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Dietary Patterns of Children with Autism Spectrum Disorder: A Study Based in Dhaka City

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Abstract - *Autism Syndrome Disorders (ASD) is better known as "spectrum condition" that affects individuals differently and to varying degrees. Some of the behaviors associated with autism include delayed learning of language; difficulty making eye contact or holding a conversation; difficulty with executive functioning, which relates to reasoning and planning; narrow, intense interests; poor motor skills' and sensory sensitivities. Food selectivity is more commonly reported in children with developmental disabilities than in typically developing children, particularly in children with autism spectrum disorders (ASDs). Parental and anecdotal clinical reports as well as a few research studies have suggested that children with ASDs have unusual eating habits. The main purpose of the study is to explore the need for special food intake pattern that may affect ASD's life and its associated factors that can be barrier to raise ASD children with the part of the society. The study was performed in two schools located in Dhaka city in children aged between 5 to 16 years of age. The study was a cross-sectional descriptive design using quantitative method. A semi-structured questionnaire was used for face to face interview of the mothers or caregivers of 52 children. According to this study, most of the children (56%) did not communicate or socially interact with others but in contrary to various studies. Moreover, equal percentage (50%) of children make eye contact while talking or intercting. This study showed that as their age increases the children did not like to socially interact. A positive sign that this study data showed that these children liked to eat at regular interval (73%) and most of the children liked to eat home made food (83%) rather than store brought food. The study also found that most of the children like to have hot food and this number is high in children from nuclear families and a signification relationship (p value 0.058) was found between them. As food always have impact on human life so it is crucial to get more information on food habit of these children. It is quite necessary to educate both parents and caregivers on food intake pattern of these children to make their life easier and help these children to live a better life like others.*

INTRODUCTION

Autism is a lifelong neuro-developmental disability, which affects the way a person communicates and relates to people around him. Individuals with autism are unable to relate to others in a meaningful way. Their ability to develop friendship is impaired as is their capacity to understand other people's feelings and thoughts. Individuals with autism can have accompanying learning disabilities but everyone with the condition shares a difficulty in making sense of the world. Autism is a spectrum disorder that means the condition has wide-ranging degrees of variability and severity. The term Autism Spectrum Disorder is used to describe all degrees of the condition. Autism typically appears during the first three years of life. It is not a mental illness. Because people with autism are not physically disabled, they look just like anybody without the disability. Due to this invisible nature it can be much harder to create awareness and understanding of the condition (Society for the Welfare of Autistic Children, Bangladesh, 2017).

Problems commonly found in autistic children are as follows:

- Lack of imaginative play.
- Attention problems.

- Repeated body movement (hand flapping, rocking, etc.)
- Unusual attachment to objects.
- Resistance in any change in routine.
- Apparent insensitivity to physical dangers and pain.
- Disruptive, aggressive or self-injurious behavior.
- Lack of eye contact.
- Echolalia.
- Lack of interest in peers.
- Failure to point at objects.

Symptoms are virtually always present before the age of 3 years but autism is often not diagnosed until 2 to 3 years after symptoms appear. The earlier a diagnosis is made the better the chance of receiving appropriate help and support and better will be the prognosis.

There is no magical cure for autism. Early diagnosis and intensive behavioral intervention in optimal educational settings can have a significant, positive and lasting impact on children with autism. They can benefit from placement in a good educational program. Occupation therapy, speech and language therapy and sensory integration therapy are very effective for their overall development. With intensive intervention, many children diagnosed with the disorder before the age of 5 go on to attend mainstream schools. Proper evaluation of each child's strengths and limitations, appropriate training, therapy and an autism friendly environment can help them to perform to their maximum potential (Society for The Welfare of Autistic Children, Bangladesh, 2017).

Food selectivity is more commonly reported in children with developmental disabilities than in typically developing children, particularly in children with autism spectrum disorders (ASDs). Parental and anecdotal clinical reports as well as a few research studies have suggested that children with ASDs have unusual eating habits. These are often described as overly selective, with aversions to specific textures, colors, smells, and temperatures and rigidity with respect to specific brands of foods. The term "food selectivity" has been used variously to refer to food refusal, decreased variety, and restricted intake to a few frequently eaten foods, with a variety of approaches employed to categorizing food, such as focusing on nutritional components (e.g., high protein, high starch) or sensory aspects (e.g., sticky, sweet). The lack of a standardized definition of food selectivity limits assessment or ability to compare across populations of children (Linda, et al., 2010). A 2008 Australian study reported wide variation and inconsistent results in prevalence estimates; for example, national estimates for the prevalence of ASD in Australia ranged from 1.21 to 3.57 per 1,000 for children aged 6–12 years (Autistic Children's Welfare Foundation, Bangladesh, 2011). A 2008 Hong Kong study reported a prevalence of 1.68 per 1,000 for children less than 15 years (Autistic Children's Welfare Foundation, Bangladesh, 2011).

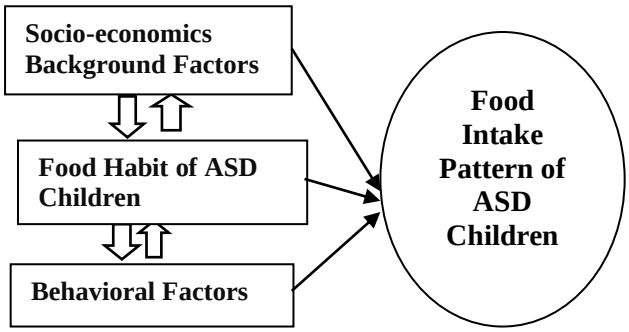
In Bangladesh Autism is still treated negatively and considered as a social barrier. Due to lack of knowledge it is still considered as God-given curse and because of social harassment many families try to hide this. The family is the first place to get support so it is necessary to educate them, counsel them and provide them proper information which will help them in the long run. All Autistic children do not have same type of problem or difficulties. It varies from person to person. So, it is necessary to obtain information as much as possible to provide them the support they need. After diagnosed with ASD it becomes difficult to cope with the situation as the parents or family is not provided with all the information they needed. One important part is their food intake behavior which may affect their health both mental and physical. As they are special children so their nutritional requirement may also be special. The role of food may not be same for them in comparison with normal children. So, it is expected that more and more studies should be carried out on focusing on the relationship between food intake pattern/behavior of autistic children with their behavior or interactive skill.

Autism spectrum disorder is a lifelong disability of development. It is not a disease that can be cured by medicine. Two different person having ASD may act differently. There are many forms of therapy that can be used for the management but that also requires information on which therapy is applicable for whom. Children diagnosed with ASD are not creatures from other planets. They are human being like us and they also have emotions, feelings like us. But they represent it differently. Their way of behavioral interaction, social interaction is not same as a normal child. They are special people with special need. So it is needed to identify their need and find them ways to live their live like others. Therefore, the main focus of this research is to find out a relationship between food habit or food intake pattern and behavioral outcome of the children diagnosed with ASD.

OBJECTIVE OF THE STUDY

The main purpose of the study is to explore the need for special food intake pattern that may affect ASD's life and its associated factors that can be barrier to raise ASD children with the part of the society.

CONCEPTUAL FRAMEWORK



MATERIALS AND METHODS

The study was conducted in two educational institutions for especially able children located in Dhaka city of Bangladesh. Data was collected from a renowned school of Dhaka Cantonment which is a specialized institute that provides services for holistic development of the children with special educational needs through multidimensional programs and "Society for Rehabilitation of Autistic Children" (SRAC) which is located in Lalmatia. The study was cross-sectional descriptive design using quantitative method. Children (aged 6 to 15 years) were the study respondents diagnosed with ASD (Autism Syndrome Disorders) who were attending selected educational institutions in Dhaka, Bangladesh. However, the parents and/or caregiver were interviewed to collect the information of above mentioned children which was conducted from 8 months (April 2019 to November 2019). The sample estimating procedure was the probability sample technique. A semi-structured questionnaire with specific sections of questions according to the study indicators was developed. The questionnaire was pre-tested for validity and reliability checks and then translated into Bengali for finalization and field deployment. During field data collection, the questionnaire was filled-in by the responses of the participants through face-to-face interview. Collected data was entered into the computer using SPSS software. Data was processed, edited and managed for archiving in the data base. Uni-variate (percentage, proportion, mean, standard deviation) and Bi-variate (cross-tabulation with statistical test like chi-square) was conducted. The results were presented in the report with tables, graphs and charts and then explained accordingly. Individual consent form was given to the each respondent for their willingness to participate in the study and institutional review/ethical clearance was taken from American International University-Bangladesh (AIUB) to implement the study.

RESULTS

Table 1: Age of the Child (n=52)

Age Limit	Frequency	Percent
<7 Years	9	17.3
7 to 10	19	36.5

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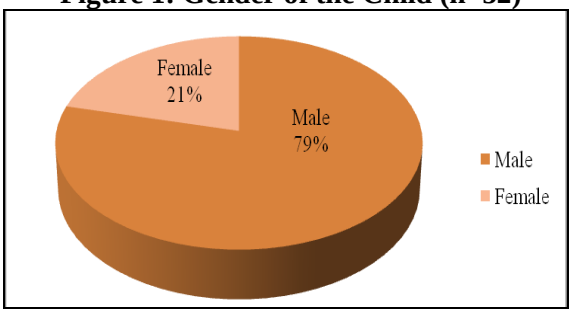
Years		
10+ Years	24	46.2
Total	52	100.0

In this study children aged between 5 to 15 years were chosen as sample. From the study it was found that the highest percentage was children aged 10 years and above (46.2%), then 7 to 10 years (36.5%) and the lowest percentage was children of 7 years and below (17.3%) shown in table 1.

Figure 1: Gender of the Child (n=52)



From this study it was found that there were higher number of male child (79%) in comparison to female child (21%) with ASD (shown in figure 1).

Figure 2: Education Level of the Mother (n=52)

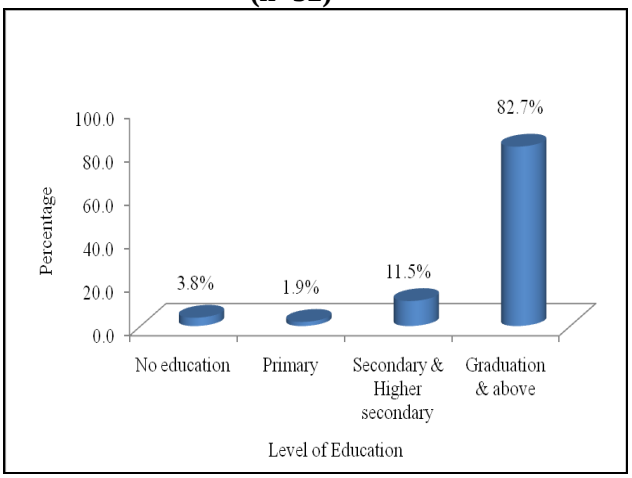
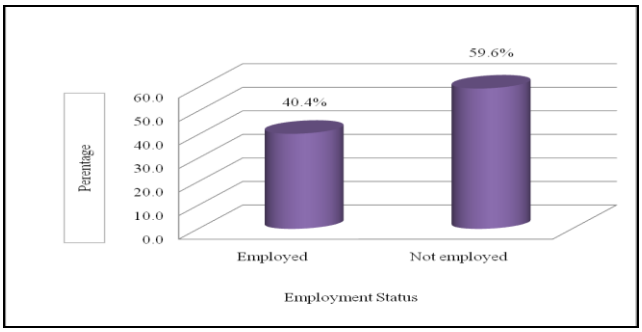
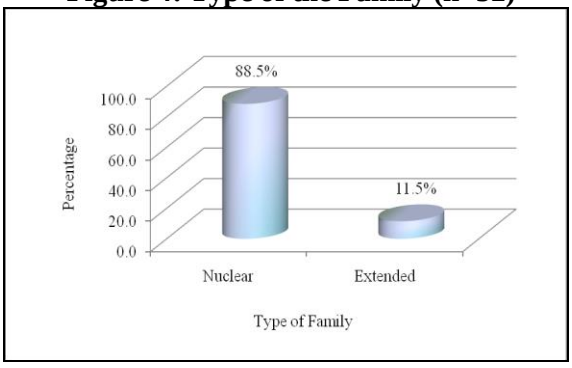


Figure 3: Occupation Status of the Mother (n=52)



ASD not only affects the children but also their families. From this study we have found that high percentage of mothers were not employed (59.6%). They either did not join any organization or left their job for the sake of their baby. For this reason lower percentage of mothers were found who were working mothers (40.4%) despite of having higher educational qualification (graduation and above 82.7%) (Shown in figure 3).

Figure 4: Type of the Family (n=52)



This study shows that majority of the children came from nuclear family (88.5%) and very less came from extended family (11.5%) which is shown in the figure 4.

Figure 5: Communication of ASD Children with Others (n=52)

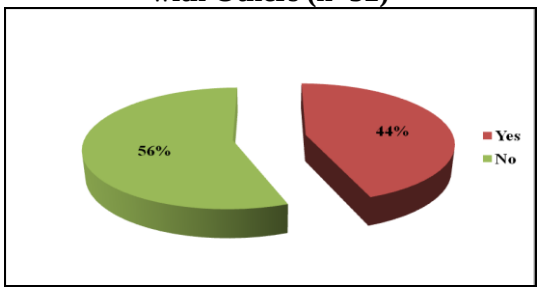


Figure 6: Social Interaction ASD Children with Others (n=52)

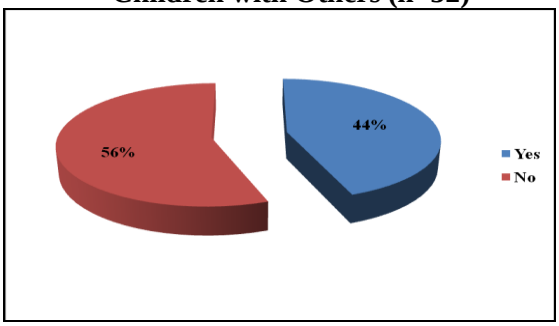
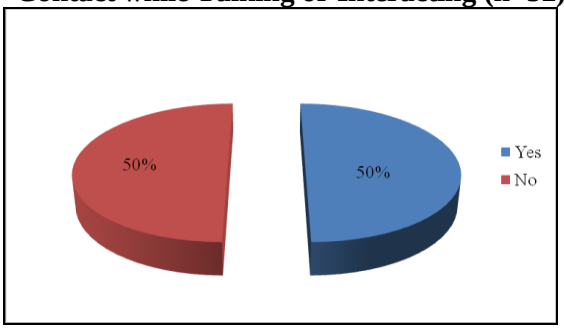


Figure 7: Children with ASD making Eye Contact while Talking or Interacting (n=52)



It is assumed that Children with ASD do not communicate like others or do not socially interact with others. From this study we found the same scenario. 56% children do not communicate or socially interact with others. (Shown in figure 5 and 6). Though this study show that children with ASD are less comminicative but the percentage of children making eye contact while talking or intercting is not very less. Equal percentage of children make eye contact while talkning or intercting (shown in figure 7).

Table 2: Way of Communication of Hungry Children (n=52)

Type of Response	Percent
Normally ask for food	30.8
Shout	5.8
Cry	51.9
Show Sign	11.5
Total	100.0

This study already showed that children with ASD do not communicate like others. This is also shown in their activities when they are hungry. It has been seen that most of the children cries (51.9%) when they are hungry and less percentage normally asks for food (30.8%).

Table 3: Favorite food item and meal time of the ASD child.

Variables	Frequency	Percent
Most Favorite Meal Time of The Child (n=52)		
Breakfast	18	34.6
Lunch	32	61.5
Dinner	2	3.8
Total	52	100.0
Items Typically Like to Eat During Breakfast (n=52)		
Bread	40	76.9
Rice	11	21.2
Items Typically Like to Eat During Lunch (n=52)		
Rice and fish	27	51.9
Rice and Meat	21	40.4
Items Typically Like to Eat During Dinner (n=52)		
Rice and vegetables	12	23.1
Name of Favorite Food Item/items (n=52)		
Oily and rich foods	15	28.8
Snacks items	9	17.3
Sweet food	7	13.5
Meat items	14	26.9
Fruits	3	5.8
Other food item	4	7.7
Total	**52**	**100.0**

The eating pattern of children with ASD is quite normal as it was seen in this study that most of the children eat bread during breakfast (76.9%). The study also found that 21.2% children have rice as a breakfast item. It was also revealed the eating pattern of children during three major meal times. During lunch time rice along with fish (51.9%) or meat (40.4%) is taken mostly by the children. This study showed that lunch time is the favorite meal time (61.5%) of the children (shown in table 3). Children like to have similar item as lunch during dinner but the

percentage of children having rice and vegetable (23.1%) is higher than lunch time.

Table 4: Behavioral factor of the ASD child in the eating issue.

Variables	Percent
Child's Behavior During Mealtime (n=52)	
Eat properly	90.4
Leave table frequently	9.6
Total	100.0
Child's Response to Try New Food (n=52)	
Accepts easily	50.0
Rejects strongly	25.0
No response	25.0
Total	100.0
Child Become Aggressive After Eating Any Certain Food Item (n=52)	
Yes	25.0
No	75.0
Total	100.0
Children Eating Non-food Item (n=52)	
Like to eat	17.3
Do not eat	82.7
Total	100.0
Parents Following Any Specific Diet Chart for the Child (n=52)	
Yes	28.8
No	71.2
Total	100.0

This study was also focusing on child's behavior during mealtime and it has been shown in table that most of them ear properly (90.4%) and very few leave the table frequently during mealtime (9.6%). Besides, the study found that (shown in table 4) most of the children accepts new food easily (50.0%) while though less but equal percentage of them either strongly rejects new food (25%) or do not respond at all (25%). This study showed that most of the children do not become aggressive after eating any certain food item (75%). Also most of the children do not like to eat any non-food item (82.7%) such as dirt, soap etc. Though food habit or pattern is very important for children with ASD but this study found that most of the parents (71.2%) do not follow any specific diet chart for their children.

Bivariate Analysis

Table 5: Making Eye Contact While Talking or Interacting by Children Age

Making eye contact while talking or interacting	Children Age			Total
	<7 Years	7 to 10 Years	10+ Years	
Yes	6	8	12	26
No	3	11	12	26
Total	**9**	**19**	**24**	**52**

p value= 0.479

Table 6: Making Eye Contact While Talking or Interacting by Gender of the Child

Making eye contact while talking or interacting	Gender of the child		Total
	Male	Female	
Yes	22	4	26
No	19	7	26
Total	**41**	**11**	**52**

p value= 0.308

From this study it was found that children with ASD make eye contact or interact with others and the rate increases with growing age. Similarly the rate of not making eye contact also increases with growing age. But the relationship is not significant as the p value found was 0.479. This relationship is not significant in terms of gender as well (p value 0.308) (Table 5 and 6).

Table 7: Child's Reaction to Hot Food by Family type

Child React to Hot Food	Family type		Total
	Nuclear	Extend	
Avoids hot food	18	0	18
Likes hot food	28	6	34
Total	**26**	**6**	**52**

P value =0.058

Table 8: Child's Reaction to Hot Food by Gender of the Child

Child React to Hot Food	Gender of the child		Total
	Male	Female	

Avoids hot food	16	2	18
Likes hot food	25	9	34
Total	**41**	**11**	**52**

P value= 0.197

This study found that most of the children like to have hot food. This number is high in children from nuclear families (Table 7) and it found a signification relationship (p value 0.058). This study also showed that male child likes hot food more than female child (Table 8) but this association between gender and choice of hot food is not significant (p value 0.197).

DISCUSSION

In last couple of years there are many studies performed on different aspects of autism spectrum disorder (ASD). This was focused on children diagnosed with ASD and their dietary pattern. From the study it was found that age of most of the children was more than 10 years. The percentage of children aged below 7 is less which may be an indication that they are not starting the education at early age like other children of their age. According to Society for Welfare of Autistic Children, Bangladesh if these children (diagnosed with ASD) are placed in good educational institutions & provided proper therapies then before the age of 5 they may attend mainstream schools.

The number of children diagnosed with ASD is increasing worldwide. In various studies it has been found that more male autistic child is present in comparison to female child. According to one study conducted by Md. Kamruzzaman et al., boys are affected more frequently than girls and this study also found the same. The study found that 79% male child in comparison to 21% girl child.

Education is an important requirement for civil society. This study found that a high percentage (82.7%) of mothers were graduates (graduation & above). It is a good sign that it can be helpful to educate or provide proper training to the mothers for the betterment of their child.

Though life has become very fast and professional but the bonding between family members still remains important. The study showed that majority of the children with ASD (88.5%) came from nuclear family. Though it is a matter of debate but our data represents the presence of less family members may not always leave a good effect on the children.

This study data showed the most of the children (56%) do not communicate or socially interact with others. It was mentioned in the study of Oono et al., that children diagnosed with ASD do not like to communicate or interact like others which also coincides with the finding of this study.

It is found through studies that children with ASD do not like to make eye contact. But in contrary to these studies such as the study of Madipakkam et al., this study found that equal percentage (50%) of children make eye contact while talkning or intercting. This may be a good sign as this study was performed on school children and after admitting to school they might have changed positively to show such sign.

This study showed that though most of the children cry for food (51.9%) when they are hungry but also a good percentage (30.8%) normally asks for food when they are hungry. It may also be a good sign showing benefit of education in these children. This statement is supported by another data found through this study which showed that in majority of students there was a positive change in behavior (96.2%) after getting admission in the school and continuing study there.

Autism is called spectrum disorder and the name justifies the reason. Normally children of growing age like to have sweet food but in this case it is quite different. The study showed that most of the children with ASD like to have spicy food (53.8%) and low percentage (28.8%) likes sweet food . This indicates that common concept of food habit of children is not applicable for special children and it is obviously a matter to be studied for more information.

From the study it was found that lunch time is the favorite meal time of these children (61.5%).

From the study it was found that lunch time is the favorite meal time of these children (61.5%). It can be an useful information for using this meal time to apply any food related intervention for study purpose or research purpose.

From this study it was found that most of the children with ASD like to have hot food (65%) and avoids cold food (65%). Although the food pattern of children is very crucial and calls for special attention but from this study it was found that most of the parents do not follow any specific diet chart for their child (71.2%). This study data also supported the statement as majority of the parents (76.9%) admitted that their existing knowledge regarding dietary pattern in children with ASD is not enough and 51.9% of them feel that they need assistance or specific information about this topic.

CONCLUSION AND RECOMMENDATION

Autism spectrum disorder (ASD) is not a new field of study and gaining attention of more researchers due to shortage of proper information. We performed the study keeping this thing in our mind as well. Management of proper life style is very important for children with ASD and maintaining a proper diet is a part of this management. As food always have impact on human life so it is crucial to get more information on food habit of these children. Through this study it was found that male children are more in numbers than female children and in most cases they came from nuclear families. It was also found that the number of children with the age of 7 years or more is high as many of them did not started school early. So, it is important to provide more information to the mothers to start education of their child at earlier age. It is quite necessary to educate both parents and caregivers and arrange seminars on food intake pattern of the children which could be a good way to provide information to them. At the end it is expected that more and more studies focusing on specific food items and their relationship with behavioral outcome of the children with ASD will be performed. It will be helpful for the parents, for the children, for the families and most importantly for the nation as these children are part of our society and to involve them in this society more actively we have to prepare them with proper support.

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