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Wasting and Stunting in Preschool Children and the Associated Risk Factors - Case Study

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Abstract: Purpose: The importance of the first 5 or 6 years of life of child its growth and development is well known. Any adverse influences operating on children during this period may result in severe limitations in their development, some of which at least are irreversible. Objective: to measure the proportion of stunting and wasting in preschool children in Al amal Al akhdar kindergarten and to investigate the risk factors affecting such as different socio economic factors. Method and Material: - 259 mother's children who attend the equipped classes of the kindergarten were interviewed. Questionnaire was used to collect the data. Results: (69.1%) of children were found to have fallen in the weight (8-12) kg, whereas (23.9%) of them were falling in the weight (13-17) kg. (79.9%) of the families said that they purchase food according to its nutritional value as a priority, whereas (16.2%) of them said according to family desire. Normal weight at birth was found to be associated with the current weight of those children who showed normal weight at birth. (P-value = 0.000 which is highly significant). Conclusions: Mothers and fathers education, the family socioeconomic status, family history of thinness and dwarfism and food eating habits, play an essential role as predisposing factors of developing stunting and wasting among preschool children. Recommendations: Improving, updating and analyzing of registration system in kinder garden are very important in such studies. Provision of nutritionists or preparing of nutrition cessions in mothers and fathers days could ensure better children growth and prevent growth defects and bad nutritional habits.

Keywords: Stunting, Wasting, Child growth, Nutritional habits, Sudan

1. Introduction

Children between 1- 4 years of age are generally called pre-school age children or toddlers. In the history of health services of many developing countries, their social and health needs were realized rather late. Today, more than ever before, the pre-school age child has become a focus for organized medical-social welfare activities, and their death rate is considered a significant of the social situation in a country (Corware karina, *et.al*, 2014).

The pre-school age is distinguished by the following characteristics:

- 1. Large numbers: Pre-school age children (1-4 yrs) represent about 12 per cent of the general population. A large majority of these children live in rural and urban areas slums by virtue of their numbers; they are entitled to a large share of health and social services. Their development is in the interest of attention. Unfortunately, pre-school age children are comparatively less attended to.
- 2. Growth and development: The importance of the first 5 or 6 years of life of child its growth and development is well known. Any adverse influences operating on children during this period (e.g. malnutrition and infection) may result in severe limitations in their development, some of which at least are irreversible. The concept of vulnerability calls for preventive care and special actions to meet the biological and psychological needs inherent in the process of human growth and development (Park, 2009).

Preschoolers can eat what the rest of the family eats, A young child's eating plan should consist mostly of healthy

foods, such as lean meats, poultry, seafood, eggs, and legumes; whole grains, such as whole-wheat bread and cereals; at least two servings of dairy foods daily; and fresh or lightly processed fruits and vegetables (Kimani, Elizabeth *et al*, 2010).

Nutrition of preschool child is of paramount importance, because the foundation for life time health, strength and intellectual vitality is laid during that period. Inadequate food intake adversely affects the growth and nutritional status of growing children particularly those from the disadvantaged sections of the community. Being the most vulnerable segment of the population, the pre-school children are at greatest risk of malnutrition since the growth demands high intake of calories and proteins.48.7% children aged 1-3 years were malnourished (verma, 2008).

Stunting, or short height for age, and wasting, or low weight for length/height, is important public health indicators. Underweight or low weight for age combines information about linear growth retardation and weight for length/height. Underweight was selected as one of the indicators to track progress in addressing hunger for the millennium development goals, but this choice has been criticized because the emergent problem of childhood overweight in many areas will overstate progress in underweight and mask stunting. Stunting and weight for length/height (or BMI) have gained acceptance as the indicators of choice for regions where overweight is a common problem (Uauy, et al., 2008); however, in regions where wasting is still common, underweight remains a suitable global indicator (Ramachandran & Gopalan, 2011).

Stunting is a major burden in developing countries, affecting 147 million children. Even though the rate of stunting has been declining worldwide for the past two decades, it remains a major burden among children in developing countries (Olivieri *et al*, 2007).

The global prevalence of stunting in children less than 5 years averages about 33% in developing countries, but varies widely among them. South Central Asia has the second highest prevalence of stunting in the world (44%), exceeded only by East Africa (48%). West Africa (35%), South-East Asia (33%), Central America (24%), North Africa (20%), the Caribbean (19%) and South America (13%) follow in order of prevalence. Data are not good enough to permit estimates to be made for East and West Asia. Asia is home to about 128 million (70%) of the world's 182 million stunted children aged under 5 years (Saurabh, K. and Mukesh, 2014).

The prevalence in South Central and South-East Asia was about 5% lower in 2000 than it was in 1995. This is encouraging, but at the present rate it will take many decades to reduce the prevalence of stunting in Asia to acceptable levels. Nine countries in Asia have a very high prevalence of stunting. An analysis of global data revealed that higher per capita energy availability, female literacy, and gross national product (GNP) were the most important factors explaining national differences in stunting (Ghanshyam et al, 2014). Because stunting is a cumulative process, the percent of stunted children increases with age. Such increases in stunting prevalence with age do not necessarily indicate that the nutrient intake and status of the children are worse at two years of life than earlier, although they often are. Rather, it reflects the cumulative nature of stunting. In Egypt, found that the prevalence of stunting and underweight is higher in males than females while wasting is higher in females than males (Mahmoud et al., 2014).

A study in Iran, (Abolfazl *et al*, 2010) reported that, underweight, stunting, and wasting were observed in 94(11.7%), 93(11.5%), and 6(0.7%) of children respectively.

A study in Bangladesh, revealed that over two-fifths of the pre-school children were stunted, of which 26.3% were moderately stunted and 15.1% were severely stunted (Mostafa, 2011). In the Bangang rural community, Cameroon the prevalence of stunting, underweight and wasting in preschool children was 41.26, 10.52 and 3.58%, respectively (Nicolas *et al*, 2014). In a rural area of western Kenya, the prevalence of stunting, wasting and underweight was 30%, 4%, and 20%, respectively (Arthur *et al*, 2003).

In a study carried out among preschool children in Hawassa, Southern Ethiopia, the overall prevalence of malnutrition in the community was high with 43.6% of the children being underweight (53.1%) stunted and (28.2%) wasted (Tsedeke *et.al*, 2014.. In Oman, the prevalence rates of wasting stunting and underweight were 7%, 10.6% and 17.9% respectively (Alasfor, *et.al*, 2007).

In Sudan the nutrition status is poorly characterized by high level of underweight and chronic malnutrition, the prevalence of chronic malnutrition (stunting) in male was 6.2 and 17.43% for severe and moderate stunting and in females was 3.03 and 12.85% for severe and moderate stunting, respectively, in a study conducted in children between 5 and 15 years in Khartoum (Taha *et al*, 2013) Considerable number of less than five children admitted to hospitals in Sudan due to malnutrition. On example way, the proportion of malnutrition among all registered diseases in Gaafar Ibn Oaf Hospital-Khartoum State, which is a major pediatric hospital in Sudan, was 20.2%. In a study conducted among displaced Sudanese children, the prevalence was found 56.1% (Abdelsafi *et al.*, 2014).

2. Results

Table No 1: Gender and Age distribution

| Gender | Frequency N=(259) | Percent (%) | | |
|--------------|----------------------|-------------|--|--|
| Male | 112 | 43.2 | | |
| Female | 147 | 56.8 | | |
| Age of child | | | | |
| (0-2) years | 5 | 1.9 | | |
| (3-5) years | 151 | 58.3 | | |
| (6-8) years | 103 | 39.8 | | |

The result presented on (Table **No.** 1) revealed that most of children (56%) were females. Most of these children (58.3%) their age 3-5year whereas(39.8%) their age between 6 to 8, the main cause of this delaying till school age, is due to higher cost of school fees in addition to as we mentioned in (Alamal Alakhdar) kindergarten was supported by NGOs that offered nutritional feeds, monitoring and evaluation of child growth which is not offered in schools at that area. Also, the lack of awareness about schooling importance could be one of the main causes to stay in the kindergarten till 8 years age in such communities.



Figure 1: Actual weight of the study group

The result presented on (figure 1.) revealed that most children 179 child (69.1%) were currently at actual normal weight, (8-12) kg. However this result is different from the study done by (Piuse, *et al*, 2014) who said that, the worldwide malnutrition estimation rates indicates that (35.8%) of preschool children in developing countries are underweight.

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| Table No 2: Height of studied group | | | | | | |
|-------------------------------------|-----------|---------|--|--|--|--|
| Height of the child / cm | Frequency | Percent | | | | |
| (80-90) cm | 54 | 20.8 | | | | |
| (91-100) cm | 120 | 46.3 | | | | |
| (101-110) cm | 85 | 32.8 | | | | |
| Total | 259 | 100.0 | | | | |

Table No (2) represents the classification of children according to their heights. The study found that, 120 Child (46.3%) their height is between (91-100) cm. with an overall average height of 103.4 cm which is normal. Weight and height of child at birth were found to be significantly associated with the current weight and height. This is supported with the study done by (Amany Edward, *et al*, 2014).

 Table No 3: Mid arm circumference of studied preschool

 children

| Mid arm circumference / cm | Frequency | Percent |
|-------------------------------|-----------|---------|
| (8-12) cm | 3 | 1.2 |
| (13-17) cm | 238 | 91.9 |
| (18-22) cm | 18 | 6.9 |
| Total | 259 | 100.0 |

Table No (3) Represents the Mid arm circumference, when the children were classified according to their mid arm circumference (cm). It was noticed that 238 child (91.9%) were found to have (13-17) cm. An overall average arm circumference were found to be 16.8 cm which is normal, and this is a good indicator, because it's an important factor and associated with severe and moderate wasting.



children

With regard to the distribution of participants according to diseases and infections among the children during the last 6 months Figure (2) showed that, 150 (57.9%) of the children have pneumonia (cough). This finding is in agreement with the result reported by Kassmass (2000), who did a Prospective cohort study conducted in 28, 753 Sudanese pre-school children between 6 months and 6 years old in rural communities in Khartoum and Gezira regions, in Northern Sudan. Results showed that, height for age, weight for height, and weight for age, were significantly& inversely associated with cough in the group of underweight children.



Figure 3: Favorite meals of studied preschool

The findings on (Figure 3) revealed that (51.70%) of participants were noticed that, Sweets is a favorite meal. These results reflected that, the majority of participant's parents had poor knowledge about the importance of good nutritional during child hood. This may be due to low educational level of parents, this result is the same as the finding that obtained by (Elizabeth Kimani, *et al.*, 2010) from the study done in rural South African's children, who found that Pre-schools can eat what the rest of the family eat. A young child eating plan should consist mostly of healthy food stuffs, such as lean meats, poultry, seafood, eggs, and legumes; whole grains, such as whole-wheat bread and cereals; at least two servings of dairy foods daily; and fresh or lightly processed fruits and vegetables.

| Foods stuffs | Fish (%) | Meats (%) | Vegetab les (%) | Dairy products (%) | Cereals (%) | Legumes (%) | Fruits (%) |
|--------------|------------|------------|--------------------|--------------------------|----------------|-------------|------------|
| Never eat | 19 (7.3) | 1 (.4) | 5 (1.9) | 10 (3.9) | 16 (6.2) | 8 (3.1) | 20 (7.7) |
| Daily | 25 (9.7) | 185 (71.4) | 215 (83.0) | 210 (81.1) | 77 (29.7) | 75 (29.0) | 116 (44.8) |
| Weekly | 100 (38.6) | 52 (20.1) | 34 (13.1) | 31 (12.0) | 148 (57.1) | 161 (62.2) | 99 (38.2) |
| Monthly | 115 (44.4) | 21 (8.1) | 5 (1.9) | 8 (3.1) | 18 (6.9) | 15 (5.8) | 24 (9.3) |

 Table 4: Rate of different food intake (%) through one month for children families

With regard to family eating habits and rate of different food intake, the study revealed that the majority of children (59.5%) ate together with family members, and vegetables were found to be eaten on daily basis by 215 (83.9%), fishes were found to be eaten on weekly basis by 100 (38.6%), and 31 (12%) of families were found to eat dairy products weekly as shown in table No.4.

This may reflect that parents had inadequate knowledge of nutrition during this important period. Moreover, this fact was explained by Mostaf (2011) who said that: "Nutrition of preschool children is of paramount importance, because the foundation for life time health, strength and intellectual vitality is laid during that period. Inadequate food intake adversely affects the growth and nutritional status of

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growing children particularly those from the disadvantaged sections of community.



Figure 4: Distribution of study sample according to Family income per month

Figure (4) shows distribution of study sample according to family income per month, when families were classified according to their monthly income it was observed that 159 (61.4%) of families were found to have monthly income (450-749) SDG, while 10% of them get monthly income class (950-1154) SDG, with an average of monthly income 694 SDG.. Socio economic status of family is the most important factor that directly affects the life style of all family members. Child nutritional status was significantly associated with monthly family income, (Monoarul *et al*, 2014).



Figure 5: Relation between Weight at Birth and Actual weight/kilograms of studied group



Figure 7: Relation between Length and actual weight of studied preschool children

Figure (7) Show that the length of the child (91-100) cm was found to be associated with the current weight of (8-

12) kg. Children with a height of (91-100) cm are more likely to have a current weight of (8-12) kg P-value =0.000

Figure (5) represents that, (normal) weight at birth was found to be associated with the current weight of those children who showed normal weight at birth. They are more likely having a current weight of (8-12). P-value = 0.000 which is highly significant.



Figure 6: Reflects the relation between age and actual weight of studied preschool children

Figure (6) indicate that, age of the child (3-5) years, was found to be associated with the current weight (8-12) kg, and those with an age of (3-5) years are more likely having a current weight of (8-12)kg. P-value = 0.000 which is highly significant.

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Figure (8) show that, a significant association was found between children at age of (3-5) years, their height at this age are more likely (91-100) cm (P-value = 0.000)

| | | | Currant weight | | | | |
|---------------------|-----------------|------------|----------------|---------|-------------|--------|--|
| | | | (8-12) | (13-17) | (18- 22) | Total | |
| | T 11'4 4 | Count | 63 | 0 | 0 | 63 | |
| | Interate | % of Total | 24.3% | .0% | .0% | 24.3% | |
| | Dreashool | Count | 29 | 0 | 0 | 29 | |
| | Preschool | % of Total | 11.2% | .0% | .0% | 11.2% | |
| | Duinsour | Count | 52 | 0 | 0 | 52 | |
| T descetions al | Primary | % of Total | 20.1% | .0% | .0% | 20.1% | |
| status of mother | Intermediate | Count | 8 | 0 | 0 | 8 | |
| | | % of Total | 3.1% | .0% | .0% | 3.1% | |
| | Secondary | Count | 27 | 1 | 0 | 28 | |
| | | % of Total | 10.4% | .4% | .0% | 10.8% | |
| | University | Count | 0 | 53 | 0 | 53 | |
| | | % of Total | .0% | 20.5% | .0% | 20.5% | |
| | Dest andusts | Count | 0 | 8 | 18 | 26 | |
| | Post graduate | % of Total | .0% | 3.1% | 6.9% | 10.0% | |
| Total | | Count | 179 | 62 | 18 | 259 | |
| | | % of Total | 69.1% | 23.9% | 6.9% | 100.0% | |

Table No 5 represents that, the university level of education between mothers, was found to be associated with their current children weight (13-17) kg.

Literacy of mothers was found to be associated with current weight (8-12) kg. While, illiterate mothers are more likely having current weight of (8-12) P-value = 0.00 crosstab table No.5.

| Table 6: Relation between Educational level | of father and Currant weight of studied group |
|---|---|
|---|---|

| | | | | Total | | |
|------------------------------|---------------|------------|--------|---------|---------|--------|
| | | | (8-12) | (13-17) | (18-22) | Total |
| | Illiterate | Count | 13 | 0 | 0 | 13 |
| | | % of Total | 5.0% | .0% | .0% | 5.0% |
| | Duasahaal | Count | 21 | 0 | 0 | 21 |
| | Preschool | % of Total | 8.1% | .0% | .0% | 8.1% |
| | Primary | Count | 52 | 0 | 0 | 52 |
| | | % of Total | 20.1% | .0% | .0% | 20.1% |
| Educational status of father | Intermediate | Count | 48 | 0 | 0 | 48 |
| | | % of Total | 18.5% | .0% | .0% | 18.5% |
| | Carandama | Count | 45 | 3 | 0 | 48 |
| | Secondary | % of Total | 17.4% | 1.2% | .0% | 18.5% |
| | T.T | Count | 0 | 54 | 0 | 54 |
| | University | % of Total | .0% | 20.8% | .0% | 20.8% |
| | Post graduate | Count | 0 | 5 | 18 | 23 |
| | | % of Total | .0% | 1.9% | 6.9% | 8.9% |
| Total | | Count | 179 | 62 | 18 | 259 |
| | | % of Total | 69.1% | 23.9% | 6.9% | 100.0% |

P-value = 0.0

Table No 6. Shows the relation between the father level of education & current children weight.

Fathers with university education are more likely to have current weight of (13-17) P-value = 0.000

3. Conclusion

All fathers of the families were having different occupations; Average monthly income of the families was relatively low. Average of family members was almost within the normal range (5 members).

Mothers and fathers education, the family socioeconomic status, family history of thinness and dwarfism and food eating habits, play an essential role as predisposing factors of developing stunting and wasting among preschool children. Inadequate food intake adversely affects the growth and nutritional status of growing children particularly those from the disadvantaged sections of the community. Most of the cases could be prevented by proper nutrition through nutrition education efforts and monthly child growth chart fallow up.

4. Recommendations

- 1. Improving, updating, and analyzing of registration system in kinder gardens.
- 2. Introducing of nutrition education to children through role plays and flashes cards and avoid food stuffs that losing their appetite.
- 3. Ministry of Health and education should elaborate together to endorse implementation of nutritional cessions for parents in the kindergartens.
- 4. Negative attitudes and beliefs regarding nutritional habits should be addressed especially in such messages and during counseling on infant feeding by the nutritionists, health and community health workers.
- 5. Strategies adopted by the health workers and NGOs to promote children nutritional status should also target all grandmothers, fathers and health workers.

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