20million,age%20are%20linked%20to%20undernutrition.
31. Yadav, Dr. Dipendra & Gupta, Neena & Shrestha, Naveen. (2014). An assessment of nutritional status of children less than 3 years in rural areas of Mahottari district of Nepal. IJMRHS. 3. 597 - 603. 10.5958