To analyze the nutritional health of children under the age of five who have siblings that are severely wasted

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Abstract:

Aim: The purpose of this study is to analyze the nutritional health of children under the age of five who have siblings that are severely wasted. **Material and methods:** This research was carried out in the context of a community cross-sectional study. After this, house visits were made to the address that had been indicated. The examination of the siblings took place at home. Children diagnosed with SAM who had addresses and phone numbers associated with them were included in the study and tracked down to their respective homes. We collected data on demographic and environmental factors, as well as anthropometric factors, for all children under the age of five, with the exception of the kid who was identified as the index case of SAM. **Results:** A total of one hundred children less than five years old were enrolled. The average age of the children was 3.25 years old with a standard deviation of 1.11 years, and 45 (45%) of the children were male. In a sample of 100 children under the age of five, anthropometry revealed that 30% of the children had wasting, 70% of the children were underweight, and 60% of the children were stunted. **Conclusion:** There was a substantial prevalence of severe malnutrition among children who had a sibling diagnosed with SAM. All children in the household of a newly diagnosed kid with SAM who are under the age of five should be screened for undernutrition aggressively. This is something that should be taken into consideration.

Keywords: Family, Nutritional status, Screening, Severe Acute malnutrition.

Introduction

A significant challenge for India's public health is the prevalence of childhood malnutrition among children under the age of five. [1] Its prevalence is the greatest in the world, and its rate in Sub-Saharan Africa is approximately twice as high as the global average. Eighty percent of the world's undernourished children are concentrated in only twenty nations. There are over 60 million youngsters in India who are underweight. [2] According to a research published by UNICEF in the year 2006, the factors that contribute to childhood malnutrition include an inadequate diet, recurrent illnesses, improper nursing techniques, a delayed introduction of supplementary meals, and an inadequate amount of protein in the diet. Intake of food is also affected by the state of one's health, societal taboos around certain foods, one's rate of physical development, and one's own dietary preferences. Malnutrition may also be the result of factors like as neglect, aberrant mealtimes, insufficient amounts of food, and inadequate information on the part of the parents.[3]

The Global Hunger Index (GHI) is compiled and released by the International Food Policy and Research Institute (IFPRI) on an annual basis. The study for 2019 indicates that India holds the 102nd spot out of a total of 119 nations in the rankings. According to the National family health survey 4 (NFHS 4) in India, the prevalence of undernutrition among children under the age of five is rather high. The study found that 35.7% of children under the age of five were underweight, 38.4% were stunted, and 21% were wasting. It has not been possible to achieve the targeted reduction in the prevalence of undernutrition from the first National Family Health Survey to the fourth National Family Health Survey. According to the findings of the Comprehensive National Nutrition Survey (2016–2018), 35% of

Indian children aged 0–4 years were considered to have stunted growth, 17% were considered to have wasted growth, and 33% were considered to have underweight growth.[4] Undernutrition, also known as underweight, stunting, and wasting, has been dubbed the "silent emergency" by the United Nations Children's Fund (UNICEF). Malnutrition may take the form of any of these conditions. [4] The government of India has made a firm commitment to working toward the achievement of the Sustainable Development Goals (SDGs) by the year 2030. All of these nutrition-related variables are covered in the sustainable development goals (SDGs), which include putting an end to hunger, achieving food security, improving nutrition, and promoting sustainable agriculture. The nation would not be able to reach its Sustainable Development Goal aim of lowering the rate of child mortality if there is not an effective decrease in undernutrition.

The socioeconomic position of a family, the mother's level of education, the prevalence of illnesses like acute respiratory tract infection and diarrhea, the level of education of the child's father, and the availability of clean water all have a role in determining a child's nutritional health in developing nations.[3] Children who are malnourished have a higher risk of contracting illnesses. Children who are underweight have a statistically increased risk of contracting illnesses such as diarrhea, measles, and malaria, as well as infections of the lower respiratory tract. Inadequate nutrition in early children may have a detrimental influence on both their physical and mental development in the long run.[4] A worldwide study on the relationship between short stature in children and adult economic results found that a one centimeter increase in height was connected with a four percent rise in salaries for men and a six percent increase in wages for women. It is of the utmost importance for both human and economic growth to make investments in the prevention of malnutrition in children.[3] The severity of weight-for-age deficiencies was shown to have a significant correlation with death rates, according to the findings of six longitudinal studies that investigated the link between anthropometric status and mortality of children aged 6–59 months. It is estimated that 6.3 million young children died as a result of malnutrition in 1995 out of a total of 11.6 million fatalities among children under the age of five that occurred in developing nations. This represents 54% of all deaths among young children.[5] Even though India's economy is growing, the child mortality rate that is caused by malnutrition is still rather high in both the urban and rural sections of the country. As a result, the evaluation of children's nutritional status is essential in the process of formulating health policy.[6]

Material and methods

This research was carried out in the context of a community cross-sectional study. After getting permission from the institute's ethics committee to begin the study, the researchers got to work. The admittance record was searched in order to compile a list of the children's contact information who had been accepted into the NRC. After this, house visits were made to the address that had been indicated. Evenings were chosen for home visits to ensure that both parents and children would be present at their residences, so allowing for the greatest possible number of siblings to be registered. The examination of the siblings took place at home. Children diagnosed with SAM who had addresses and phone numbers associated with them were included in the study and tracked down to their respective homes. By paying several visits to their homes, we ensured that all of these children's siblings felt involved. Due to logistical limitations, we were unable to include children diagnosed with SAM who were residents of a region that was beyond the municipal borders of the NRC in which they were hospitalized. We also did not include children diagnosed with SAM whose parents refused to take part in the research project. We collected data on demographic and environmental factors, as well as anthropometric factors, for all children under the age of five, with the exception of the kid who was identified as the index case of SAM. In addition, the mother's height as well as her weight were assessed, and her body mass index was computed. The WHO Anthro program, version 3.2.2, was used for the purpose of performing the z-score calculation. This program was used to compute the z-score for weight relative to age, height relative to age, and weight relative to height.

Statistical analysis

Both Microsoft Excel (owned by Microsoft) and IBM SPSS version 23.0 (owned by IBM Corp.) were used to input the data. The chi-square test was used to do a comparison of various sociodemographic and other factors between families in which more than one sibling had SAM and households in which none of the siblings had SAM. The relevant parameters from the univariate analysis were used in the logistic regression that was performed. In order to be statistically significant, the P value needed to be lower than 0.05.

Results

Table 1 Association between various sociodemographic factors and SAM status of under five- year siblings

Factors		SAM (N=20)	NO SAM (n=80)	Total	P value	Odds Ratio	95% CI
Religion	Muslim	6	4	10	0.001	5.22	1.82-12.63
	Hindu	14	76	90			
Type of family	Joint	12	28	40	0.44	0.71	0.52-2.47
	Nuclear	8	52	60			
Family members	≥7 members	12	8	20	0.001	5.11	1.91-10.52
	<6 members	8	72	80			
Socio Economic status	Lower class	4	21	25	0.07	0.19	0.21-1.34
	Others	16	59	75			
Overcrowding	Present	12	68	80	0.33	0.64	0.36-1.55
	Absent	8	12	20			
Education of mother	Illiterate	10	12	22	0.41	2.36	0.82-4.11
	Literate	10	68	78			
Mother's BMI	Underweight	14	56	70	0.001	6.15	2.11-12.58
	Normal	6	24	30			
Birth order	<2	17	73	90	0.41	1.98	0.63-11.74
	>2	3	7	10			
Administration of	Yes	6	4	10	0.006	4.22	1.55-6.33

Pre-lacteals	No	14	76	90			
Immunization status	Fully immunized	14	76	90	0.44	1.11	0.71-3.74
	Partially immunized	6	4	10			
Duration of exclusive breast feeding	< 6months	6	9	15	0.22	0.28	0.34-3.85
	≥ 6months	14	71	85			

A total of one hundred children less than five years old were enrolled. The average age of the children was 3.25 years old with a standard deviation of 1.11 years, and 45 (45%) of the children were male (Table I). According to the sociodemographic characteristics, one-third of moms lacked basic literacy skills, and just 15% of mothers had jobs. In a sample of 100 children under the age of five, anthropometry revealed that 30% of the children had wasting, 70% of the children were underweight, and 60% of the children were stunted. In addition, based on weight for height criteria, twenty percent of the children were diagnosed with severe acute malnutrition (SAM), whereas ten percent of the children were diagnosed with moderate acute malnutrition (MAM). A univariate analysis of a number of sociodemographic factors revealed that the presence of more than seven family members (P<0.001), underweight mothers (P<0.01), children who received pre-lacteal (P=0.006), and religious affiliation as a Muslim (P<0.001) were significantly associated with the probability of having another child with SAM in the family (Table 3). Only religion was revealed to be a significant independent predictor after carrying out the logistic regression analysis.

Table 2: Undernutrition in Siblings of Children with Severe Acute Malnutrition

Sibling age/sex	Wasting		Underweight		Stunting	
	N=30	%	N=70	%	N=60	%
Below 1 Years						
Male	1	3.33	2	2.86	2	3.33
Female	1	3.33	4	5.71	5	8.33
1-2 years						
Male	2	6.67	4	5.71	4	6.67
Female	1	3.33	3	4.29	4	6.67
2 -5 years						
Male	5	16.67	18	25.71	12	20
Female	5	16.67	17	24.28	13	21.67

Table 3 Logistic Regression Analysis for Factors Associated With Severe Acute Malnutrition in Siblings

Factors	Adjusted OR (95% CI)	P value
Administration of pre-lacteal feeds	0.74 (0.44-2.58)	0.52
Religion	3.98 (1.22-12.58)	0.04
Family members >7	1.44 (0.63-2.98)	0.26
Underweight mother	0.61 (0.37-1.47)	0.23

Discussion

In this research, we observed that 55% of the siblings were suffering from malnutrition, one-third of them were severely malnourished, 25% of them had moderate acute malnutrition, and only 25% of the children had gotten medical treatment. The severity of the malnutrition ranged from mild to severe, and only 25% of the children had received medical assistance. Researchers Olofin et al. [5] examined the all-cause mortality in children with sub-optimal development, and they discovered that children with severe wasting had a mortality hazard ratio that is more than 10% [5]. Anthropometry is meant to be performed on all children as part of the ICDS program that is carried out by Anganwadi workers (AWW), however many children had not been properly diagnosed. The causes might be attributed to the difficulty of juggling various duties, in addition to the quality of training that AWW receives [6]. This might also be explained by the fact that parents leave the house very early in the morning for work and don't return until late in the evening, so they aren't at home during the daytime for their children to interact with them. Parents do not choose to take their malnourished children to NRC because they are afraid of losing their daily earnings since the mother is required to remain with the kid until he or she satisfies the discharge criterion [7]. AWW does refer malnourished children to NRC. Only 21% of children were found to have received supplemental meals between the ages of 6 and 35 months, according to a study that was conducted on a nationwide scale [8].

To put a stop to malnutrition in children, the government has to detect the problem early on at the community level and begin taking corrective action. A community-based management of acute malnutrition (CMAM) program was implemented in a select few states, including Bihar, Rajasthan, Maharashtra, and Odisha. This program proved effective in lowering the prevalence of undernutrition in the population [9-11]. Unfortuitously, owing to the need for enormous sums to maintain such a program, it was not possible to apply this on a bigger scale. Despite this, India has a problem with undernutrition that has to be addressed with a program of this kind [11,12]. Our research has a few limitations, the most significant of which is that it is a cross-sectional study, meaning that it does not monitor the event history of a child's malnutrition throughout the course of their years. When it comes to the respondents who answered the questions that related to the events of the past, there is a good chance that they were affected by recall bias. We also did not estimate the percentage of other children in the city (study region) who were malnourished and did not have a sibling with SAM to use as a reference. On the other hand, we were unable to discover any additional studies that were comparable to this one that mentioned the nutritional status of siblings of children who had SAM. According to the findings of our research, the risk of developing SAM is significantly increased in families with many affected children. If they come across a kid who has sickle cell anemia (SAM), pediatricians and other health care professionals should think about doing active screenings on the other children in the household. It will be an ideal time to make a diagnosis and start treatment for them at an early stage. To such a screening process, the addition of more data

from other locations will provide further momentum.

Conclusion

There was a substantial prevalence of severe malnutrition among children who had a sibling diagnosed with SAM. All children in the household of a newly diagnosed kid with SAM who are under the age of five should be screened for undernutrition aggressively. This is something that should be taken into consideration.

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