Original Article

Association of Malnutrition with Delayed Speech among Children 2-6 Years Undergoing Speech Therapy at Rehabilitation Center

Muzafar Ali, Erum Khan, Muhammad Nasir Khan, Ameer Ullah Khan

ABSTRACT

OBJECTIVE: To determine the association of malnutrition with delayed speech children who underwent speech therapy.

METHODOLOGY: A descriptive cross-sectional study was conducted enrolling 138 children age 2 to 6 years, with delayed speech, and of both gender, using non-probability consecutive sampling technique at the speech therapy department of National Institute of Rehabilitation Medicine, Islamabad from October 2019 - March 2020. Children with all congenital abnormalities which can impaired speech, deaf, age more than 06 or below 2 years, and cases whose parents do not provide consent to participate in the study were excluded. Data was collected after seeking consent from the guardian of the respondent through a pre-developed scale to assess nutrition status and delayed speech was assessed by underachievement of verbal, reading, and spelling. The data were analyzed through SPSS 23.0.

RESULTS: Most of the respondents were male (72.5%), residents of urban areas (84.1%), and not going to schools (60.9%). 79% were rich and well-nourished (68.1%), in speech level-I (59.4%). No relationship was observed between malnutrition and delayed speech level (p-value=0.30). Age, education status, residential status, and monthly income were found in association with delayed speech (p-value <0.00).

CONCLUSION: There was no significant relationship between malnutrition and delayed speech level.

KEYWORDS: Nutrition, Malnutrition, speech, delay speech, children, speech therapy.

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INTRODUCTION

Nutrition is the essential element required for the body for growth and development, achieved through vitamins, protein, carbohydrates, and fat. It is the key factor that has a very huge impact on structural and functional capacity as well as the development of brain activity. Child development and nutrition cannot be overemphasized in developing countries especially, the nutritional status of children affects the domain of development[1]. Early childhood development serves to be of fundamental importance in the foundation for the development of human capital. Albeit, there appears to be a clear relation between delay and child development outcomes, but there appears to be scarce information on the developmental and behavioral outcomes of children at a young age with severe acute malnutrition[2].

Malnutrition is defined as “a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients” that can fail to achieve physical and mental health. Deficiency, excess, or imbalance of nutrients cause impairment in the health status of the body. It could be due to too little food, shortage of key components or impaired absorption, or another metabolic disease. Malnutrition also occurs owing to persisting high incidence of Low Birth Weight, maternal malnutrition, imbalance, and inadequate quality of antenatal and postnatal care, poor breastfeeding. Malnutrition and development challenges hold a crucial place and are prime problems of childhood. Above one billion people worldwide are affected and remain undernourished and live in disability [3].

Obstruction in language and speech development is presumed one of the frequently occurring developmental disorders in a child’s formative years [4]. Studies revealed the prevalence of 15.2 % in Pakistan[5] 24.5% in Saudia Arabia[6]. Relevant studies are imperative to recognize early potential deviations in language evolvement and, likewise, in the child's learning stages and future social performance[7]. The speech-language delay has several types such as Receptive language disorder, expressive language disorder[8]. Moreover, Speech difficulties may occur due to motor speech disorders, structural/physical differences, or sensory deficiencies. Although, the underlying factor for articulation phonological speech sound issues in various children was unidentified. Be that as it may contain male sex, ante, and pre-birth issues; oral sucking propensities, ear, throat, and nose issues, a more receptive and additionally responsive temperament, congenital history of language and speech issues, low parental proficiency, absence of help for learning in the family.

Language and speech development has been a

helpful maker in a child's cognitive ability and overall development. Recognition of children at a risk for formative deferral or related problems might help lead to intervention and prompt decision making in early childhood, where the odds for improvement are the best. Language and speech delay or initial language impairment or disorder, is becoming a necessity to be coordinated into routine developmental observatory practices of clinicians taking care of children[9].

The advancement of language and speech in the first four years of life are of utmost importance and any defect may adversely alter the children's further development and lead to impairment in the individual's ability to communicate, verbal cognitive development, and school attainment[10]. Children up to 05 years of age, with language and speech impediments that remain unattended, may portray receding spelling skills, reading skills, and poor verbal defected psychosocial acclimatization and behavior problems. Moreover, this often leads to substandard academic performance and diminished levels of Intelligence Quotient that might continue into preceding ages. Consequently, early identification and screening of a speech delay aid in early intercession and treatment[11].

No such studies have been conducted on the particular association of malnutrition with delayed speech among children. Therefore, this study has been planned to assess the association of malnutrition with delayed speech children who underwent speech therapy.

METHODOLOGY

A descriptive cross-sectional study was conducted in the speech therapy department of the National Institute of Rehabilitation Medicine (NIRM), Islamabad from October 2019 to March 2020. Total 138 children with the age 2 to 6 years, with delayed speech and of both gender were enrolled; while children more than 06 years and below 2 years; with all congenital abnormalities which impaired speech, deaf, and cases whose parents did not provide consent to participate in the study were excluded. The study was conducted after obtaining permission from the ethical committee of Liaquat University of Medical and Health Sciences, Jamshoro. Permission for data collection was taken from the NIRM. Written consent was obtained from the parents/guardians of all the cases. The cases were documented based on their demographic characteristics. Nutritional status was assessed by measuring mid-upper arm circumference and categorized as normal, moderate, and severely malnourished. The delayed speech was assessed by underachievement of (verbal, reading, and spelling). Data regarding delayed speech was assessed by already categorized children as Level-I, level-II, level-III, and level-IV at NIRM on a clinical basis by using the blank level of question taking the age of the child. All the information was collected on a predesigned proforma.

To compile and analyze data SPSS 23.0 version was used. Data were presented as frequency and percentage. Stratification concerning effect modifier with outcome was done. The Chi-square test was applied by taking a p-value of ≤0.05 as significant.

RESULTS

The response rate of the study was 100%. Most of the respondents were males (72.5%), aged 4-6 years (65.2%), and not going to schools (60.9%). The urban population of respondents was 84.1%. Regarding monthly income, 79% belonged to the rich category (**Table I**). Most of the participants (68.1%) were well-nourished, and only 0.7% were in severe undernourished condition; only 1 respondent was in level-IV, while most of the respondents (59.4%) were in level-I of delayed speech (**Table II**).

Table III demonstrated the association of malnutrition status of participants to their delayed speech level by applying the chi-square test. The data showed that there is no significant relationship between the malnutrition status of respondents and their delayed speech level (p-value=0.302). While most of the respondents belonged to the normal category of nutrition ranked in level-I.

Table IV explained the association of patients' characteristics with delayed speech level. The results showed that age (p-value = 0.01), residential status (p -value <0.001), educational status of parents (p-value < 0.001) and monthly income (p-value < 0.001) had statistically significant relationship with postoperative level of recovery.

TABLE I: SOCIO-DEMOGRAPHIC DISTRIBUTION OF RESPONDENTS

Socio-demographic feature	Category	Frequency & (%)
Age	2-4 Years	48(34.8%)
	4-6 Years	90(65.2%)
Gender	Male	100(72.5%)
	Female	38(27.5%)
Residential Status	Rural	22(15.9%)
	Urban	116(84.1%)
Educational Status	Not going to school	84(60.9%)
	Going to madras	16(11.6%)
	Under Primary	38(27.5%)
Monthly Income (Rupees)	Poor < 15 thousand	1(0.7%)
	Middle < 25 thousand	28(20.3%)
	Rich > 25 thousand	109(79.0%)

TABLE II: DISTRIBUTION OF MAL NUTRITION STATUS & DELAYED SPEECH LEVEL AMONG RESPONDENTS

	Category	Frequency (%)
Malnutrition Status	Moderate	43 (31.2)
	Normal	94 (68.1)
	Severe	1 (0.7)
Delayed Speech Level	Level-I	82 (59.4)
	Level-II	32 (23.2)
	Level-III	23 (16.7)
	Level-IV	1 (0.7)

TABLE III: ASSOCIATION OF MALNUTRITION STATUS WITH DELAYED SPEECH LEVEL AMONG RESPONDENTS

Malnutrition Status	Delayed Speech Level				p-Value
	Level-I	Level-II	Level-III	Level-IV	
Normal	59	19	15	1	0.30
Moderate	23	13	7	0	
Severe	0	0	1	0	

TABLE IV: SPEARMAN CORRELATION OF PARTICIPANTS CHARACTERISTICS WITH DELAYED SPEECH

Variable	Delayed Speech	
	ρ	p-Value
Age	- 0.211	0.01*
Gender	0.059	0.49
Residential Status	- 0.266	<0.001*
Educational Status	- 0.343	< 0.001*
Malnutrition Status	0.089	0.30
Monthly Income	- 0.349	< 0.001*

DISCUSSION

The current study aimed to enquire about the association of malnourished status and level of delayed speech. As by instinct, most children start to speak at the age of 2-3 years and develop full command by the age of 6 year[12]. This is the prime time to identify any variability in the speech and if find any we can overcome it by several speech therapies and with a balanced diet within this age[13]. The study revealed higher participation of age 4-6 years and found in statistically significant association with delayed speech (p-value= 0.01) with a weak negative correlation (ρ= -0.21). Most male participants were part of the study (72.5%). The disorder appears to be three to four times more common in boys than in girls[9].

The current study explored that majority of the children with delayed speech were not going to school. Education helps children to guide them about proper nutritional needs. Parental education is also necessary to control malnutrition issue[14,15]. Socioeconomic status plays a vital role in the selection and availability of diet. As most of the participants of the study were from the rich class, they may have access to quality food. It is noticed that most of the parents just focused to give more and more diet to their children and spend a lot of money on children's food but due to lack of education about a balanced diet, they do not get their goal of healthy children and sometimes results even worsen. The study found education level, resident status, and monthly income insignificant association with a weak negative correlation (p-value <0.00) and are in line with previously conducted studies[5,16,17].

Nutrition status in the current study was mostly observed in the normal range while 0.7% in severe malnourished status, found lower from the previous studies[14,18]. Malnutrition is an important risk factor for poor child development[19]. A report from UNICEF presumes, one of the main causes of child mortality worldwide can be attributed to under-nutrition, and is estimated to cause at least half of all child deaths[20]. As mentioned by WHO-World Bank-UNICEF, Joint Child Malnutrition estimates 2016, globally for children under 5 years, 155 million and 52 million children were stunted and wasted respectively. Moreover, 17 million children under 5 were severely wasted[21].

Children aged 3-6 years face impeding language and speech development and are one of the frequent recurrent developmental disorders. The said disorder prevailing in the population ranges from 1% - 32% and about 60% of cases of language and speech delay often resolve voluntarily without any intervention in children that are under the age of three years. Moreover, delay in speaking could be either an ephemeral stage in the developmental phase or can be an important indicator of a psychiatric, neurological, or behavioral problem[22]. The brain in formative years is specifically prone to nutritional insults; resulting in global and specific neurodevelopmental sequela evolving at subsequent phases of life span[23]. This can result in speech delay, poor cognition, and affected motor functions. Neurological symptoms with Thiamine deficiency and poor language development are comparatively high in low-income countries[24]. The results of the current study revealed higher participants in level-I of delayed speech (59.4%) while only 0.7% in level-IV. In India, speech delay was found in 2.53% of children recruited[16] and in developing countries range 2% to 8%[25]. A disability-based study in eighteen low and middle-income countries reported that 23% of the children aged between 2 to 9 years were previously at

high risk for dysfunction[26].

The study found that the majority of participants were from the urban population. It might be a risk factor for delayed speech. Less socialized lifestyle, indoor activities in megacities, higher use of electronic gadgets by the urban community may affect the development of speech[27].

The study found no association between malnutrition and delay in speech (p-value=0.30). It is the first study of its nature to examine such association. A previous study revealed that malnutrition was found associated with developmental challenges, especially motor, cognition, speech delay, behavioral, and learning disabilities[11].

CONCLUSION

This study concluded that most of the participants were well-nourished, belonged to rich families, and residing in urban areas but not going to school. Most of them were at speech level-I. No significant association was found between delayed speech and malnutrition.

RECOMMENDATIONS

This type of study should be held over a large population in both the public and private sectors.

Ethical permission: Liaquat University of medical & health sciences synopsis approval letter No. LUMHS/ REC/ACD/-28274/79, Dated: 01-10-2019.

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AUTHOR CONTRIBUTIONS

Ali M: Concept idea, literature search, data collection, introduction, results & finalized
Khan E: Development of idea, review & finalize the manuscript, supervision
Khan NM: Development of idea, supervision, critical review, bibliography
Khan A: Literature search, data entry, data analysis

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AUTHOR AFFILIATION:

Muzafar Ali *(Corresponding Author)*
Charge Nurse
National Institute of Rehabilitation Medicine
Islamabad-Pakistan.
Email: captainali07@gmail.com

Dr. Erum Khan
Department of Oral Pathology, Institute of Dentistry
Liaquat University of Medical and Health Sciences
Jamshoro, Sindh-Pakistan.

Muhammad Nasir Khan
Senior Speech Therapist
Speech Therapy Department
National Institute of Rehabilitation Medicine
Islamabad-Pakistan.

Ameer Ullah Khan
Staff Nurse
Dr. Ruth K.M. Pfau, Civil Hospital
Karachi, Sindh-Pakistan.