Effect of Oral Nutritional Supplements (ONS) on Weight of Malnourished Children in Developing Countries

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Citation

ABSTRACT:
Malnutrition during childhood is the condition which is at the high priority of world health concerning management and control. Malnutrition is the significant contributor of children death in several areas around the world. The factors that causes malnutrition in children are varied and multifaceted ranging from the political flux, cultural and social values, sluggish economic progress and various communicable diseases. The struggle to avoid and control malnutrition in childhood therefore need demands comprehensive investigation. The primary attribute of these investigations and measure could include a complete policy agenda regarding mother and child health to ensure maximum nutrition program along with regular monitoring in the growing children. RUSFs are the best to meet their nutritional requirements. It is obtained from and contains vegetable oil inter alia the dry skimmed milk. RUSF contains 513 Kcal. The reference weight increase is 5g/kg/day. RUSF is used for 3 to 4 months. The brands used in study are acha mum, wawa mum. Based on the results obtained it is recommended that Oral Nutritional Supplement RUSF should be provided to the malnourished children for their healthy growth.

Keywords: Oral Nutritional Supplements, Weight of malnourished Child, Developing Countries.
Introduction

World Health Organization that demand extraordinary attention (Beagle hole et al., 1993) identifies a number of health issues. Malnutrition in childhood is one of them which in the high priority list of WHO (2020), and focus of the United Nations Millennium Development goals (United Nations Children’s Fund, 2019). It is still a major contributing factor to death of children and burden on healthcare and economies through the developing nations (Early Childhood Development, 2016). Likewise, childhood under-weight is of the main cause of increasing global diseases (Fatima, Malkova, Wright, & Gerasimidis, 2018). The widespread poverty in developing countries worsens the existence of malnutrition in childhood. The extent of which in different in communities could be witnessed through the weight for the height deficiency, weight for the age as well as height for the age deficiency as identified by (Alarcon, Lin, Noche, Hernandez, Cimafranca, Lam, & Comer, 2023). The struggle to avoid and control malnutrition in childhood therefore need demands comprehensive investigation. The primary attribute of these investigations and measure could include a complete policy agenda regarding mother and child health to ensure maximum nutrition program along with regular monitoring in the growing children (Dung, Pham, Ngo, Nguyen, Tran, Pham, et al., 2019). RUSFs are the best to meet their nutritional requirements. It is obtained from and contains vegetable oil inter alia the dry skimmed milk which contains 513 Kcal against 5g/kg/day weight increase which is used up to 3 to 4 months. Rural communities are more vulnerable because of unemployment and poverty coupled with poor or no economic growth, which is indicated by the height for the age and weight for the age deficiencies. Similarly, Height for the age and weight for the age are general predictors of childhood malnutrition (Antoniou, Roefs, Kremers, Jansen, Gubbels, Sleddens, & Thijs, 2016). Social practices in child feeding is another factors causing childhood malnutrition especially breastfeeding and food supplements used up to 5 years age. With this context, this study aimed to address the question that to what extent Oral Nutritional Supplements (ONS) affects the weight of malnourished children below the 5 years of age. Second, the objective this research was to determine the impact of Oral Nutritional Supplements (ONS) on the weight among the malnourished children along with an assessment of the nutritional status among the malnourished children under the age of years. The findings of the study will help the health authorities in developing countries to revise and strengthen the intervention programs nutrition. Thus, study will also enable the local health decision makers and practitioners to motivate the communities and government for increased allocation of funds to alleviate poverty, and initiate programs for food supplementation.

Hypothesis

H₀: The Oral Nutritional Supplements has no effect on the weight of mal-nourished children.

H₁: Weight of mal-nourished children is gained by the use of Oral Nutritional Supplements.

Literature Review

Perspectives on Malnutrition

In most case the reports of WHO are mainly focusing on the macro aspect of the incidence of malnutrition in childhood and tries to highlight the economic factors in the underdeveloped and developing countries, and do not touch the cultural practices and socialization. This view supports to the international struggle to get rid of poverty, which is also included in the millennium developmental goals of United Nations Organization (United Nations Children’s Fund, 2019). Information on India, Pakistan, and Sri Lanka in Asia are available in the literature (Kapil & Sethi, 2004). Although the studies mentioned did not give a clear picture of the phenomenon. However, all these studies commonly focused on the malnutrition in children in relation to the women status, household income and somehow on level of education of caregiver or the mother (Karlsson, Kim, Sarwal, James, & Subramanian, 2021). The rates of malnutrition in developing nations is 38% for stunting, 31% for being under weight and 9% for wasting. A 41% for stunting, 35% for underweight and 10% as reported by Khadilkar, & Khadilkar (2015). Research has established that if Oral nutritional supplements (ONS) are used as intended (in addition to food) to support people to regain weight and improve health, and that this use is reviewed regularly, then ONS can be a very cost-effective method of treating malnutrition, particularly where appetite can be affected by medication or illness (Mayneris-Perxachs & Swann,
The focus therefore must be in ensuring continuity of nutritional care from admission to discharge from hospital and maintaining care once people have returned home through regular screening and monitoring, thereby preventing readmission, and reducing costs across the NHS. Good nutritional care is a vital part of patient management and includes nutritional screening, provision of appetizing and nutritious food, nutritional support, and monitoring (Murray, Kerr, Brunton, Williams, DeWitt, & Wulf, 2021). ONS are one of a spectrum of nutritional support strategies that can be used to tackle malnutrition, which also include dietary counseling, tube feeding and parenteral nutrition. ONS are an effective and non-invasive solution to malnutrition in patients who are able to consume some normal food but not enough to meet nutritional requirements (Phillips, Bailer, Foster, Li, Dogan, Smith, Reilly, & Freedman, 2020). ONS have proven nutritional, functional, clinical, and economic benefits in both the hospital and community setting in a wide variety of patient groups. Studies show that ONS increase energy and protein intakes in both hospital and community patients without reducing spontaneous intake from food; indeed, ONS may help to stimulate appetite e.g., in post-surgical patients and in older people. There is no question that your body needs calcium. It is involved in everything from nerve signal transmission to blood vessel health. Calcium builds and strengthens bones—a function that is especially critical after menopause, when bones become more fragile and prone to fractures. Vitamin D helps the body absorb calcium, which is why the two nutrients are often paired up in supplements.

**Factors Predisposing Children to Malnutrition**

**Economic Status**

Regarding female, economic status is a significant determinant of a child nutritional status (UNICEF, 1990). One comparative studies considering a child nutrition covering 15 countries reported it an instrumental factor (Gwela, Mupere, Berkley, & Lancioni, 2019). Likewise, in Ethiopia the studies of Alderman, Behrman, & Hoddinott (2020) reported that higher economic status decreases the level of stunting in children.

**Education**

Education is a significant resource that enables the mothers take to care the child properly, and a predictor of child growth (Ghosh, Kishore, Shaikh, Satyavrat, Kumar, Shah, et al., 2018) investigated the same in East Asia, while Huynh, Estorninos, Capeding, Oliver, Low, & Rosales (2015) in reported limited prevalence of child malnutrition because of increased literacy among the mothers.

**Employment**

Alderman, Behrman, & Hoddinott (2020) claimed that employment could enhances the female household’s accessibility to resources through their earnings. Yet it could also negatively effects the nutritional status of a child. On the other because it decreases mother caring-time for a child (Ghosh, Kishore, Shaikh, Satyavrat, Kumar, & Shah, et al, 2018b) found that mother’s malnourished children are almost working women, however Karlsson, Kim, Sarwal, et al. (2021) did not find any evidence on the relationship between children's nutritional status and mothers’ employment.

**Water and Toilet Facilities**

Inadequate water and sanitation increase the rate of communicable diseases and resulting in various kinds of malnutrition De Onis & Branca (2016) discovered that contaminated water source and absence of toilets are correlated with low stature of a child.

**Morbidity of a Child**

Pneumonia and diarrhea and alike communicable diseases results in fever and affect the dietary intake and utilization (Scharf, Rogawski, Murray-Kolb, Maphula, Svensen, Tofail, Rasheed, Abreu, Vasquez, & Shrestha et al., 2018). It negatively affect a child nutritional status. Olofin, McDonald, Ezzati, Flaxman, Black, & Fawzi et al (2013) reported higher stunting in the children with diarrhea.
Age

The nutritional status of a child is very critical factor including care, breastfeeding, and preventing practices inter alia contact with the age specific infectious diseases (Best, Neufingerl, van Geel, van den Briel, & Osendarp, 2010). Pesch, Bauer, Christoph, Larson, & Neumark-Sztainer (2020) reported positive relationship between age and height-for-age (growth retardation). Likewise, Schulze, Christian, Wu, Arguello, Cui, & Nanayakkara-Bind et al. (2014) found that malnutrition is also related to the child age.

Order

Alderman, Behrman, & Hoddinott (2020) reported that parents pay less attention to the older children in case of birth of a new baby. Similarly, Pesch, Bauer, Christoph, Larson, & Neumark-Sztainer (2020) found rare stunting in birth order, they also recorded that child malnutrition is positively correlated with birth order (5+).

Birth Interval

Closely spaced pregnancy is correlated to the mother who fined slight time to recover the lost fat and nutrient (ACC/SCN, 1990), it is observed that an enough birth space yield better child nutrition. This mothers also get plenty time for feeding and care, while birth in short intervals i.e., >24 months results in higher stunting in in developing communities (Alderman, Behrman, & Hoddinott, 2020).

Ecological Conditions and Malnourishment.

The surroundings in which we live always accounts for diseases in the children, for example those who are live in squalor areas, and they are more susceptible to communicable disease i.e., pneumonia and diarrhea. The non-availability of clean drinking water and inadequate sanitation are among the key ecological conditions responsible for diseases (Alderman, Behrman, & Hoddinott, 2020). In several developing countries like Pakistan, governments have arranged the supply clean water and proper sewerage one can see in the Integrated Development Plans (IDP) developed by the local governments. In Pakistan, where most of the children are partially immunized or not immunized through childhood vaccines. They are highly susceptible to infections. The most common infections among young children are gastrointestinal infections (diarrhea), respiratory infections, and communicable diseases, which severely affect the nutritional status of children and cause malnutrition among them (Perignon, Fiorentino, Kuong, Burja, Parker, Sisokhom, Chamnan, Berger, & Wieringa, 2014)). Another biological factor that causes malnutrition is presence of birth defects and organic diseases among young children. Amongst various such disorders congenital defect of the gastrointestinal tract severely affects the nutritional status of young children by affecting swallowing, digestion, absorption, or metabolism of food. Some of the other common congenital abnormalities that cause malnutrition include cleft lip/palate, trachea- esophageal fistula, mal-absorption syndrome, lactose intolerance, etc. (Volger, Sheng, Tong, Zhao, Fan, Zhang, Ge, Ho, Hays, & Yao, 2017). In Pakistan, many families do not opt to seek medical help for these conditions because of the fact that management of these conditions requires high tech care and financial resources: therefore, many such conditions are left unaddressed and, consequently, young children with these conditions end up with malnutrition. Other variables causing malnutrition includes parental education, residential area (rural/urban), socio-economical condition of home, awareness about nutrition, balanced diet.
Figure 1

Conceptual Framework

Method

The suitable design for studies like one in hand is a cross-sectional survey (Oleske, 2001), which has the power to measure the variables and their attributes concerning the population at a specific point in time. The design is also used by similar studies in various parts of the world (Wang, 2012). The unit of analysis of this study were the children below the 5 years of age, and target population was children between the ages of one month to sixty months. Population was taken from rural areas of District Dera Ismail Khan Pakistan and Kota Kinabalu Malaysia. Children of 61 months or over were excluded, thus the estimated population was estimated at 450. The sample size was calculated by the bellows formula:

\[ n_0 = \frac{(t)^2 \times (p)(1-p)}{(d)^2} \]

Where
\( t = \) is value of the selected alpha level at 0.05
\( n_0 = \) sample size
\( p = \) estimate of variance at 0.5
\( D = \) acceptable margin of error = 5%.
(Bartlet et al., 2001; Wang, 2012).
The sample was selected randomly and was visited to administer the questionnaires. In case they do not have children under 5 years then a next door was knocked on and son on. Total 120 sample were included in the survey, which accounts for 13.6 % in respect to the target population of the study.

Instrument and Data Collection procedure

A structured questionnaire was administered for data collection data. The questionnaire had three parts i.e., anthropometric, demographics. The weight of the children was measured using common scales. The children below six months were considered without dresses. The measurements ranged from one kg to two and half kg at birth, and measurement of height was done by heal-head technique. Moreover, those less than twelve months were measured by employing supine-position methods. The children above twelve years were measured by a standardized height-measuring panel, which was fixed nearest .1 cm as recommended (Long, 1984; Bowling (1997). This relate to the question seeking to establish whether there is a relationship between malnutrition and the host. The methods and tools for weight and height measurement were same which the WHO recommends. After providing the statistical description of the Oral Nutritional Supplement (ONS) RUSF on malnourished children before and after taking the ONS. The other important area of statistical inference is to test the statistical significance of ONS RUSF on the weight gain of the malnourished children. This study takes large sample size (> 30) of 120 children; therefore, Z test statistic is used for statistical significance of ONS RUSF on the weight gain.

The steps for testing a hypothesis about the average weight of malnourished children before and after taking the ONS with unknown variance $\sigma^2$ is given below:

1. The null and alternative hypothesis

$H_0$: The ONS has no effect on the weight of malnourished children. That is average weight gain before and after taking ONS remains the same.

$H_0: \mu_1 = \mu_2$

$H_A$: Weight of malnourished children is gained by the use of Oral Nutritional Supplements. That is average weight gain after taking ONS on malnourished children is greater than the weight gain after not taking ONS on malnourished children, where

$H_A: \mu_1 > \mu_2$

Where $\mu_1$ represents the average weight of malnourished children after taking ONS and $\mu_2$ is the average weight of malnourished children. Before taking ONS.

2. The following test statistics are used to test these hypotheses.

$$z = \frac{\bar{X}_1 - \bar{X}_2}{s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

and $s_p = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}$

Where $\bar{X}_1$ is the sample mean $n_1$ is a sample size and $s_1^2$ is the sample variance of 1 weight of malnourished children after taking ONS. $\bar{X}_2$ is the sample mean, $n_2$ is sample size and $s_2^2$ is the sample variance of weight of malnourished children before taking ONS. $s_p$ is the pooled estimate of the common standard deviation. If $z > z_a$ then we reject the null hypothesis at a percent level of significance ($a = 0.05, 0.01$ and $0.10$) and conclude that Weight of malnourished children is gained by the use of Oral Nutritional Supplements.
Table 1  
*Characteristics of Children Aged 6-59 Months at Dera Ismail Khan*  

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>68</td>
<td>57</td>
</tr>
<tr>
<td>Female</td>
<td>52</td>
<td>43</td>
</tr>
<tr>
<td>Child Age (in Months)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 – 11</td>
<td>25</td>
<td>21</td>
</tr>
<tr>
<td>12 – 23</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>24 – 35</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>36 – 47</td>
<td>25</td>
<td>21</td>
</tr>
<tr>
<td>48 – 59</td>
<td>25</td>
<td>21</td>
</tr>
<tr>
<td>Place of Delivery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>Health Facility</td>
<td>90</td>
<td>75</td>
</tr>
<tr>
<td>Gestational age at Birth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 9 months</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>At 9 Months</td>
<td>103</td>
<td>86</td>
</tr>
<tr>
<td>Greater than 9 Months</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>Types of Birth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>120</td>
<td>100</td>
</tr>
<tr>
<td>Twin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Still Breastfeed Child</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>45</td>
<td>37.5</td>
</tr>
<tr>
<td>No</td>
<td>75</td>
<td>62.5</td>
</tr>
<tr>
<td>Reason for not feed breast (n=120)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal Health Problem</td>
<td>4</td>
<td>3.33</td>
</tr>
<tr>
<td>Refusal of Child</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal Pregnancy</td>
<td>71</td>
<td>59.16</td>
</tr>
<tr>
<td>Diarrhea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4</td>
<td>3.33</td>
</tr>
<tr>
<td>No</td>
<td>116</td>
<td>96.67</td>
</tr>
<tr>
<td>Fever</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4</td>
<td>3.33</td>
</tr>
<tr>
<td>No</td>
<td>116</td>
<td>96.67</td>
</tr>
</tbody>
</table>

Table 2  
*Maternal Characteristics of Dera Ismail Khan District (n=120).*  

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of mother (in years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 – 19</td>
<td>17</td>
<td>14.17</td>
</tr>
<tr>
<td>20 – 29</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>30 – 39</td>
<td>60</td>
<td>50</td>
</tr>
<tr>
<td>40 – 49</td>
<td>2</td>
<td>1.66</td>
</tr>
<tr>
<td>50 – 59</td>
<td>1</td>
<td>0.83</td>
</tr>
<tr>
<td>Age at first birth</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Findings and Analysis

This section provides the statistical significance of the ONS RUSF on the weight gain of mal-nourished children over various child age groups. The results are provided in Table 3. As can be seen from the results the average weight of mal-nourished children before using ONS is lesser than the average weight of mal-nourished children after using ONS under respective age groups. Whether or not ONS significantly improve the weight of mal-nourished children is performed by one sided $z$ test. The results of $z$ test in Table 3 reports that the calculated value of $z$ statistic exceed from the $z$ critical at 5% level of significance. Therefore, null hypothesis that is ONS has no effect on the weight of mal-nourished children is strongly rejected and the alternative hypothesis that is average weight gain after taking ONS on mal-nourished children is greater than the weight gain after taking ONS on mal-nourished children is strongly accepted. Based on these results, it is recommended that Oral Nutritional Supplement RUSF should be provided to the malnourished children for their healthy growth.

Table 3

Statistical Inference of ONS on Mal-Nourished Children

<table>
<thead>
<tr>
<th>Child Age (in Months)</th>
<th>Mal-Nourished Children Before Using ONS</th>
<th>Mal-Nourished Children After Using ONS</th>
<th>$Z_{a=0.05}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$</td>
<td>$\bar{x}$</td>
<td>$s^2$</td>
</tr>
<tr>
<td>6 – 11</td>
<td>25</td>
<td>7.136</td>
<td>0.039</td>
</tr>
<tr>
<td>12 – 23</td>
<td>30</td>
<td>9.810</td>
<td>0.179</td>
</tr>
<tr>
<td>24 – 35</td>
<td>15</td>
<td>11.030</td>
<td>0.547</td>
</tr>
<tr>
<td>36 – 47</td>
<td>25</td>
<td>12.710</td>
<td>0.056</td>
</tr>
<tr>
<td>48 – 59</td>
<td>25</td>
<td>13.600</td>
<td>0.652</td>
</tr>
</tbody>
</table>
The ages of the respondents’ was from one to sixty. Those in the age group of 1 to 12 months were 22.6 % (n=25), 22.6 % (n=25) belonged to age group of 49 to 60 months. The mean age was 17.6 months, which is the maximum period of breastfeeding. The anthropometric failure of wasting was found high in the children from one to twelve months i.e., 40% (n=10) and it was recorded lowest for age between 25 – 36 months i.e., 12% (n=3).

Figure 3

*Gender Distributions of the Children*
The distribution for gender shows the 57% (n=68) of the respondents were males and 43% (n=52) were females. The incidence of malnutrition is recorded with high rete i.e., stunned =61.8% (n=21), under-weight 67.7% (n=23) and wasted among males were 68.0% (n=17) in contrast for females it was recoded stunted= 38.2% (13), under-weight = 32.3% (n=11) and wasted= 32.0% (n=8). The results of the study are thus consistent with studies conducted previous studies.

Figure 4

Breastfeeding Distribution

Amongst all the respondents the breastfed were 92% (n=106), and fed by other means were 8% (n=14). Likewise, 34(100%) respondents were stunted, 76.4% (n=26) were fed by other means and 23.5% (n=8) were breastfed. As for under-weight is concerned, 70.6% (n=24) were not breastfed at the same time as 29.4% (n=10) were breastfed. Similarly, for wasting it was found that 44% were breastfed and 66% were not breastfed. However, the study did not find any significant relationship these variable of breastfeeding as could be seen from the results ($\chi^2 = 1.487, p= 0.223$ and $\chi^2 = 0.345, p= 0.557$; odds ratio= 0.8) respectively. Yet a significant relations is found for stunting ($\chi^2 =3.980, p= 0.046$; odds ratio= 2.3). The results indicate that children who were not breastfed were more likely to suffer stunting as compared to the breastfed. However, studies show that breastfeeding is now days encouraged in the developing countries like Pakistan and Malaysia and it is expected the chances of children being afflicted with malnutrition will be reduced.
Figure 5
Mother/Caregiver Age Categories

Figure 5 shows age distribution of the caregivers and mothers. The study found that 58% (n=63) fall in the age group of 25-34 years, study also reported that (n=38, 17-34) mothers fall age group of 17-24. The stunned were 76.5%; n=26, Underweight children = 76.5%; n=26, wasted = 72%; n=18 belonged to mothers between 17-34 years of age. The results did not proved any significant relationship between the anthropometric measures at 5% level and the age of mothers.

Figure 6
Number of Children

Figure 6 indicates that 38% (n=44) bore a single less than five years, 48% (n=59) had two less than five years. As for anthropometric failure is concerned, stunted were 88% (n=30), underweight were 77% (n=26), and wasted were 72% (n=18) who do not have children in the age group one to twenty-four month. The findings bring into fore that, there is no significant relationship between stunting and underweight number of children in this age though this appear to be a wasting factor.
**Table 4**

*Supply of Clean Drinking Water*

<table>
<thead>
<tr>
<th>Where do get your water?</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communal-Tap</td>
<td>20</td>
<td>17.8%</td>
</tr>
<tr>
<td>Household-Tap</td>
<td>85</td>
<td>80.7%</td>
</tr>
<tr>
<td>River and Wells</td>
<td>15</td>
<td>2.5%</td>
</tr>
<tr>
<td>Aggregate</td>
<td>120</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table shows that there is no issue of supply of clean water in District Dera Ismail Khan. The percentage of households is given in table 4. This means that scarcity of household-tap water in the community is five percent i.e., 5.7% (n=55), which also displays community’s economic status.

**Conclusion**

Malnutrition in children is a disease phenomenon generally found in the poor family children investigated by several researchers, studies indicated that malnourished children result into different kind of adulthood deficiencies, for example, it severally affect their ability to perform optimally. To inhibit and control the occurrence of malnutrition in the children, measuring the extent of the existence of the illness inter alia the contributing factors is an imperative.

**Conclusion Based on Literature Review**

The existing studies revealed how malnutrition is taken by the researchers around the scientific world and relationship between level of socio-economic development and malnutrition. The literature suggested that communities with backward socio-economic conditions are at greater risk of childhood malnutrition. It further indicated that South-East Asia and Africa the rate of childhood malnutrition is very high.

**Conclusions Based on Research Methodology**

The study employed a cross-sectional design. A structured questionnaire was used to achieve the objectives. The design was selected because it enables investigations in assessing the scale of malnutrition in children. It helped in the recording the exposure variables and outcome variables.
Conclusion Based on the Empirical Research

Effect of Oral Nutritional Supplements on Weight of Malnourished Children

It could be observed from the results that normal weight of the malnourished children prior to the use of ONS are lesser in comparison to the average weight of malnourished children post ONS among the respective age groups. Whether or not ONS considerably enhances the weight of malnourished children is tested by one sided z test. Results in Table 3 shows the calculated value of z statistic surpass from the z critical at 5% significance level. Thus, null hypothesis is substantiated and accepted. Based on the results, it is concluded that Oral Nutritional Supplement RUSF must be administered to malnourished children for healthy growth.

Ages and Gender of the Children

Age is considered as one of the significant measure to compute and interpret anthropometric. The anthropometric tables compared to reference group with the (stunting) height-for-age and (underweight) weight-for-age. Result states a significant dependence on the accuracy of the children age. The study found presence that anthropometric failures differs according to difference in ages. The study reported that high presence of stunting i.e., 38.2%; n=13) in children between age twelve to twenty-four months. The results in line with Murarkar, Gothankar, Doke, Pore, Lalwani, Dhumale, Quraishi, Patil, Waghachavare, & Dhobale, et al. (2020). It is therefore concluded that stunting results in long-term deprivation of adequate nutriment. The gender is widely studied by researcher concerning the malnutrition as a significant predictor. It is assumed that in cases the community’s childcare has a gender bias and males are preferred over the females. However, our study establish that anthropometric indices used male children and reported a rate of incidence among the males than the females.

Practice of Breastfeeding

Around the globe breast-feeding is encouraged during the first four to six months except for mothers in case if they are HIV positive. The study reported that 88% children got breastfeeding at their birth. As for age is concerned, the study reported breastfeeding for children between ages one and fifteen months. The study also reported a significant statistical association with stunting, yet not with anthropometric indices. The findings are however inconsistent with that Mehndiratta, Bhasin, Khadilkar, Kochi, Pai, Mittal, Sanskar, & Agrawal (2021).

Solid Foods

Alderman, Behrman, & Hoddinott (2020) assert that solid food play role in the children during first four to six months. Cosminsky et al (1993) shared similar views. However, our results are contrary to them, as it did not show role of this factor on the incidence of childhood malnutrition might be because sample size. On other hand, the conservative knowledge in clinical health also reported any major change in the kind of solid food and the existence of malnutrition in children. For underweight and wasting, result did not show any significance since maximum cases were reported for wasted and underweight concerning meal of soft porridges. According to Cosminsky et al. (1993: 946), mothers might be ignorant about the nutritional value of refined maize meal.

Mother or Caregiver’s Demographics

Age and Marital Status of the Mother/Caregiver

An anthropometric failure relates with the age of mothers, and it was found in mothers between the ages of seventeen to twenty-four. The results however, did not confirm our assumption and did not report any significant association between mother’s age and anthropometric failures, which needs further investigation.
Age Difference between Siblings

It is reported by earlier studies that if the number of children below 24 years in a family are more from the same mother will bear impact on the proper childcare. Our results are consistent with previous studies, and it did not proved any significance, and it might be attributed to the small sample size.

Hygiene Consciousness

The surroundings in which live matter a lot for our health. The families who lives in unhygienic conditions their children are more prone to the communicable diseases like pneumonia and diarrhea. The supply of clean drinking water and waste management inter alia adequate sanitation system are instrumental. However, this study did not find any evidence on the relationship between the levels of anthropometric failures and water storage.

Employment and Income Status

Poverty is the outcome of widespread unemployment, which is related to the socio-economic problems in the less developed communities, and it compromised the household income, which put in danger the mothers in the sense that they are unable to meet their bread-and-butter requirements and in some cases it leads abuse and prostitution inter alia an abandonment of child. This study identified that majority of the mothers and caregivers as unemployed (n=116) which is responsible for their dependency in the young mothers i.e., state social grants and parents income. Even though the social security network is critical to fight and alleviate poverty, yet it is not a substitute to the employment.

Mother/Caregiver Educational Level

The mother and caregiver education level has significant bearing on the prevalence of childhood. It give sense of responsibility and increase the likelihood of employment and income. Individuals with higher qualifications have direct access to modern services, well aware of the disease prevention and cure inter alia the hygiene practices. Studies reported that level of education of a mother or a caregiver is associated with the incidence of malnutrition in children below the age of five years, thus malnourished grown have work capacity in adulthood.

Significance

This research will investigate whether factors may play a role in workplace bullying, a topic that has not been thoroughly explored before. Factors associated with the initial meeting were accounted for. It was found that managers endured bullying from on high. Harassment in the workplace might be understood as a "dependence process" (Keashly & Jagatic 2003). The means by which a workforce could have influence over its leadership will become clearer to us. As a result, it appears that bullying at higher levels of an organization or even inside an individual has not been taken seriously. Considering the common perception that workers lower in the organizational hierarchy are more vulnerable to bullying in the workplace, this may be the truth (Keashly & Jagatic 2003; Rayner et al. 2002). People are not aware that bullying occurs at all levels of a business, therefore management has few ideas about how to prevent and address the problem. While analyzing the importance of managers in businesses, it is crucial to have a firm grasp on the phenomenon of upward bullying (Bartol, Tein, Matthews & Martin 2005).

Limitations and Policy Recommendations

This study was limited to a smaller geographic area, it affected the adequate proper redressal of the research problem further aim and objective of the study not achieved 100%. The response rate was below the expected rates. Most of the villages were undiscoverable on maps, which severely affected survey and sample selection. Therefore, the study has used a small sample size due to the outlined issue and time constraints, hence it is recommended that in future a study might be repeated with a relatively large sample size to generalize the results. During conduct of the study, the researchers encountered numerous issue too. The issue of malnutrition during early childhood is a barrier to normal growth development of the children in developing countries and especially among the downtrodden, has multiple causes, and affects which demands proper program management and control. Government initiated programs to
address the issue of grave poverty in these poor communities. This study recommends intensifying a health education program for developing and promoting a culture of breastfeeding up to the first 6 months. Likewise, health education drive could be helpful to materialize the goals of the program concerning childcare and nutrition. It might be extended gradually. A district level comprehensive study might be conducted to build up the knowledge on the issue i.e., malnutrition in childhood in general, and particularly in growing children. Furthermore, household empowerment could lead to the socio economic improvement in sub-districts through governmental and non-governmental grants, parcels of food together with project for skills development and employment programs. It is suggested that Municipal Integrated Development Plan (IDP) may also be introduced and implemented at sub-district and tehsil levels.

References


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