



Received: 03 May, 2021

Accepted: 31 May, 2021

Published: 05 June, 2021

*Corresponding author: Muqadim Sadiq, Faculty of Pharmacy and Health Sciences, University of Balochistan Quetta, Pakistan, Tel: 00923342318008; E-mail: Mukadims@gmail.com

Keywords: Under nutrition; Five years' age; Malnutrition; Quetta; Pakistan

<https://www.peertechzpublications.com>



Research Article

Prevalence, level and factors associated with malnutrition in children under-five years of age and their parents' awareness about children nutrition in Quetta city

Musa Bin Bashir¹, Muqadim Sadiq^{2*}, Mirwais Khan³, Asad Khan⁴, Adlin Ho⁵ and Syed Muhammad Younas²

¹Xian Jiaotong University, China

²Faculty of Pharmacy and Health Sciences, University of Balochistan, Quetta, Pakistan

³Balochistan Institute of Psychiatry, Quetta, Pakistan

⁴Bolan University of Medical & Health Sciences, Public university in Quetta, Pakistan

⁵Xi'an Jiao tong University School of Medicine, PR China

Abstract

Background: Malnutrition continues to be a major public health problem in developing countries. It is the most important risk factor for the burden of diseases. There was lack of information regarding the prevalence, level and factors associated with malnutrition among children of under-five years of age from Baluchistan, Pakistan.

Objective: Therefore, the current study was conducted to evaluate the prevalence, associated factors and parents' awareness with malnutrition among children of under-five years of age.

Methods: This cross-sectional analytical study was carried out at Basic Health Unit (BHU), Nawa Killi, BHU Killi Deba, BHU Spini Road, Mubarak Chowk, Sheikh Zahid Hospital Quetta, Rehnuma Center Satellite Town Quetta. A self-developed validated questionnaire was used to evaluate the parents' awareness regarding children nutrition status. The mean mid upper-arm circumference (MUAC) value of the children was used to categorize the children nutritional status. Children with MUAC value < 12 cm were classified as malnourished, MUAC value =11-12 cm was considered as Moderate Acute Malnutrition (MAM) and, MUAC value < 11 cm was considered as Severely Acute Malnutrition (SAM). Data was analyzed by using Statistical Package for Social Sciences (SPSS version 20). Multivariate binary logistic regression was used to find factors associated with the presence of malnutrition. A p-value <0.05 was considered statistically significant.

Results: A total of 205 children and their parents were included in the study. Majority of studied children were baby boys (60.4%) and belonged to the age group of 0-12 months (74.6%). Majority of the fathers of evaluated children were laborers (42%) and had a family monthly income of between 10000-20000 Pakistani Rupees. Majority of respondents were not well-known about the colostrum milk (63.9%), had not been informed or taught about nutrition (73.7%) and considered children vaccination necessary of disease prevention (91.7%), and had vaccinated their children (97.1%). prevalence of malnutrition in children who were not breastfed was 55.99 times higher than those who were breast fed (p-value <0.001, OR=55.99, 95%CI=13.524-231.842).

Conclusion: The undernutrition in children is comparable to the national figures. Although our study found that absence of formal education, big family size, late and early weaning, absence of exclusive breast feeding and poverty were the factors associated with undernutrition in children, they could cause increase in under nutrition in future if not improved.



Introduction

Child undernutrition in all its forms is a global health concern [1]. Underweight, stunting and wasting are reported to be serious problems affecting developing countries [2]. Pediatric malnutrition is a major public health problem worldwide and globally a major contributive factor to nearly 45% of all mortality in childhood [3]. Malnutrition is a chronic and extensive situation, difficult to cope typical of developing countries [4]. On the other hand, it is usually a result of acute or chronic diseases in developed countries [5]. Assessment of pediatric malnutrition is based on objective anthropometric measurements such as Z-score, weight-for-height (wasting index), height-for-age (stunting index), weight-for-age (underweight index), and head circumference, body mass index, midupper arm circumference and skin fold thickness [6]. However it is difficult to determine malnutrition in childhood with a single index [7, 8]. Recently, World Health Organization (WHO) recommended new growth standards for children under 5 years and attached more indicators (e.g. body mass index for age) to describe optimal early childhood growth [9]. In addition, several investigations have been performed for testing the WHO charts in different countries, which have showed disagreements in prevalence compared with existing standards, the WHO standards generally accepted for clinical assessment of malnutrition in children worldwide [10].

The National Nutrition Survey (NNS) conducted in Pakistan in 2011 demonstrated that the proportion of stunted and wasted children less than five years of age was 43.7% and 15.1% respectively [11]. Pakistan has developed and implemented a number of programs in order to reduce child undernutrition such as infant and young child feeding, sanitation, deworming, vitamin A supplementation and health education [12]. Despite these programs, child undernutrition is still a challenge [13].

The prevalence of stunting, wasting and severe wasting in children less than five years of age is 52.2%, 16% and 7% respectively in Baluchistan, which is the highest as compared to other provinces [14]. This paper presents recent *status* of malnutrition in children from Quetta City.

Methodology

Cross-sectional analytical design was adopted for the current study. A structured questionnaire was used to collect data about nutritional status of children and anthropometric measurements. The validation of this questionnaire was not done by any organization, but by self and field experts as there were no such bodies with registered versions of such questionnaires. This study was carried out at different Basic Health Units of the City. All the children with age of less than five years who were presented to the study sites for different treatment and vaccination purposes the parents of whom agreed to participate in the study by giving a written or oral consent were included in the study. The mean mid upper-arm circumference (MUAC) value of the children was used to categorize the children nutritional status. Children with MUAC value < 12 cm were classified as malnourished, MUAC value =11- 12 cm was considered as Moderate Acute Malnutrition

(MAM) and, MUAC value < 11 cm was considered as Severely Acute Malnutrition [15]. The variables discussed included demographics i.e. age, gender, family size, family monthly income, source of income, number of children, parents' education and way of feeding children. These variables were cross tabulated with level and prevalence of malnutrition in the result section of this research paper.

Results

Table 1 presents the socio-demographic characteristics of the total 205 children and their parents included in the study. Mean age of the children included was, majority of them were baby boys (60.4%) and belonged to the age group of 0-12 months (74.6%). Majority of the fathers of evaluated children were laborers (42%) and had a family monthly income of between 10000-20000 Pakistani Rupees (PKR) (81%). Furthermore, majority of the interviewed parents of the children were uneducated (44.4%).

Table 2 presents information about parents' awareness about children nutrition and caring practices. A total of 96.1% of the parents' interviewed were considering proper nutrition an important aspect of children life. Majority of them were not well-known about the colostrum milk (63.9%), had not been informed or taught about nutrition (73.7%) and considered

Table 1: Study participants' socio-demographic characteristics.

Variables	No.	(%)
Gender		
Female	81	39.5
Male	124	60.4
Age(Months)		
0-12	153	74.6
12-24	40	19.5
36-48	6	2.9
>48	6	2.9
Family size		
1-4	24	11.7
5-7	42	20.5
8-10	62	30.2
>10	77	37.6
Total number children in the family		
Number of children of age 1- 5 years	183	89.3
Number of children of age > 5 years	18	8.8
Family Monthly income (PKR)		
10000-20000	166	81.0
20000-40000	37	(18.0)
> 40000	2	(1.0)
Parents source of income		
Business	78	(38.0)
Labor	86	(42.0)
Job	41	(20.0)
Educational status of the interviewed parent		
No Formal education	91	(44.4)
Primary education	37	(25.4)
Secondary education	52	(25.4)
Higher education	25	(12.2)
Way of feeding children		
Breast milk	40	(19.5)
Formula milk	149	(72.7)
Animal milk	16	(7.8)

children vaccination necessary of disease prevention (91.7%), and had vaccinated their children (97.1%). Among the interviewed parents, only (48.8%) were of the opinion that babies should be weighed right after birth and 43.3% had done so. Furthermore, only 1% and 19% of the parents thought that newborns should be breastfed right after birth and for initial two years of life respectively. Most of the parents (49.8%) replied that they do not know about the micronutrients essential for children health, only 88.3% parents replied that they wash hand before feeding the children and 48.3% thought that their child is malnourished.

The mean mid upper-arm circumference (MUAC) value of the children evaluated was 11.55 + 0.62. On the basis of MUAC value, majority of the studied children (62.4%) were classified to be suffering from malnutrition (MUAC value <12 cm). Among the malnourished children, 78 (38%) suffered from severe acute malnutrition (SAM, MUAC value <11 cm) and 50 (24.4%) from moderate acute malnutrition (MAM, MUAC value =11-12 cm) (Figure 1).

Children and their parents' sociodemographic characteristics were cross-tabulated against the nutritional status of the children. The results of the chi-square test revealed statistically significant association between children age and the presence of malnutrition (p-value <0.001). Children of age between 0-12 months were comparatively more malnourished (34%) than those of age between 12.1-24 months (32.5%) and > 24 months. Children with a monthly family income of 10000-20000 PKR were significantly (p-value <0.001) more malnourished (72.3%) than those with a monthly family income of >20000 PKR (20.5%). Similarly, the family size was also significantly associated with the presence of

Prevalence and Level of Malnutrition

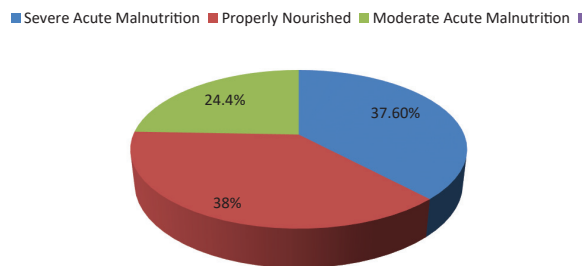


Figure 1: Prevalence and level of malnutrition.

malnutrition (p-value <0.001). The prevalence of malnutrition increased from 28.5% in a family of less than five persons to 75.6% in children having a family size of 6-10 persons. The chi-square test also revealed statistically significant (p-value <0.001) association between the parents' source of income. The children whose parents had a government/private job were comparatively less malnourished (24.4%) as compared to the children who parents were either businessmen (75.6%) or laborers (68.6%). Furthermore, children born to uneducated parents had significantly high prevalence (p-value <0.001) of malnourishment (85.4%) as compared to their counterparts (43.9%). Similarly, the prevalence of malnutrition was significantly lower (p-value <0.001) among breastfed children (17.5%) as compared to those who were not breastfed (73.3%) (Table 3).

In order to find out the factors associated with malnutrition in the studied children, all those factors which had statistically significant association with malnutrition in cross-tabulation were entered in multivariate analysis. In multivariate binary logistic regression analysis, only monthly family income and the way of feeding reached the level of statistical significance. In multivariate analysis the monthly family income of >20000 PKR had statistically significant negative association with malnutrition (p-value <0.001, OR=0.055, 95%CI=0.011-0.263). Furthermore, the results of multivariate analysis revealed that the prevalence of malnutrition in children who were not breastfed was 55.99 times higher than those who were breast fed (p-value <0.001, OR=55.99, 95%CI=13.524-231.842) (Table 4). This model fit was based on non-significant Hosmer Lemeshow value (p-value=0.315) and overall percentage of 83.4% from classification table.

Discussion

The prevalence of malnutrition among children, right from birth up to 12 months of age, as most of subjects lay within the said range, is first ever study conducted in a socioeconomically compromised province of Pakistan i.e. Baluchistan Quetta. In this study some statistically attractive findings were encountered. Socioeconomic status of the families and literacy rate of parents were two important dragging forces, as 81% of the parents of the subjects had a monthly income between 10000 to 20000 PKR and were lacking any sort of formal education. 62.4% of the children were malnourished.

Table 2: Awareness of parents about child nutrition.

Question	Interviewed parent responses					
	No. (%)					
	No	Yes	Don't Know	No	Yes	Don't Know
Do you think that proper nutrition is an Important aspect of children life?	8	(3.9)	197	(96.1)	0	(0)
Do you know about colostrum milk?	131	(63.9)	66	(32.2)	8	(3.9)
Have you ever been taught about Nutrition?	151	(73.7)	34	(16.6)	20	(9.8)
Do you think that children should be Vaccinated for disease prevention?	8	(3.9)	187	(91.29)	10	(4.9)
Have you vaccinated your children?	6	(2.9)	199	(97.1)	0	(0)
Do you think newborn babies should be Weighed immediately after birth?	100	(48.8)	46	(22.4)	59	(28.8)
Have you weighed your children Immediately after birth?	92	(44)	89	(43.3)	24	(11.7)
Do you think that newborns should be Breastfed right after birth?	174	(84.9)	2	(1.0)	29	(14.1)
Do you think that children should be breastfed for two initial years of life?	121	(59.0)	39	(19.0)	45	(22.0)
Do you know about vital micronutrients which are important for the children health?	102	(49.8)	34	(16.6)	69	(33.7)
Do you wash your hands every time before feeding your child?	17	(8.3)	181	(88.3)	7	(3.4)
Do you think that your child is malnourished?	99	(48.3)	40	(19.5)	66	(32.2)



As per our collected data on the basis of mid upper arm circumference (MUAC) value in which 38% were severely acute malnourished and 24.40% were moderately acute malnourished children and rest of the 37.60% were properly nourished. A Study conducted in Sanghar district of Sindh province revealed that 66.1% children under five were categorized as malnourished, a value close enough to our results [15]. A Study conducted in Damot Gale district South Ethiopia revealed that 40% of the subjects were malnourished which were possibly due to low provision of food and low trend of breast feeding among mothers [16].

For knowing the awareness of parents about proper nutrition for the children, a questionnaire based interview was performed which revealed some unexpected results. The study further revealed that 96.1% parents had considered that nutrition is an important part aspect of the children's life but most of them were having malnourished children. It further revealed that 63.9% of sampled population were unknown to the colostrum milk which is produced right after child birth. Colostrum milk is most important for the child health because of having healthy constituents which helps in developing better immune system. Reason behind this is traditional norm in some areas of Baluchistan as they do not consider the colostrum milk clean milk so that's why they don't feed their child colostrum milk. Because they are not familiar to the advantages of the colostrums milk because of lack of awareness and education.

Table 3: Cross-tabulation between socio-demographic characteristics of the study participants and the present of malnutrition.

Variables	Malnutrition No. (%)			p-value
	No		Yes	
Child gender				0.865
Male	46	(37.1)	78	(62.9)
Female	31	(38.3)	50	(61.7)
Age (months)				< 0.001
0-12	52	(34.0)	153	(74.6)
12.1-24	13	(32.5)	40	(19.5)
> 24	12	(100)	12	(5.8)
Family Monthly income (PKR)				< 0.001
10000-20000	46	(27.7)	120	(72.3)
> 20000	31	(79.5)	8	(20.5)
Family size				<0.001
< 5	27	(71.1)	11	(28.9)
6-10	22	(24.4)	68	(75.6)
>10	28	(36.4)	49	(63.6)
Parents source of income				< 0.001
Business	19	(24.4)	59	(75.6)
Labor	27	(31.4)	59	(68.6)
Job	31	(75.6)	10	(24.4)
Educational status of the interviewed parent				< 0.001
No Formal education	64	(56.1)	50	(43.9)
Educated				
Way of child feeding				
Breast milk	33	(82.5)	7	(17.5)
Others*	44	(36.7)	121	(73.3)

*Formula milk + animal milk; PKR: Pakistani Rupees

Table 4: Results of multivariate analysis of factors associated with malnutrition.

Variables	Malnutrition	B	OR (95%CI)	p-value
Age (months)				
0-12	153(74.6)		Referent	
12.1-24	27(19.5)	0.258	1.294(0.382-4.378)	0.679
> 24	12(5.8)	-22.019	NC	
Parent's source of income				
Business	59(75.6)		Referent	
Labor	59(68.6)	1.058	2.880 (0.871-9.526)	0.083
Job	10(24.4)	-0.058	0.944 (0.163-5.472)	0.949
Parent's education status				
Uneducated	78(85.7)		Referent	
Educated	50(43.9)	-0.483	0.617(0.157-2.422)	0.489
Family Monthly income (PKR)				
10000-20000	120 (72.3)		Referent	
20000-40000	8 (20.5)	-2.909	0.055(0.011-0.263)	< 0.001
Way of child feeding				
Breast milk	7 (17.5)		Referent	
Others	121(73.3)	4.025	55.99(13.524-231.842)	<0.001
Family size				
< 5	11 (28.9)		Referent	
6-10	68 (75.6)	0.628	1.873(.029- 1.575)	0.501
>10	49 (63.6)	-1.541	.214 (.157- 2.422)	0.130

PKR: Pakistani Rupees; B: Beta; OR: Odds Ratio

As data of my research also reveals that 73.3% of the parents haven't had any information or proper education about child nutrition which is considered as fundamental unit of life for every child. This is an alarming situation that our education system lacks providing information about the better nourishment of child. Furthermore, 59% of the parents had answered NO to a question that newborns should be breastfed right after birth and for initial two years of life respectively. This is also a major problem in increased prevalence of malnutrition in child's health because it is considered that a child should be fed with mothers' milk till two years as it helps in child's proper growth. Most of the parents (48.3%) replied that they don't think so that their child is malnourished though their children were in process of treatment for the malnutrition.

According to the results multivariate analysis, parents' income and way of breast feeding were major factors associated with malnutrition. The study revealed that 73.3% of parents who had malnourished children were not breastfed by their mothers. In the total population of interviewed samples only 17.5% were breastfed. A study in Ludhiana India found a significant relationship in those children who were not breast fed in their first 4 months were malnourished [17].

A study conducted in Kamaiyas city of Nepal also mentioned breast feeding a major factor which is cause of malnutrition in under five-year-old children Eight percent of children did not receive colostrum which is produced in mother's milk right after birth of child [18, 19].

The collected data also presents shocking results that most of malnourished child's were associated with families who had low income which was a great barrier in providing quality food to their children. It also reveals that 72.3% of parents had low income which was in between to 10k to 20 k and 20.5% were



having more than 20k, this indicates that parents having low source of income can develop more chances of malnutrition among their children as compare to the parents earns more than 20k per month. The findings are similar to the study conducted in North Maluku Province of Indonesia which also consider that those children who belong to low economic class and lack breast feeding are on greater risk of being malnourished [20,21].

Conclusion

The current study evaluated the prevalence and factors associated with malnutrition among children below five years in multiple health centers of Quetta city. Furthermore, it also evaluated parents' awareness regarding children nutrition. Parents' education regarding children nutrition particularly about breast milk and significance of colostrum are suggested to improve the worse situation of children malnutrition.

Recommendations

Under nutrition prevention efforts should target the younger age groups and there is need to improve the immunization coverage because the immunization status of children is very poor. Supplementary feeding centers and fortified food must be available on large scale for the community. There is a need to establish a nutrition surveillance system to monitor any progression of the nutritional situation.

Acknowledgements

We are thankful to the teaching staff of Faculty of Pharmacy and Health Sciences University of Baluchistan. Moreover, we also pay our gratitude to our friends and colleagues for their unconditional help and guidance.

Ethical consideration

This study was approved by Research and Ethic committee of Faculty of Pharmacy and Health Sciences, University of Baluchistan, Quetta. The approval of this study was submitted with the research sites where they allowed the researchers to conduct study. Informed consent was also taken from the parents of the children.

Study limitation

Cross-sectional designs, enrollment of participants only in Quetta, non-probability sampling, lack of information of about micro-nutrients were the significant limitations associated with the current study. A large multicenter study with the evaluation of micro-nutrients is recommended to confirm findings of the current study.

(Appendix)

References

1. Fore HH, Dongyu Q, Beasley DM, Ghebreyesus TA (2020) Child malnutrition and COVID-19: the time to act is now. *Lancet* 396: 517-518. [Link: https://bit.ly/3i8HYv1](https://bit.ly/3i8HYv1)
2. Black RE, Victora CG, Walker PS, Bhutta ZA, Christian P, et al. (2013) Maternal and child undernutrition and overweight in low-income and middle-income countries. *Lancet* 382: 427-451. [Link: https://bit.ly/2SFTWBQ](https://bit.ly/2SFTWBQ)
3. Awuchi CG, Igwe VS, Amagwula IO (2020) Ready-to-Use Therapeutic Foods (RUTFs) for Remedying Malnutrition and Preventable Nutritional Diseases. *International Journal of Advanced Academic Research* 6: 47-81. [Link: https://bit.ly/34zPM13](https://bit.ly/34zPM13)
4. Becker PJ, Carney LN, Corkins MR, Monczka J, Smith E, et al. (2014) Consensus statement of the Academy of Nutrition and Dietetics/American Society for Parenteral and Enteral Nutrition: indicators recommended for the identification and documentation of pediatric malnutrition (undernutrition). *Journal of the Academy of Nutrition and Dietetics* 114: 1988-2000. [Link: https://bit.ly/3uy53dm](https://bit.ly/3uy53dm)
5. White JV, Guenter P, Jensen G, Malone A, Schofield M, et al. (2012) Consensus statement: Academy of Nutrition and Dietetics and American Society for Parenteral and Enteral Nutrition: characteristics recommended for the identification and documentation of adult malnutrition (undernutrition). *JPEN J Parenter Enteral Nutr* 36: 275-283. [Link: https://bit.ly/3wRdpOT](https://bit.ly/3wRdpOT)
6. Mehta NM, Corkins MR, Lyman B, Malone A, Goday PS, et al. (2013) Defining pediatric malnutrition: a paradigm shift toward etiology-related definitions. *JPEN J Parenter Enteral Nutr* 37: 460-481. [Link: https://bit.ly/3c5AnJS](https://bit.ly/3c5AnJS)
7. Babu GR, Das A, Lobo E, Deepa R, John DA, et al. (2021) Mid Upper Arm Circumference in Pregnant Women and Birth Weight in Newborns as Substitute for Skinfold Thickness: Findings from the MAASTHI Cohort Study, India. [Link: https://bit.ly/34Ba4XW](https://bit.ly/34Ba4XW)
8. Saeidlou SN, Babaei F, Ayremlou P (2014) Malnutrition, overweight, and obesity among urban and rural children in north of west Azerbaijan, Iran. *Journal of obesity* 2014: 541213. [Link: https://bit.ly/3vEbxZ](https://bit.ly/3vEbxZ)
9. De Onis M, Onyango AW, Borghi E, Garza C, Yang H, et al. (2006) Comparison of the World Health Organization (WHO) Child Growth Standards and the National Center for Health Statistics/WHO international growth reference: implications for child health programmes. *Public Health Nutr* 9: 942-947. [Link: https://bit.ly/3uyIwhC](https://bit.ly/3uyIwhC)
10. Grummer-Strawn L, Krebs NF, Reinold CM (2009) Use of World Health Organization and CDC growth charts for children aged 0-59 months in the United States.
11. Akhtar AN, Jamil R, Tariq S (2020) Impact of Education on Knowledge of Women Regarding Food Intake During Pregnancy: A Hospital Based Study. *Annals Of Abbasi Shaheed Hospital And Karachi Medical & Dental College* 25: 35-43. [Link: https://bit.ly/2SORucs](https://bit.ly/2SORucs)
12. Tariq A, Khan SR, Basharat A (2020) Assessment of knowledge, attitudes and practice towards Vitamin D among university students in Pakistan. *BMC Public Health* 20: 355. [Link: https://bit.ly/3p6qtgF](https://bit.ly/3p6qtgF)
13. Badruddin SH, Agha A, Peermohamed H, Rafique G, Khan KS, et al. (2008) Tawana project-school nutrition program in Pakistan-its success, bottlenecks and lessons learned. *Asia Pac J Clin Nutr* 17. [Link: https://bit.ly/3gePdPR](https://bit.ly/3gePdPR)
14. Achakzai P, Khan R (2016) Nutritional status and associated factors among children less than five years of age in tehsil Zarghoon town, District Quetta, Baluchistan. *J Ayub Med Coll Abbottabad* 28: 146-151. [Link: https://bit.ly/3uF1fqA](https://bit.ly/3uF1fqA)
15. Mwangome MK, Fegan G, Prentice AM, Berkley JA (2011) Are diagnostic criteria for acute malnutrition affected by hydration status in hospitalized children? A repeated measures study. *Nutr J* 10: 1-6. [Link: https://bit.ly/3paktUc](https://bit.ly/3paktUc)
16. Batiro B, Demissie T, Halala Y, Alemayehu Anjulo A (2017) Determinants of stunting among children aged 6-59 months at Kindo Didaye woreda, Wolaita Zone, Southern Ethiopia: Unmatched case control study. *PLoS one* 12: e0189106. [Link: https://bit.ly/3pg6YSU](https://bit.ly/3pg6YSU)



17. Laghari ZA, Soomro AM, Tunio SA, Lashari K, Baloach FG, et al. (2015) Malnutrition among children under five years in district Sanghar, Sindh, Pakistan. Gomal Journal of Medical Sciences 13. [Link: https://bit.ly/3fANW6r](https://bit.ly/3fANW6r)
18. Abera L, Dejene T, Laelago T (2018) Magnitude of stunting and its determinants in children aged 6–59 months among rural residents of Damot Gale district, southern Ethiopia. BMC Research Notes 11: 557. [Link: https://bit.ly/2TnUOv8](https://bit.ly/2TnUOv8)
19. Sengupta P, Philip N, Benjamin A (2010) Epidemiological correlates of under-nutrition in under-5 years children in an urban slum of Ludhiana. Health and Population: Perspectives and Issues 33: 1-9. [Link: https://bit.ly/3uCwxhV](https://bit.ly/3uCwxhV)

20. Khatri RB, Mishra SR, Khanal V, Choulagai B (2015) Factors associated with underweight among children of former-Kamaiyas in Nepal. Front Public Health 3: 11. [Link: https://bit.ly/3i7luup](https://bit.ly/3i7luup)
21. Agho KE, Inder KJ, Bowe SJ, Jacobs J, Dibley MJ et al. (2009) Prevalence and risk factors for stunting and severe stunting among under-fives in North Maluku province of Indonesia. BMC Pediatrics 9: 64. [Link: https://bit.ly/3wHkxwU](https://bit.ly/3wHkxwU)