



A Comparative Study of Sensory versus Mental Disability among Children with Special Care Needs, Baghdad, 2016

Wijdan Akram Hussein*

Assistant Professor, Al-Kindy College of Medicine-Baghdad University, Baghdad, Iraq

*Corresponding e-mail: dr.wijdanakram2002@gmail.com

ABSTRACT

Background: Ineffectiveness of nutritional programs directed toward children with special care needs and studies on risk factors for malnutrition among those children in Iraq are absent although increased clinical reports of malnourished disabled children. This study aimed to find out the disability types associated with malnourishment in addition to identifying the disabled children characteristics related to malnutrition. **Methods:** Present study was a cross sectional study conducted in Nine Governmental Institutes in Baghdad city through the period from March 01, 2016 to November 30, 2016 on 413 children with disability of deafness, blindness, Down's syndrome, and autism. **Results:** The anthropometric means were significantly higher among children with mental disability ($p < 0.001$), especially among children with Down's syndrome ($p < 0.001$). Monthly income and educational status of children mothers were significantly risk factors of malnutrition of children with special care needs ($p < 0.001$). **Conclusion:** Malnutrition of children with special care is commonly affected by type of disability.

Keywords: Children with special care needs, Malnutrition, Disability type

INTRODUCTION

The child malnutrition represented the common public health disaster in developing countries. Worldwide, 165 million children were stunted, 99 million children were underweight and 51 million children were wasting at year 2012 with death of 3.1 million less than five years children every year [1]. The disability of children is defined as an interaction between health conditions with the environmental and personal factors [2]. The disability is classified into three levels; disability of body function, restriction of activity and limitation of participation [3]. Children with special needs identified as 'children who require special social support'; this reflects the reality that these children have the fewest opportunities to develop and maintain age-appropriate levels of physical, intellectual, emotional, and social development without additional social services. Special needs can be physical, developmental, behavioral, or emotional [4].

Unfortunately, those children are weakest members of community [5]. The number of children (0-14 years) with moderate or severe disabilities was 93 million, while number of same age children with severe disabilities was 13 million [6]. It was estimated that children with disabilities (<18 years) was about 200 million [7] with high proportion of those children in developing countries [8].

The relationship between malnutrition and disability is complex. Nowadays, rare policies and programs directed for children are combining both malnutrition and disability, however, there is a rising awareness of linkage between two [9]. The malnutrition in gestational period, infancy and childhood is the common risk factor of development abnormalities and physical, sensory, and intellectual disabilities. Some nutrients deficiency during pregnancy can lead to impairment of infant development [10]. Many authors revealed that underweight and stunted growth among malnourished infants and children is more likely to be at high risk of disability [11-13]. Although many nutritional program strategies are preventive also for disabilities, children with special care needs are at high risk of malnutrition. Those children with disabilities and as result of malnourishment would suffer from secondary malnutrition entities or death from severe acute malnutrition. Children with special care needs are at higher risk of malnutrition, stunting, and wasting [14].

Factors affecting nutritional status of children with special needs are either leading to underweight which are related to cognitive, sensory, and physical limitations or leading to overweight and obesity which are related to sedentary lifestyle, increased attention, and social activities withdrawal [11].

In Iraq according to the Ministry of Labour and Social Affairs in 2016 there is 3741 documented children with mental and physical disability, 54.8% physical disability, 45.2% mental disability, in Baghdad the percentage of mental disability is 0.4%, and physical disability is 0.5%, this is according to verbal information taken from department responsible on the care of children with special needs in the ministry [15]. Ineffectiveness of nutritional programs directed toward children with special care needs and studies on risk factors for malnutrition among those children in Iraq are absent although increased clinical reports of malnourished disabled children.

Aim of the Study

To find out the disability types associated with malnourishment in addition to identifying the disabled children characteristics related to malnutrition.

METHODS

Study Design and Settings

This study was a descriptive cross-sectional study conducted for children with special needs which include sensory disability (deafness, blindness) and mental disability (Down's syndrome and autism) in Nine Governmental Institutes in Baghdad city (Al-Ragaa, Al-Aamal, Al-Kadesia, Al-Rawabi and Al-Wafaa, Al-Khamaeel, Al-Izdehar, A-Inaya institutes) between March 01, 2016 to November 30, 2016.

Study Participants

All children with deafness, blindness, Down's syndrome, and autism who were studying in these special institutes were selected for this study. Exclusion criteria were children age less than 5 years and more than 15 years, deteriorated health and conjunction with other disability type. The total number of children with special care who were eligible in this study was 413.

Data Collection

The data was collected by researcher by reviewing of files of children with special care in institutes age, gender, family monthly income and education of parents. The weight and height of children were measured by workers in institute under supervision of the researcher. Weight was measured by using flat digital floor scale (SECA), weight measurements were taken in light clothing; shoes, trainers, jackets were removed. Weight recorded to the nearest 0.1 kg. To minimize errors in measurements, the weighing scales were checked regularly to ensure that the unloaded scale registered zero.

Height was measured by using wall-mounted stadiometer (SECA-208), height measurements were taken with light clothes; shoes, thick socks, trainers, jackets were removed, the child looks forward and stand-up straight with head, buttocks, shoulder blades and heels together touching the wall. Then height recorded to the nearest 0.1 cm. Z-scores were calculated for height-for-age (ZHA), weight-for-age (ZWA) and body mass index (BMI)-for-age (ZBMIA) by WHO Anthro Plus Software Z-scores of less than -2 for ZHA, and ZBMIA were indicative of stunting and thinning respectively, while score less than -3 were indicated sever stunting, severe thinning respectively. Scores of higher than +1, +2 were indicative of overweight and obesity respectively by ZBMIA. Z-score for weight-for-age (ZWA) limited to 6-10 years children, if ZWA less than -2 indicate underweight, less than -3 indicates sever underweight, Z score more than +1, +2 were indicated overweight and obesity respectively, because of small sample size the underweight was gathered with severe underweight and overweight was gathered with obesity [16].

Monthly income and the parent education were divided into three parts: The income divided to: low income <500,000 ID, Middle income 500,000-1000000 ID, Good income >1000000 ID. The education level of parent divided into 3 parts: - Primary School-Secondary school- University and higher study.

Ethical Considerations

Ethical permission was taken from Ethical Committee of Al-Kindy Medical College and administrations of Disability

Institutes. Oral consent was taken from children parents by phone before participation in the study. The researcher made referral for malnourished children to pediatric center for management with special advice to parents.

Statistical Analysis

All the data were entered analyzed by using statistical package of social sciences software program. The results were categorized in contingency table. Paired t-test was used to compare between two means of both groups (sensory and mental). One-way ANOVA analysis was used to compare between means of three study groups while Chi-square test was used to compare between categorical variables of adverse effects. Level of significance was set as <0.05.

RESULTS

The present study included 413 children with special needs with age range (6-15 years) and predominance of male gender (male to female ratio 1.5:1). Sensory disability type was significantly more prevalent among younger age children while the mental disability was significantly more common among older age children ($p=0.005$). There was a highly significant association between mental disability type and male gender ($p<0.001$) (Table 1).

Table 1 Demographic characteristics of children according to disability type (total no= 413)

Variables	Sensory	Mental	P-value ^s
Age			
6-10 years	199 (65.2)	52 (48.1)	0.006*
11-15 years	106 (34.8)	56 (51.9)	
Gender			
Male	175 (57.4)	75 (69.4)	<0.001**
Female	130 (42.6)	33 (30.6)	

^sChi-square test; * Significant; ** Highly significant

Means of height, weight, and BMI of children with mental disability type were significantly higher than those of children with sensory type disability ($p=0.02$, $p<0.001$, $p<0.001$, respectively). The Z-score mean of children with special needs was significantly higher among children with mental disability ($p<0.001$). The mid upper arm circumference (MUAC), biceps skin fold thickness (BSFTh) and triceps skin fold thickness (TSFTh) means were significantly higher among children with mental disability ($p<0.001$) (Table 2).

Table 2 Distribution of children anthropometric measurements according to disability type (total no=413)

Anthropometrics	Disability types		P-value ^s
	Sensory (Mean \pm SD)	Mental (Mean \pm SD)	
Height (cm)	133.7 \pm 14.8	137.4 \pm 14.5	0.02 *
Weight (Kg)	33.6 \pm 13.5	40.1 \pm 15.6	<0.001 **
BMI (Kg/m ²)	18.1 \pm 4.1	20.7 \pm 5.6	<0.001 **
Z score (BMI/age)	2.3 \pm 1	2.6 \pm 0.6	<0.001 **
MUAC (mm)	20.3 \pm 4	22.7 \pm 4.9	<0.001 **
BSFTh (mm)	8.1 \pm 4.5	10.5 \pm 5.7	<0.001 **
TSFTh (mm)	12.8 \pm 6.6	16 \pm 8.5	<0.001 **

^sIndependent sample t-test; * Significant; ** Highly significant

Studying disability subtypes revealed that means height was significantly higher among children with autism and significantly lower among children with blindness ($p<0.001$). The weight and BMI means were significantly higher among children with Down syndrome while these means were significantly lower among children with blindness ($p<0.001$). For Z-score, it was significantly higher for children with Down syndrome ($p<0.001$). MUAC, BSFTh and TSFTh means were also increased among children with Down syndrome and decreased for children with blindness ($p<0.001$) (Table 3).

Table 3 Distribution of children anthropometric measurements according to disability subtype (total no=413)

Anthropometrics	Disability subtypes				P-value ^s
	Deafness (Mean ± SD)	Blindness (Mean ± SD)	Down (Mean ± SD)	Autism (Mean ± SD)	
Height (cm)	135.2 ± 15.5	129.4 ± 11.7	132.3 ± 11.3	141.9 ± 11.3	<0.001**
Weight (Kg)	35.6 ± 14.4	28 ± 8.2	40.3 ± 17.9	39.9 ± 13.4	<0.001**
BMI (Kg/m ²)	18.7 ± 4.3	16.4 ± 2.7	22.1 ± 6.3	19.4 ± 4.5	<0.001**
Z score (BMI/age)	2.5 ± 0.7	2.1 ± 1	2.8 ± 0.7	2.4 ± 1	<0.001**
MUAC (mm)	20.7 ± 4.3	19.2 ± 2.9	23.5 ± 5.5	22.1 ± 4.2	<0.001**
BSFTh (mm)	8.4 ± 4.8	7.1 ± 3.3	10.6 ± 6.1	10.4 ± 5.3	<0.001**
TSFTh (mm)	13.4 ± 6.9	11.1 ± 5	17.1 ± 9.8	15 ± 6.9	<0.001**

^sOne-way ANOVA analysis; ** Highly significant

No significant relationship was observed between demographic characteristics of children with special needs (age and gender) and their nutritional status (Table 4).

Table 4 Distribution of children's demographic characteristics according BMI/age categories (total no=413)

Variables	Normal (No. (%))	Malnourished (No. (%))	P-value*
Age			
6-10 years	36 (52.2)	215 (62.5)	0.1 #
11-15 years	33 (47.8)	129 (37.5)	
Gender			
Male	44 (63.8)	206 (59.9)	0.5 #
Female	25 (36.2)	138 (40.1)	

*Chi-square test; # Not significant

A highly significant association was observed between disabled children with low income families (<500,000 ID) and malnourishment (p<0.001). There was a highly significant association between children of maternal primary educational status and malnourishment (p<0.001). Fathers' educational level of children with special needs had no significant effect on their nutritional status (p=0.05) (Table 5).

Table 5 Distribution of children's social characteristics according BMI/age categories (total no=413)

Variable	Normal No (%)	Malnourished No. (%)	P-value*
Monthly income			
<500,000 ID	6 (8.7)	212 (61.6)	<0.001
500,000-1000,000 ID	14 (20.3)	94 (27.3)	
>1000,000 ID	49 (71.0)	38 (11.1)	
Mother educational level			
Primary	3 (4.4)	227 (66.0)	<0.001
Secondary	18 (26.1)	88 (25.6.6)	
University/Institute	48 (69.5)	29 (8.4)	
Father educational level			
Primary	36 (52.2)	156 (45.4)	0.5
Secondary	10 (14.5)	58 (16.8)	
University/Institute	23 (33.3)	130 (37.8)	

*Chi-square test; ID: Iraqi dinar

DISCUSSION

World Health Organization stated that although high developmental hazards, the children with special care needs are always neglected in national health programs [17]. Incomplete legislations and policies, poor attitudes, weak health services and inaccessible environments are the main obstacles facing the children with special care needs and their families [18].

Studying the relationship between disability types and demographic characteristics of children with special needs in present study revealed that mental disability was significantly common among older age male children with special needs. This finding is similar to results of previous studies conducted in Iraq and multiple European countries [19,20].

The anthropometric measurements of studied children with special care were significantly higher among children with mental disability. This is consistent with reports of review study by Reinehr, et al. [21] which detected higher obesity and overweight prevalence among children with mental disability. Many authors from different countries had shown the relationship between mental development delay among children and obesity [22-24]. The connection between psychopathology and weight was completely established among adults [25] but with less extent for children [26]. Disability types with different medications [27], sleeping problems [28], nutritional problems [29], low physical activity [30] and socioeconomic status [31] might be regarded as risk factors for increased BMI of children with special care.

Current study found significantly higher anthropometric measurements especially BMI, MUAC, BSFTh and TSFTh among children with Down syndrome. This finding coincides with results of Basil, et al. [32] study in USA which reported that children with Down syndrome are always at risk of obesity and high risk of obstructive sleep apnea syndrome. It was found that children with Down syndrome had lipid profile abnormalities make them more vulnerable for obesity [33]. Special recommended strategies are required for children with Down syndrome to eliminate bad physiological and psychological sequels of obesity among children with Down syndrome [34]. Lower anthropometric indices in present study were significantly observed among blind children. Groce, et al. [35] suggested that disability among children is the leading reason of malnutrition and the effect is varied according to disability type, environmental factors and health services provided. However, previous study carried out in Turkey reported high obesity prevalence among children with blindness [36].

Low monthly income of children with special care family in this study was significantly associated with malnutrition of those children ($p < 0.001$). This is similar to results of Hendricks, et al. [37] study in USA which suggested that malnutrition of disabled children was high among low income and violence families. In Baghdad, it was proved that malnutrition among all children was significantly related to living in unsafe and poor neighborhood, but it documented no effect of parental educational level and employment on nutritional status of children [38]. In our study, low educational level of mothers was significantly associated with malnutrition of children with special care ($p < 0.001$). Consistently, Kuper, et al. [39] study in UK revealed that low educational status of disabled children caregiver was significantly related to nutritional status of those children. Many studies regarded the economic class of the family as independent risk factor for malnutrition among healthy children [40,41].

The main limitations in our study were failure in assessment of temporal relationship as this study was cross sectional, inability to generalize the findings on Iraqi population and poor institute administrations compliance.

CONCLUSION

Malnutrition of children with special care is commonly affected by type of disability; children with Down syndrome are more vulnerable to overweight and obesity. Incomes of family and educational level of mother have strong effect on nutritional status of children with special care.

Recommendations

It is recommended to support the national nutritional programs of all children with special focusing on nutritional programs of children with special care in collaboration with Ministry of Labor and Social Affairs.

DECLARATIONS

Conflict of Interest

The authors and planners have disclosed no potential conflicts of interest, financial or otherwise.

Acknowledgement

Special thanks to Dr. Osama F. Qaisi for his role in statistical analysis.

Study Contribution

This work was the result of the researcher work in Disability Institutes with help of workers in these institutes.

REFERENCES

- [1] Endris, Neima, Henok Asefa, and Lamessa Dube. "Prevalence of Malnutrition and Associated Factors among Children in Rural Ethiopia." *BioMed Research International*, No. 2017, 2017.

- [2] World Health Organization. "International Classification of Functioning, Disability and Health (ICF)". *World Health Organization*. <http://www.who.int/classifications/icf/en/>.
- [3] World Health Organization. "Early childhood development and disability. A discussion paper". *www.who.int/en/*. World Health Organization 2012, http://apps.who.int/iris/bitstream/10665/75355/1/9789241504065_eng.pdf.
- [4] Nolan, Emily. "Children with special needs: Barriers and opportunities in Serbia. Paper 2: Out of School Children Paper Series" *www.unicef.org*, UNICEF, https://www.unicef.org/eca/SEN_Serbia.pdf.
- [5] UNICEF. "Monitoring Child Disability in Developing Countries: Results from the Multiple Indicator Cluster Surveys" *www.unicef.org*, United Nations Children's Fund Division of Policy and Practice, 2008, https://www.unicef.org/disabilities/index_68330.html.
- [6] World Health Organization. "The global burden of disease: 2004 update". *Health statistics and information systems*. World Health Organization, http://www.who.int/healthinfo/global_burden_disease/2004_report_update/en/.
- [7] World Health Organization. "Concept Note: World Report on Disability and Rehabilitation". *World Health Organization*, http://www.who.int/disabilities/publications/dar_world_report_concept_note.pdf.
- [8] Wang, Zhenjie, et al. "Changes in Prevalence and Socioeconomic Factors of Psychiatric Disability among Children in China from 1987–2006: A Population Based Survey." *International Journal of Environmental Research and Public Health*, Vol. 14, No. 3, 2017, p. 279.
- [9] Maulik, Pallab K., and Gary L. Darmstadt. "Childhood disability in low-and middle-income countries: overview of screening, prevention, services, legislation, and epidemiology." *Pediatrics*, Vol. 120, Supplement 1, 2007, pp. S1-S55.
- [10] World Health Organization. "World report on disability" *World Health Organization*, http://www.who.int/disabilities/world_report/2011/en/.
- [11] Hashim, Nur Hamiza Ruzaini, et al. "Prevalence and Risk Factors Associated with Malnutrition among Children with Learning Disabilities: A Scoping Review." *Malaysian Journal of Nutrition*, Vol. 23, 1, 2017, pp. 65-80.
- [12] Nogay, Nalan Hakime. "Nutritional status in mentally disabled children and adolescents: A study from Western Turkey." *Pakistan Journal of Medical Sciences*, Vol. 29, No. 2, 2013, p. 614.
- [13] AbdAllah, Asmaa M. "Nutritional Status of Mentally Disabled Children in Egypt." *Egyptian Journal of Hospital Medicine*, Vol. 29, 2007, pp. 604-15.
- [14] Groce, Nora, et al. "Stronger Together: Nutrition-Disability Links and Synergies [briefing note]." *University College of London. United Kingdom*, 2013.
- [15] UNICEF. "A Study of Education Opportunities for Disabled Children and Youth and Early Childhood Development (ECD) in Iraq: Phase 1 Report." The United Nations International Children's Emergency Fund. <https://www.escholar.manchester.ac.uk/api/datastream?publicationPid=uk-ac-man-scw:131680&datastreamId=Supplementary-2.PDF>.
- [16] World Health Organization. "Growth reference data for 5-19 years" <http://www.who.int/growthref/en/>.
- [17] Simeonsson, R.J. "Early childhood development and children with disabilities in developing countries." *Chapel Hill, University of North Carolina*, 2000.
- [18] World Health Organization. "World report on disability" *World Health Organization*, http://www.who.int/disabilities/world_report/2011/en/.
- [19] Al-Jawadi, Asma A., and Shatha Abdul-Rhman. "Prevalence of childhood and early adolescence mental disorders among children attending primary health care centers in Mosul, Iraq: a cross-sectional study." *BMC Public Health*, Vol. 7, No. 1, 2007, p. 274.
- [20] Di Giulio, Paola, Dimiter Philipov, and Ina Jaschinski. *Families with disabled children in different European countries*. No. 23. Families and Societies Working Paper, 2014.
- [21] Reinehr, Thomas, et al. "Obesity in Disabled Children and Adolescents: An overlooked group of patients." *Deutsches Ärzteblatt International*, Vol. 107, No. 15, 2010, p. 268.
- [22] Bandini, Linda G., et al. "Prevalence of overweight in children with developmental disorders in the continuous

- national health and nutrition examination survey (NHANES) 1999-2002." *The Journal of Pediatrics*, Vol. 146, No. 6, 2005, pp. 738-43.
- [23] Curtin, Carol, et al. "Prevalence of overweight in children and adolescents with attention deficit hyperactivity disorder and autism spectrum disorders: a chart review." *BMC Pediatrics*, Vol. 5, No. 1, 2005, p. 48.
- [24] Russell-Mayhew, Shelly, et al. "Mental health, wellness, and childhood overweight/obesity." *Journal of Obesity*, Vol. 2012, 2012.
- [25] Puder, J.J., and S. Munsch. "Psychological correlates of childhood obesity." *International Journal of Obesity*, Vol. 34, 2010, pp. S37-S43.
- [26] Mustillo, Sarah, et al. "Obesity and psychiatric disorder: developmental trajectories." *Pediatrics*, Vol. 111, No. 4, 2003, pp. 851-59.
- [27] Marcus, Ronald N., et al. "A placebo-controlled, fixed-dose study of aripiprazole in children and adolescents with irritability associated with autistic disorder." *Journal of the American Academy of Child & Adolescent Psychiatry*, Vol. 48, No. 11, 2009, pp. 1110-19.
- [28] Hollway, Jill A., and Michael G. Aman. "Sleep correlates of pervasive developmental disorders: a review of the literature." *Research in Developmental Disabilities*, Vol. 32, No. 5, 2011, pp. 1399-1421.
- [29] Matson, Johnny L., Jill C. Fodstad, and Timothy Dempsey. "The relationship of children's feeding problems to core symptoms of autism and PDD-NOS." *Research in Autism Spectrum Disorders*, Vol. 3, No. 3, 2009, pp. 759-66.
- [30] Chen, Alex Y., et al. "Prevalence of obesity among children with chronic conditions." *Obesity*, Vol. 18, No. 1, 2010, pp. 210-13.
- [31] Durkin, Maureen S., et al. "Socioeconomic inequality in the prevalence of autism spectrum disorder: evidence from a US cross-sectional study." *PLoS One*, Vol. 5, No. 7, 2010, p. e11551.
- [32] Basil, Janet S., et al. "Retrospective study of obesity in children with Down syndrome." *The Journal of Pediatrics*, Vol. 173, 2016, pp. 143-48.
- [33] Adelekan, Tahira, et al. "Lipid profiles of children with Down syndrome compared with their siblings." *Pediatrics*, Vol. 129, No. 6, 2012, pp. e1382-e1387.
- [34] Murray, Julie, and Patricia Ryan-Krause. "Obesity in children with Down syndrome: background and recommendations for management." *Pediatric Nursing*, Vol. 36, No. 6, 2010, p. 314.
- [35] Groce, N., et al. "Malnutrition and disability: unexplored opportunities for collaboration." *Paediatrics and International Child Health*, Vol. 34, No. 4, 2014, pp. 308-14.
- [36] Açıl, Dilay, and Sultan Ayaz. "Screening of Visually Impaired Children for Health Problems." *Asian Nursing Research*, Vol. 9, No. 4, 2015, pp. 285-90.
- [37] Hendricks, Charlene, et al. "Associations Between Child Disabilities and Caregiver Discipline and Violence in Low-and Middle-Income Countries." *Child Development*, Vol. 85, No. 2, 2014, pp. 513-31.
- [38] Ghazi, Hasanain Faisal, et al. "Malnutrition among 3 to 5 years old children in Baghdad city, Iraq: a cross-sectional study." *Journal of Health, Population, and Nutrition*, Vol. 31, No. 3, 2013, p. 350.
- [39] Kuper, Hannah, et al. "Malnutrition and childhood disability in Turkana, Kenya: Results from a case-control study." *PloS one*, Vol. 10, No. 12, 2015, p. e0144926.
- [40] Erola, Jani, Sanni Jalonen, and Hannu Lehti. "Parental education, class and income over early life course and children's achievement." *Research in Social Stratification and Mobility*, Vol. 44, 2016, pp. 33-43.
- [41] Coulter, J.B.S. "Nutrition and malnutrition in low-and middle-income countries." *Paediatrics and International Child Health*, Vol. 34, No. 4, 2014, pp. 233-35.