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Original Research Article

Dietary assessment complements anthropometry in identifying childhood undernutrition: A cross sectional hospital based in children (1-18 years)

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ABSTRACT

Background: Parents worried about health of their ward are quite common in a pediatrician clinic. The usual approach is anthropometric assessment only. Present research was an attempt to verify recent recommended concurrent use of dietary assessment along with physical measurements for identifying undernutrition.

Materials and Methods: It was a hospital based, cross sectional study, enrolled were 1 to18 years old children who attended pediatrics OPD with only complaint being not growing well or not eating well. Detailed anthropometry was done, and children were grouped as normal or underweight, wasted or stunted using available standards. Three-day diet recall data was used along with food frequency questionnaire to assess dietary intakes for all.

Children were placed into four groups-Both anthropometric and dietary failure (BF), Anthropometric failure only (AFO), Dietary failure only (DFO), Neither failure (NF).

Results: The present research included 176 children, of which 102(57.9%) were boys. Dietary failure only (DFO) was found in 64(36.3%) children. Anthropometric failure combined with dietary failure, (BF) found was underweight in 79(44.8 %) and overweight in 9(4.5%) children. Stunting was found in 26(14.8%) children. Proportion of children with anthropometric failure only (AFO) & neither failure (NF) were 13(7.3%) and 11(6.2%) respectively.

Dietary failure was found in more than four fifth (86.3%) children, of which manifest anthropometric failure was present in approximately 44.8% children. Anemia & rickets were found in 88(50%) & 8(4.5%) children.

Conclusion: Both diet and anthropometry are important determinants of nutritional status of an individual but both should be used concurrently to avoid overlooking hidden undernutrition. Most of the times parental concern of their ward not well turns out to be correct.

1. Introduction

All pediatricians in their office practice very often encounter anxious, worried parents complaining about their child being thinner or shorter than his cousins or schoolmates. The usual practice is to check whether the child's anthropometry is falling in undernutrition category or not. It's a simple, noninvasive and quick way to comment on nutritional status. Many of these children with normal anthropometric parameters may be harboring multiple micronutrients deficiency having significant health implications like anemia, rickets or various xerophthalmia etc. It is this group of children which may be overlooked and passed as normal. Many recent studies have shown that dietary assessment along with anthropometry will be better approach to identify childhood undernutrition. They stressed to identify existent dietary failure be it in terms of

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decreased number of calories, protein or excessive amount of fat, sugar, salt or poor dietary diversity.

Many recent researchers have concluded that dietary assessments have been largely overlooked as a measure of nutritional status.[1] The consumption of sweet bakery items, fried snacks, refined flour ,tinned food is increasing has been the observation from all around the world.[2–4] At the same time the consumption of healthy food items like fresh fruits and vegetables ,pulses and nonvegetarian diet is still much below the recommendations.[5,6] A detailed dietary assessment analyzing if macro nutrients are consumed in adequate amount or if dietary diversity[7,8] is as per recommendations will be useful to provide appropriate nutritional counselling and suggest recommended interventions.[9]

The present research work was undertaken using the typology given by Beckerman-Hsu et al[1] and children presenting with complaints of not eating well or not growing well were grouped as anthropometric failure only(AFO), dietary failure only(DFO), both Failures(BF) or neither failure (NF).

2. Materials and Methods

Present research was an observational, cross sectional, hospital-based study conducted during 12 months from September 2020 to August 2021. All consecutive children (1-18 years) who were brought to Pediatrics OPD of a medical college situated in urban Ghaziabad, U.P with only parental concern being their child not eating right or not growing well were eligible to participate. Inclusion criteria were child not suffering from obvious clinical illness, consent to participate given by caretakers & their willingness to provide three days 24 hours dietary recall & FFQ data. Clearance from institutional ethical committee was taken.

Definitions used to categorise children in to four groups[1] -anthropometric failure only (AFO), dietary failure only(DFO), both failures (BF)and neither failure(NF) were as follows-

Anthropometric Failure was assigned if child had Z-score for weight for height (wasted), weight for age (undernourished)or weight for height (stunted) below – 2SD relative to WHO standards.[10]

Dietary failure were assigned if diet consumed was found to have calorie gap, protein gap or if food pyramid was unbalanced showing frequency or amount of different food items consumed was deviating from age appropriate recommendations of NIN.[11] Nutrient adequacy ratio(NAR) was calculated for five nutrients (energy, protein, fat, calcium & iron). NAR was the ratio of daily individual intake to recommended amount for that age and sex category.[12,13] The various food groups noted to draw food pyramid were cereals, pulses, fruits & vegetables, milk & milk products, non-vegetarian food items, sugar, oil and salt.[11] The data collected and analysed from 24 hour diet recall was in terms of amount per serve and frequency/number of serves consumed per day for these various food groups.

Statistical analysis-The proportions of all four failures (AFO,BF,DFO,NF) were calculated. Percentage of children with underweight, stunting or wasting, anemia and rickets were recorded. NAR was calculated for energy, protein, fats, iron & calcium.

3. Results

The present research included 176 children, of which 102(57.9%) were boys. Proportion of adolescents (45,25.5%) and toddlers (41,23.2%) was higher than other age groups. Dietary failure only (DFO) was found in 64(36.3%) children. Anthropometric failure (combined with dietary failure, BF) found was underweight in 79(44.8 %) and overweight in 9(4.5%) children. Stunting was found in 26(14.8%) children. Proportion of children with anthropometric failure only (AFO) & neither failure (NF) were 13(7.3%) and 11(6.2%) respectively.

So dietary failure was found in more than four fifth (86.3%) children, of which manifest anthropometric failure was present in approximately 44.8% children. Anemia & rickets were found in 88(50%) & 8(4.5%) children (Table 1).

Dietary failure found was energy gap in 112(63.6%), no to minimal protein gap in majority 170(96.6%), calcium & iron intake was inadequate in 95(54%) and 119(68%) children. The cereals, pulses & fruits/vegetables were being consumed less than recommended amount in. The food groups being consumed in excess in all age groups were fats and sugar. Milk also was being consumed more than recommendations in DFO group toddlers (Table 2).

4. Discussion

Present study has following three main findings. First, approximately one third children (36.3%) children had no anthropometric failure yet they had dietary failure and significant micronutrients deficiencies having serious health implications like anemia and rickets. The hidden undernutrition in this group of children would have been overlooked if measures focused solely on anthropometry would have been followed. In a way their parental concern was correct about their ward's improper diet. If this visit of child to the health care facility passes without proper corrective nutritional counselling, then these children may continue to consume inadequate, unbalanced diet and may come later at some point of time with manifest anthropometric failure.

Second important observation was that approximately fifty percent (49.3%) children had both dietary and anthropometric failures and highlights the need of

Table 1: 1: Frequency and percentage of children in all four types of failure groups in study participants

	Anthropometric failurePresent	**Anthropometric failure absent**	**Total**
Dietary failure present	Both failures 79 underweight + 9 overweight =88 (49.3%)	Dietary failure only 64 (36.3%)	152(86.3%)
Dietary failure absent	Anthropometric failure only 13(7.3%)	Neither failure 11(6.2%)	24(13.6%)
Total	101 (57.4%)	75 (42.6%)	176

Table 2: Distribution of Children according to consumption of nutrientsin relation to NAR calculated by average of three days 24-hour diet recall

Nutrient consumption		**Children with Diet Failure**
Less than NAR	More than NAR	Number/Total Number % 152/176 (86.3%)
Energy		112 (63.6%)
Protein		6 (3.4%)
	Fat	125 (71%)
Calcium		95 (54%)
Iron		119 (68%)

continuous promotion of nutritional intervention at all levels.

Finally, the dietary diversity is skewed towards higher consumption of harmful trans-fat, salt, oil and sugar rich snacks. This finding is in concurrence with nationwide data from NFHS 4.[7] It was by some researchers that it is not the household wealth but the maternal education having strong association with dietary diversity.[6]

Another important observation was high consumption of milk in many children and the reason provided by these parents was as their child is not eating anything else, at-least he is consuming enough milk & it gives them some assurance. An important observation by some researchers is that diet and anthropometry are seldom used concurrently[7,14] & focus on diet usually shifts when child is found to have anthropometric failure.

So its concluded that both diet and anthropometry are important determinants of nutritional status of an individual but both should be used concurrently.

5. Conflict of Interest

The authors declare no relevant conflicts of interest.

6. Source of Funding

None.

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