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

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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.

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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 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 (42.4%) and had a family monthly income of between 10000–20000 Pakistani Rupees (PKR) (83%). 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 | 205 |    |
| 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  | (12.2) |
| Higher education   | 25    | (12.2) |
| Way of feeding children | | |
| Breast milk       | 40    | (19.5) |
| Formula milk      | 149   | (72.7) |
| Animal milk       | 16    | (7.8) |

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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 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 lessmalnourished (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. (%) |
|-----------------------------------------------|------------------------------|---------|
| 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 (9129) 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) |         |

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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 65.9% 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 colostrum 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 (%) | Yes (%) | p-value |
|----------------------------|--------------|--------|---------|---------|
| Child gender               |              |        |         |         |
| Male                       | 46           | (37.1) | 78      | (62.9)  | 0.865   |
| Female                     | 31           | (38.3) | 50      | (61.7)  |         |
| Age (months)               | < 0.001      |        |         | < 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 | < 0.001 |        |         |         |
| parent                     | 13           | (14.3) | 78      | (85.4)  |         |
| 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)  |         |

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 20k and 20.5% were

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

| Variables                  | Malnutrition | B | OR (95%CI) | p-value |
|----------------------------|--------------|---|------------|---------|
| Age (months)               |              | B |           |         |
| 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  |              | B |           |         |
| 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  |              | B |           |         |
| Uneducated Educated        | 78(85.7)     | Referent | |       |
| Family Monthly income (PKR) | <0.001      | B |           |         |
| 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       |              | B |           |         |
| Breast milk                | 7(17.5)      | Referent | |       |
| Others                     | 121(73.3)    | 4.025 | 55.99(13.524-231.842) | <0.001  |
| Family size                |              | B |           |         |
| < 5                        | 27(11.8)     | Referent | |       |
| 6-10                       | 68(75.6)     | 0.628 | 1.873(0.029-1.575) | 0.501   |
| >10                        | 49(63.6)     | -1.541 | 0.214(0.157-2.422) | 0.130   |

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

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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.

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**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**

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