IOSR Journal of Nursing and Health Science (IOSR-JNHS)
e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 6, Issue 6 Ver. III. (Nov.- Dec .2017), PP 01-13
www.iosrjournals.org

Nutritional Statusand AutismManifestationsImprovement:The Effect of Educational Program onCognition andBehavior for Caregivers` Children with Autism

SaharSedkyFaheim[1], Eman El-Sherbeny[2]&Ahmed A.El-Gendy[3]
[1]*Lecturer of Pediatric Nursing, Faculty of Nursing, Beni - Suef University, Egypt Corresponding Author E-mail: saharsedqy@gmail.com*
[2]*Lecturer of community health nursing, Faculty of Nursing, Beni–SuefUniversity, Egypt*
[3]*Assistant professor of Faculty of Medicine, Mansoura University, Egypt*

Abstract
Background: *Autism spectrum disorder (ASD) is a complex developmental condition that characteristically reveals in the first three years of life. (ASD) is the fastest developing neurodevelopmental disorder in children.* ***Aim:****to design, plan, implement and evaluate the effect of educational program oncognition and behavior forcaregivers of children with autismregarding relation between nutritional status and autism manifestations improvement****Design:*** *A quasi-experimental research design was carefully selected for the current study.* ***Setting:****A convenience sample including all available caregivers (100) of children with autismstudents attended at outpatient students' Health Insurance Clinic and affiliated to EltarbiaAlfkriahSchool in Beni-Seuf,* ***Tools:****A-Structured Interview Questionnaire Sheet for caregivers(1): Socio-demographical data (2): Caregivers` cognition regarding autism (3)Caregivers` cognition regarding treatment and relation between nutritional status and autism symptoms improvement.B- Likert scale (Caregivers` attitude regarding relation between nutrition autism symptoms improvement).* ***Results*** *the findings revealed that there was a highly significant difference in pre and post-intervention program and caregivers` cognition and behavior.* ***Conclusions:*** *Educational intervention had a significant role in increasing cognition and behavior.****Recommendations:*** *More efforts in developing and applying similar educational endeavors for caregivers 'children with autism*
Key Words: *Autism, Caregivers, Nutritional Status, Educational Program,Cognition and Behavior*

Date of Submission: 12-05-2017 Date of acceptance: 18-11-2017

I. Introduction

Autism spectrum disorder (ASD) is characterized by deficits in social communication skills and the occurrence of repetitive or limiting behaviors **[1],** the incidence of ASD is found almost five times in boys more than girls (1 in 54 compared to 1 in 252) **[2].** The symptoms severity of ASD varies widely among affected individuals clinically. The incidence of ASD between 2000 and 2012, ASD diagnosis has doubled from 8.2 to 24.6 per 1000 children aged 8 years **[3].** In the United States, one in 68 children was diagnosed with ASD in 2012 [2,3]. The economic costs for a child with ASD are 6 times higher than that for a healthy child [1]

The autism is genetically and environmentally determined, genetic factors might explain only 10% to 20% of the observed ASD cases and have been shown to be complex and unclear whether, it is because of gene mutation or multi-gene interactions**[1],** ASD may be caused by a contribution of a vital environmental elements in ASD development**[4].** Prenatal and perinatal environmental exposures (eg, dietary factors, maternal diabetes, stress, medications, heavy metals, alcohol, smoking, drugs and vaccinations or infections) are linked with an increased risk of ASD **[5].**

In some children, development seems uncommon in some esteem right from birth. Often, the children with autism do not sound, form words and use signs such as pointing with the predictable occurrence this is through parents observation. In other children, development seems near normal through 12-18 months. These children cooperate with adults in the surroundings, use some language to interconnect, and express an interest in their social environments, but they may be a little behind their age. Then, at about 18 months of age, thealterations in their capabilities turn out to be evident. In some cases, an event in their environment appears to cause a loss in the acquired abilities such as speech and interaction from what we have detected **[2].**

Moreover, A collection of microbes, including bacteria, viruses, and fungi (micro- biota) gut–brain axis has been defined as a way of message between the gut micro-biota and the brain. Functional and inflammatory

gastrointestinal (GI) diseases participate in high comorbidity (94%) with psychiatric diseases, such as depression or anxiety **[6].**

Also, microbial fermentation of carbohydrates end-products in the colon (such as (Short-chain fatty acids (SCFAs), acetate, propionate, and butyrate) have several health benefits to the host (related to, for example, weight control, lipid profiles, and colon health) **[7].** High levels of SCFAs and accumulation of SCFAs have comprehensive effects on the function of nervous system, causing developmental delay or seizures and bad effect on neurotransmitters such as serotonin, or 5-hydroxytryptamine (5HT), which concentrations in stool and serum of children with ASD and SCFAs are producing bacteria, e.g., Clostridia, Desulfovibrio, and Bacteroides, are raised in feces of children with ASD [8, 9] **.** Thereby, translocation through the blood brain barrier by transporters existing on the blood brain barrier or by passive diffusion might be areason of potential effects on the brain and cause the development of ASD symptoms **[10].**

Children with ASD are more probable to suffer from food allergies, and parental states of allergies contain milk/dairy, nuts, and fruits **[11].** Picky eating, food refusal, and food selectivity are most commonly associated with higher rates of ASD symptoms of problematic eating behaviors in autistic children [9]. Food selectivity is based on the color, shape, texture, or temperature of food and so, a rejection of fruits, vegetables, protein, is more common in autistic children **[12].** Increasedconsumption of snack foods and calorie-dense foods can result in extreme weight gain, and research suggests higher rates of obesity in autistic children than in natural offspring which can lead to obesity complications (e.g., hypertension, diabetes, and metabolic syndrome)[**13],**that are also more prevalent among adults with ASD. In some studies of autistic children an improvement of ASD symptoms have been reported after probiotic treatment of potential gut micro-biota **[14].**

Wherever, a number of nutrition intervention strategies including gluten-free/casein-free diets, ketogenic diets, or supplementation with n-3 fatty acids, minerals, or multivitamins have been suggested a therapeutic measure for ASD symptoms and one-third of children have been improvedwith some dietary intervention at time of ASD diagnosis [**15,16],** it has been explored to treat behavioral symptoms and comorbid GI dysfunction. Some types of diets (e.g., gluten-free/casein-free diet, antioxidant diet, ketogenic diets) have resulted in an improvement of symptoms related to ASD, but others caused no behavioral changes compared with control diets or uniform due to inadequate or extreme nutrient intake in response to interventions **[17,18].**

Health education of parents about the feeding lifestyles and problems, relation between nutritional status and autism improvement, food types should be given and food types should be avoided for autistic children or dietary interventions, including FODMAP (fermentable oligo-di-mono-saccharides, polyols), crunchy foods or nourishments that have a slick mouth feel and food smells) diet, elimination diets. Avoidance of food coloring/food additives, or specific carbohydrate diet is the main role of the researcher in educational program, Specific considerations are necessary when dealing with autistic children due to higher prevalence of food selectivity and general feeding problems. For example, if constipation has been suffered by children, the diet must be evaluated for the types of fruits, vegetables, and whole grains that the child will accept **[15]** and other subjects may occur in the area of sensory processing. For example, if children with ASD are hypersensitive to sounds, they may not be able to eat in a noisy region or with others involved in the discussion. If they have visual sensitivities, they may agree to take foods only of assured colors. They also may not be able to eat foods that are touching each other on their plate **[2].**

Significance of the study:

Autism is noticed firstly within the first few years of life, it is considered a complex developmental and functional disorder which prevents the child from socio-communicative interaction and learning activity [2, 19].Among children with developmental disorders the incidence of autism spectrum disorders in Egypt and Tunisia were documented to be 33.6% and 11.5% respectively [2]. The first study ever done on the cost consequences of ASD in Egypt reported, the currently estimated that 3:6 children out of every 1,000 worldwide have ASD. Boys are 4 times more likely to have ASD than girls [20].Through assessment, the researcher noted that, feeding difficulties, with highly restricted range of food choices, gastrointestinal discomfort, food selectivity and picky eating patterns problems have been increased among many autistic children and youngsters have an extremely limited food repertoire. Eating habits patterns are often unusual and have effect on family life. Less attention directed to study relation between nutritional status, eating problems,social and behavioral aspects of children with autism which contribute autism modulation symptoms recovery. So the clarity of the systematically review specific patterns and area of concern regarding the effect of an educational program on cognition and behavior forcaregivers of children with autismregarding relation between nutritional status and autism symptoms improvement is the main aim of the study. Therefore, thestudy aimed to design, implement and evaluate the effect of educational program on cognition and behavior forcaregivers of children with autismregarding relation between nutritional status and autism manifestations improvement.

Hypothesis:
The research hypothesis was that the caregivers of children with autismwho will attend the educational program will have a better cognition and behavior towards relation between nutritional status and autism manifestations improvement

Research design:-
A quasi-experimental design was utilized in this study.

II Subject and Methods:-

a- Setting:

The study was conductedat Outpatient Students' Health Insurance Clinic andEltarbiaAlfkriahSchool at Beni- Seuf, which has 290 students and it contain 23 classes (primary education, preparatory education, and secondary education) and another part of school for administration, activity, art and daily living of autistic students in three levels.

b- **Subjects:**

A convenience sample including all available caregivers of children with autismstudents attended at previous setting, (100) caregivers (75 fathers and 25 mothers),

Sample size: sample size was detected based on the last numbers of previous setting students aged 6-18 years. The sample size was calculated utilizing the following formula. **[21].**

$$n = \frac{N}{1+N\,(e)^2}$$

Where: n= sample size, N= students` parent (130), e= margin error (0.05). A total of sample size was 100 caregivers.

The inclusion criteria: The inclusion criteria set for sample selection were as follows:
- Caregivers of students who studying in the previous setting.
- Caregivers of students were willing to participate in the study.
- All children`s parents who are autism diagnosed.
- Caregivers of students aged 6-18 years.

The exclusive criteria :
-Caregivers' students not available at the time of data collection
- Caregivers' students who not consented to participate in the study

c- Tools of data collection:

Tool A – Autism caregivers' knowledge Structured Interview questionnaire Sheet developed by the researchers to assess cognition of adolescents 'caregivers about the relation between nutritional status and autism manifestations improvement. It was based on recent literature review and caregivers` needs. This tool was divided into 3 parts;

Part (1): Socio-demographical data of the studied sample, including (age, education, residence, training course and caregiver's occupation) .

Part (2): It was used to assess caregivers` cognition regarding autism (definition, causes, types, clinical manifestations, high - risk factors and groups, diagnostic tests, the treatment method of autism and sources of information).

Part (3): It was used to assess caregivers` cognition regarding treatment and relation between nutritional status and autism symptoms improvement. such as (the type of favorite dietmetabolic or feeding problems with autistic children, aims of treatment, the new technology of autism treatment, nutrition and its relation with autism symptoms improvement, methods of how to dealwith autism, complications, preventing method and their opinion about the educational program)**[22].**

Scoring system:

Scoring system was followed to gain the conclusions of caregivers` cognition.

-Cognition subjects were divided into 21 questions and each question was assigned a score and three score level if the participant final score obtained is considered the complete and /or correct answer was scored (3), Incomplete correct answer was scored (2), while don't know or the wrong answer was scored (1).

- The total score was100% calculated as: satisfactory >= 70% of the total score, and unsatisfactory < 70% of the total score.

Tool B : Autism Likert scaledeveloped by the researchers to assess caregivers' behavior related to relation between nutritional status and autism manifestations improvement(nutritional treatment program, difference of child condition during nutritional treatment program, punishment behavior toward her or his child, set a feeding schedule and routine, avoiding all day eating, providing comfortable and supportive seating, limiting mealtime, presentation, minimizing distractions, get the child involved, practice pleasant and healthy eating behaviors).**[23]**

Scoring system was followed to obtain the outcomes of caregivers` behavior.

-Behavior contents were divided into16 itemsand each item was assigned. It was used twice for evaluation first in the baseline assessment & second after the program. Participants were asked to grade each question on a scale of 0-5, (0) meaning strongly disagree, (1) meaning disagree,(2) meaning somewhat disagree, (3) meaning somewhat agree,(4) meaning agree and (5) meaning strongly agree. The average Scores ≥ 4.00 were determined to be positively associated. Those < 4.00 were determined to have anegative association.

-The total score of behavior'questionnaire responses was100%, accordingly more than or equal 70%was considered positive, less than 70% was considered negative.

Procedure

1. An official permission to conduct the study was obtained from theinstitutional directors at the selected settings, after explaining the aim of the study.
2. An ethical approval was taken from the ethics committee of faculty of BeniSuef

3. Validity of the study tools was assessed by 5 experts in a pediatric nursing professor, community health nursing professor and medical physiology department professor field to examine content validity and its result was 95%. Modifications of the tools were complete according to the judgment panel on clearness of sentences, appropriateness of content and sequence of items.

4. **Reliability** was estimated byAlpha Cronbach`s test for tool one and its result was R= 0.83

5. A pilot study was conducted on10 caregivers to test clarity, feasibility of the tools, and the necessary modifications were done accordingly.

3. **Educational program:**

It was verified for content validity by 5 experts in the field of pediatric nursing professor, community health nursing professor and medical physiology department professor (University of Beni-Seuf and Mansoura). Omission, correction and clarification of some items were done. The educational program was carried out in the following four phases:

-This program was planned to increase caregivers` cognition and behavior regarding the relation between nutritional status and autism manifestations improvement

I. Assessment phase:

It was carried out using tool one & two to collect baseline data and to identify caregivers' cognition/behavior needs.

II. Planning phase:

Educational program was planned based on assessment phase and recent review of literature. It included goals & contents.

Implementation Phase

- The educational program was carried out through fivesessions; each was between 30-45 minutes according to the caregivers‘ needs and condition in groups. At the beginning of the first session, the program content and its aim were clarified to the caregivers.
- The data were collected by the researchers during the period of 12 months from the start of March 2016 up to the end of February 2017.
- Each caregiver was interviewed individually by the researchers. The mean time needed for each sheet was about 25-35 minutes to finish a questionnaire.
- This study was displayed in five separate steps: developinginterview questionnaire sheet, pilot study, assessment of baseline caregivers‘ cognition and behavior (pre-test), implementation of educational program and evaluation of caregivers‘ cognition and behavior after educational program intervention.
- Each session was started by a summary about what has been taught in the previous one and offering the objectives of the new session using simple Arabic language, also the session was completed by a summary of its content and feedback was obtained to ensure that they got the maximal benefit.
- The total number of the subjects was 100 caregivers; they were divided into 9 groups11-12 caregivers in each group. The program was presented to each group separately.
- Each phase required between 30-45 minutes for prolongation of the plan. Teaching sessions were conducted two days /week. They were carried out using different teaching strategies,(lectures, discussion, role play and demonstration and re-demonstration using real objects, brainstormingand handouts of the educational program were given to theinstitutional directors as a teaching media.

- **First session contents were (** aim of the program**,** definition**,** causes and clinical manifestations of autism **)**
- **Second session contents were (**types, risk factors and groups, complication, physical examination and diagnostic tests of autism**).**
- **Third session contents were**(treatment types of autism, relation between nutritional status and autism manifestations improvement, nutritional elements of autistic children)
- **Fourth session contents were (**common behaviors associated with autistic children, type of favorite dietmetabolic or feeding problems with autistic children)
- **Fifth session contents were(** methods of reducing and increasing autistic children prognosis or manifestations improvement , methods of how to dealing with autism, preventing method of complications)

Program evaluation:
The effect of the program on the study subjects was carried out through comparing the pre and post immediately assessment score of caregivers` cognition & behavior.

Administrative design:
An official approval was obtained from the dean of the faculty of nursing to the administrators of the study setting to carry out the study. A clear explanation was given about the nature, importance and expected outcomes of the study.

Ethical and Legal Considerations:

-The researchers explained the study aim before applying the tools to gain confidence and trust of the caregivers who participated in the research.
- The researchers obtained oral consent from each subject who participating in the program, informing them that they have the right to withdraw at any time without giving any reason.
-The study was conducted in a safe place for caregivers.
-Data were collected and treated confidentially.

Statistical Data Analysis
The data were computerized and analyzed using the statistical package for social science (SPSS), version 16.0 Data were presented using:
 Descriptive statistics in the form of number, percentages means and standard deviation
 Statistical tests included: Chi-square ($\chi 2$) test for analysis of qualitative variables.
 The graphical presentation included pie and column chart diagrams.
 Statistical significance was considered at P -value <0.05

III Result

Table (1):The demographic data of caregivers or children's parent indicated that, 43.0% of the studied caregivers age ranged between 25-30 years with mean age 26.37±2.08years. Regarding the level of education, half (50%) of the caregivers had university, master and doctor degree. As regards residence of caregivers, this table showed that 60% of them from rural community. As regards experience years of caregivers, this table showed that less than three quarters (70%) of them didn't take any training courses, while according to father`s and mother`s occupation 68% of mothers weren't working and 100% of fathers were working.

This figure (1) indicated that, the majority 91.7% of autistic children had an imbalanced diet and didn't follow ideal autistic nutrition according to the caregivers observation and the health problem effect on their children appetite as 17.7% of children had loss of appetite.

Table (2): This table showed that there was an improvement in caregivers' cognition immediately after program mean scores and there were highly statistically significant differences ($P < 0.001$) between before and immediately after program intervention

Figure(2) regarding forms of favorite diet, the study results showed that (100.0%) of children had preferred carbohydrate, while35% of children had preferred fat

Figure (3) showed that 83.7% had unsatisfactory in their total scores of cognition followed by 16.3% had satisfactory level before program intervention. While the same figure displayed that, more than three quarters of

the studied caregivers (91.8%) had satisfactory level in their scores of cognition followed by 8.2% had an unsatisfactory level after program intervention.

Figure (4) illustrated that the caregivers had more than half of their information from more than onesource and the minority had their information from friends.

Table (3):pointed out that there were highly statistically significant differences (P < 0.001) between cognition score and their socio demographic characteristics about pre and post-intervention program in educational level, residence, training courses and mother occupation. While there were no statistically significant differences (P < 0.001) between cognition score and their socio demographic characteristics about pre and post-intervention program in father`s occupation and age in years.

Figure (5) showed that 89.3% had unsatisfactory in their total scores of cognition followed by 10.7% had satisfactory level before program intervention. While the same figure displayed that, more than three quarters of the studied caregivers (92.5%) had satisfactory level in their scores of knowledge followed by7.5% had an unsatisfactory level after program intervention.

Table (4) pointed out that there were highly statistically significant differences (P < 0.001) between behavior score and their socio demographic characteristics about pre and post-intervention program in educational level, years of experience, training courses and mother occupation, while there were no statistically significant differences (P > 0.05) between behavior score and their socio demographic characteristics about pre and post-intervention program in residence

Table (5) showed a statistically significant positive correlation between students` total cognition scores after program implementation and their attitude immediately after program implementation

Table (6) showed that the majority or more than 90% of the studied caregivers had a positive opinion and satisfactory about the relation between nutritional status and autism symptoms recovery educational program.

Table (1): Socio demographic characteristics of children`s parent with Autism No=100

	Frequency	%
Age in years		
Less than 20	0	0.0
20-	23	23.0
25-	43	43.0
≥30	24	24.0
Mean ±SD	26.37±2.08	
Educational level		
illiterate & primary	13	13.0
Secondary & technical institute	37	37.0
University, Master and doctor degree	50	50.0
Residence		
Urban	40	40.0
Rural	60	60.0
Training courses of caregivers		
Yes	30	30.0
No	70	70.0
Father's occupation:	No=75	
Working	75	100.0
Not working	0	0.0
Mother`s occupation	No=25	
Working	8	32.0
Not working	17	68.0

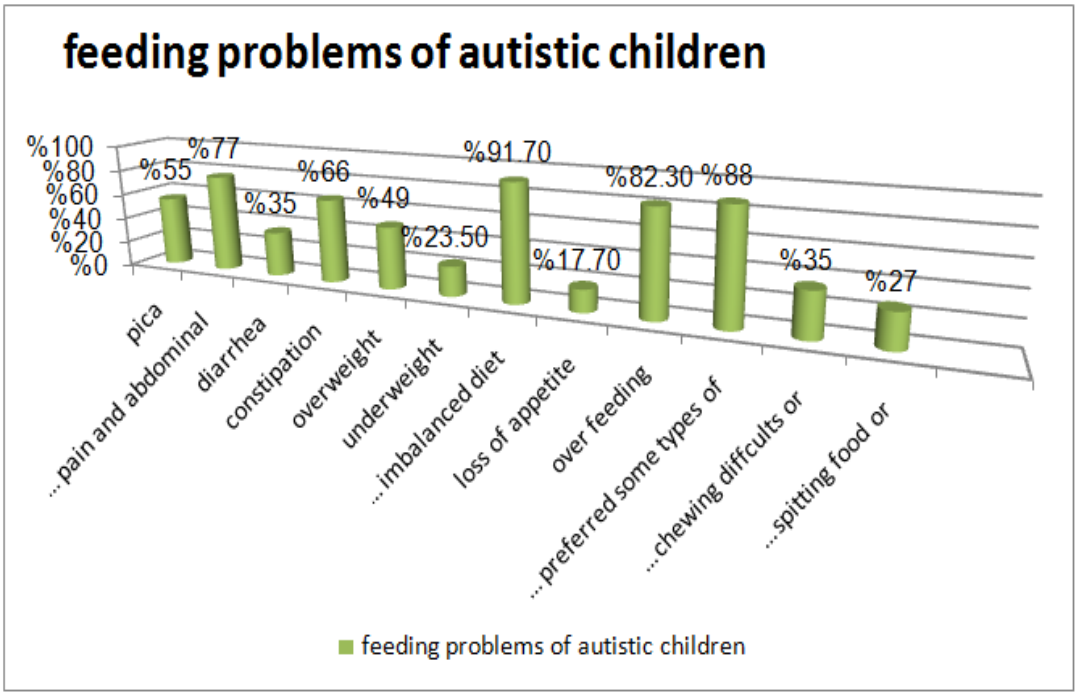

Figure (1) Distribution of common feeding problems among of autistic children

	Total cognition				Chi square Test(1)	P value
	Pre-intervention		Post-intervention			
	Satisfactory	unsatisfactory	Satisfactory	Unsatisfactory		
	%	%	%	%		
Definition of autism	92.0	8.0	100.0	0.0	112.74	<0.001**
cause of autism	60.3	39.7	100.0	0.0	16.77	<0.001**
Risk factors of autism and the main systematic affections	25.0	75.0	98.0	2.0	4.75	<0.001**
Autism`s manifestations	30.0	70.0	96.0	4.0	118.00	<0.001**
Types of autism	10.0	90.0	92.0	8.0	114.76	<0.001**
Diagnostic test of autism	20.0	80.0	88.0	12.0	17.82	<0.001**
Common treatment methods and main goals of treatment	35.0	65.0	95.0	5.0	109.76	<0.001**
New technology method of autistic children treatment (**Management of autism by stem cell**)	0.0	100.0	94.0	6.0	6,75	<0.001**
Nutritional status and autism symptoms improvement and its role in autism treatment	12.0	88.0	95,0	5,0	15.72	<0.001**
Meaning of gluten-free/casein-free diets	15.0	85.0	96.0	4.0	109.76	<0.001**
Methods of autism precaution and preventing	0.0	100.0	89.5	10.5	110.74	<0.001**
Methods of how to dealing with autistic children	40.0	60.0	98.0	2.0	6,55	<0.001**
Health and nursing care of autistic children	20.0	80.0	95.0	5.0	113.66	<0.001**

Table (2): Percentage distribution of caregivers 'cognition regardingrelation between nutritional status and autism recovery educational program

<0.001 highly statistically significant**

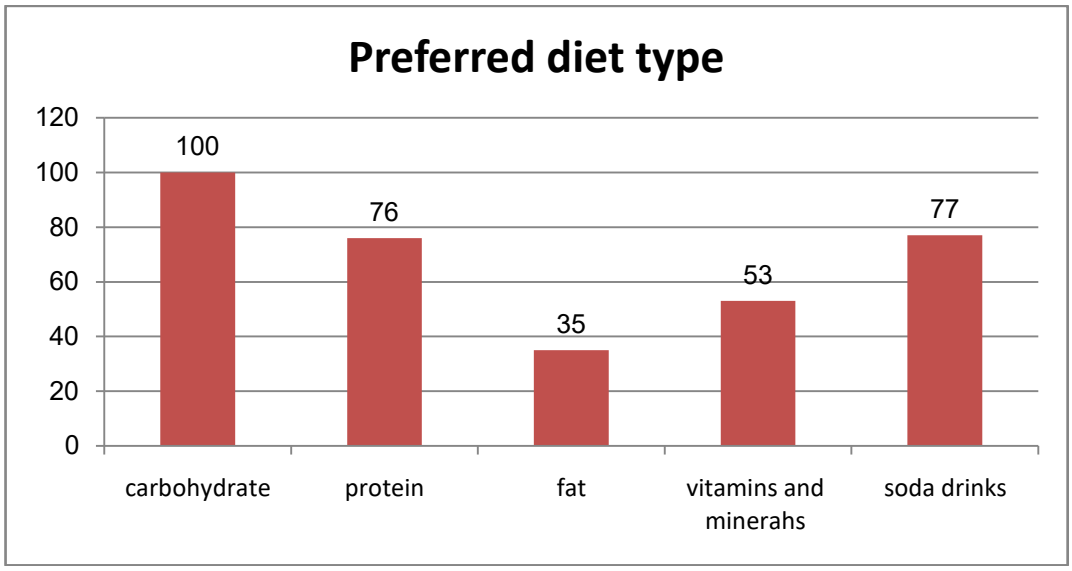

Figure (2): Distribution of the current type of favorite diet behavior among autistic children

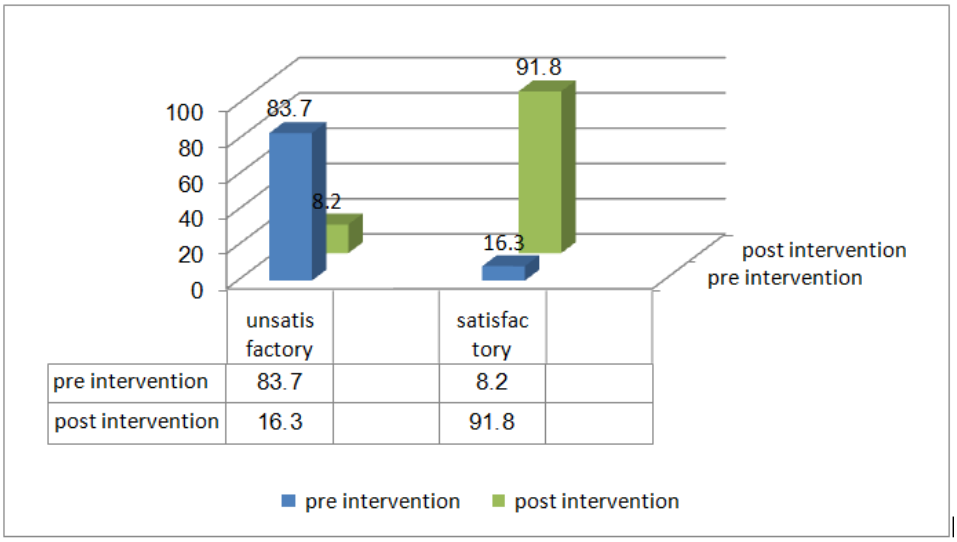

Figure (3): percentage distribution of total cognition score of the studied caregivers pre and post phases of intervention about relation between nutritional status and autism symptoms recovery educational program. No=100

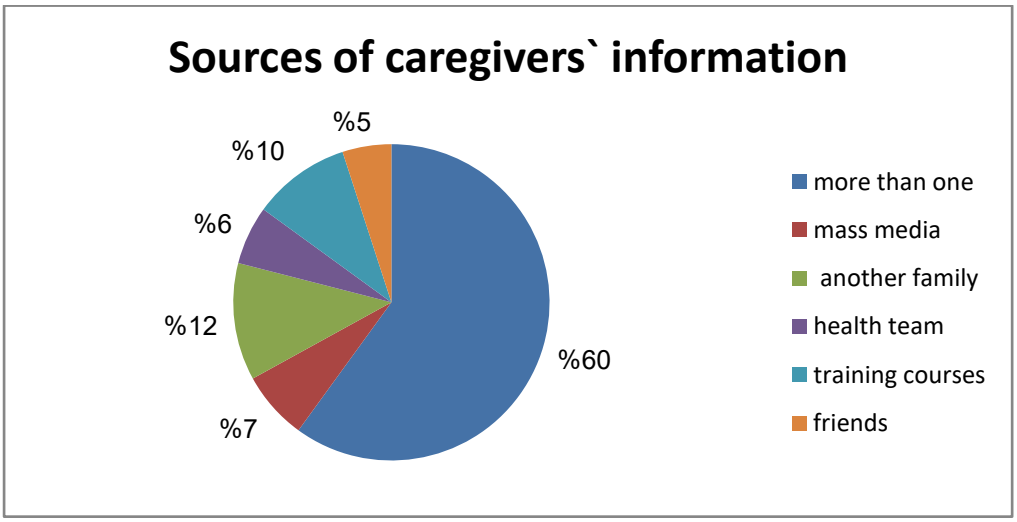

Figure (4): Distribution of the studied caregivers regarding the source of informationrelation between nutritional status and autism recovery educational program. No=100

Table (3) Relation between cognition or knowledge score and their demographic characteristics about relation between nutritional status and autism recovery educational program No=100

	Total cognition								Chi square Test(1)	P value
	pre-intervention				post-intervention					
	Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory			
	No	%	No	%	No	%	No	%		
Age in years	0	0.0	100	100.0	90	90.0	10	10.0	2.40	>0.05
Educational level	5	5.0	95	95.0	95	95.0	5	5.0	4.28	<0.001**
Residence	8	8.0	92	92.0	88	88.0	12	12.0	0.557	<0.001**
Father`s occupation	12	12.0	88	88.0	95	95.0	5	5.0	2.91	>0.05
Training courses	15	15.0	85	85.0	95	95.0	5	5.0	2.87	<0.001**
Mother occupation	5	5.0	95	95.0	95	95.0	5	5.0	4.28	<0.001**

<0.001 highly statistically significant**

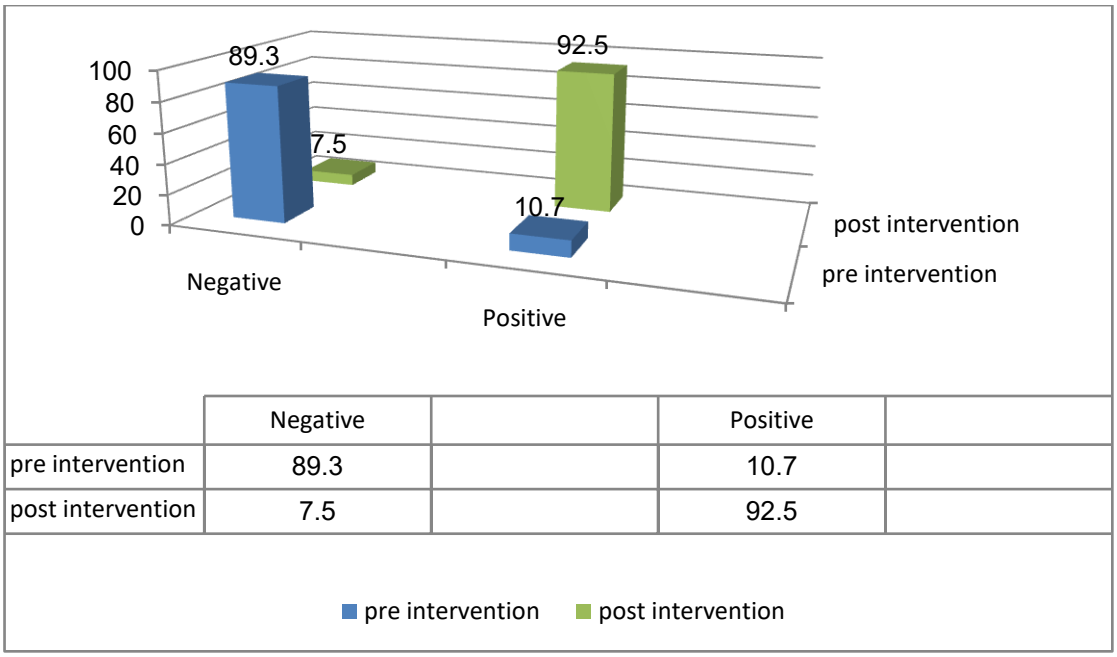

Figure (5): percentage distribution of total behavior score of the studied caregivers pre and post phases of intervention about relation between nutritional status and autism symptoms recovery educational program. No=100

Table (3) Relation between behavior score and their demographic characteristics about relation between nutritional status and autism recovery educational program No=100

	Total **behavior**								Chi square Test(1)	P value
	pre-intervention				post-intervention					
	Positive		Negative		Positive		Negative			
	No	%	No	%	No	%	No	%		
Age in years	10	10.0	90	90.0	90	90.0	10	10.0	1. 33	>0.05
Educational level	8	8.0	92	92.0	95	95.0	5	5.0	4.28	<0.001**
Residence	11	11.0	89	89.0	92	92.0	8	8.0	0.557	>0.05
Father`s occupation	20	20.0	80	80.0	97	97.0	3	3.0	2.91	<0.001**
Training courses	5	5.0	95	95.0	96	96.0	4	4.0	2.87	<0.001**
Mother`s occupation	18	18.0	82	82.0	95	95.0	5	5.0	4.28	<0.001**

<0.001 highly statistically significant**

Table (4) Correlation coefficient between total caregivers' cognition or knowledge and behavior scores during pre/post program implementation No=100

Variable		Cognition pre	Behavior pre	Cognition post	Behavior post
Cognition pre	Pearson Correlation		.018	.226*	.126
	Sig. (2-tailed)		.642	.246*	.155
Behavior pre	Pearson Correlation	.060		.112	.004
	Sig. (2-tailed)	.740		.090	.285*
Cognition post	Pearson Correlation	.233*	.380		.060
	Sig. (2-tailed)	.367*	.090		.598
Behavior post	Pearson Correlation	.240*	.006	-.405	
	Sig. (2-tailed)	.347*	.655	.467	

Table (5) caregivers' opinion of educational program aboutrelation between nutritional status and autism symptoms recovery educational program. No=100

Items	Post program			
	Unsatisfactory		Satisfactory	
	NO	%	NO	%
Cognition of program	0	0.0	100	100.0
Time of program	5	5.0	95	95.0
Language of program	4	3.3	96	96.0
Discussion method of program	0	0.0	100	100.0
Place of program	10	10.0	90	90.0

IV. Discussion

ASD is considered a permanent developmental disability well-defined by diagnostic criteria that comprise dearth in social communication and social contact and limited, repetitive forms of behavior, interests, or activities [19].

Foods chosen to be added and taken away from their diet is the road to autism symptoms improvement and the diet is considered the first step to improve the health and well-being of children with autism. Gluten and casein are certain food substances that should be avoided because of problematic for the child with autism while other foods rich in curative nutrients are useful when added to the children's diet. Attention to these factors is anticipated to benefit balance biochemistry affect systemic curative, and be responsible for release of autism symptoms [24].

Teaching program management for caregivers about the relation between nutritional status and autism symptoms improvement is concentrated on nursing teaching and support, as well as actual treatment diet of autistic children and certain foods that must be avoided to reach autism symptoms improvement and prognosis or at least prevent autistics complication

The goal of the study was to explore the food preferred, health problems and nutrition elements which affect the eating patterns symptoms improvement of autistic children and their growth and give the caregivers educational program about the relation between nutritional status and autism symptoms improvement. As regards the distribution of the studied sample with socio demographic characteristics of the caregivers of autistic children (table 1), it was found that more than one quarter of studied caregivers their ages ranged from 25-30 years with mean age 28.37±2.08. Regarding the level of education, half of the caregivers had university, master and doctor degree and according to father`s and mother`s occupation more than half of mothers weren't working and the majority or all of fathers were working.This result agreed with [2] who found that, the majority of parent were highly educated and more than half of mothers were housewives in her study about study of eating habits for children with autism at Assiut city. As regards residence of caregivers, this table showed that more than half of them from rural community, additionally the current study supported by **[25]** who stated that, more than two fifths of parents had a high level of education. As well, more than two thirds of mothers were housewife and less than three quarters of them reside in urban areas in his study about counseling for mothers to cope with their autistic children. As regards training courses of caregivers, this table showed that, less than three quarters of them didn't take any training courses about how to deal with autistic children. Therefore the role of the training courses and education of caregivers` children with autism leads to early detection and diagnoses, treatment and good prognosis of children `s condition and also, working parents extra time outside home and leave alone in house for extended time without care and guidance.

Concerning the feeding problems among of autistic children, the present study indicated that more than three quarter of autistic children had an imbalanced diet, didn't follow ideal autistic nutrition, pica, pain

and abdominal discomfort (constipation and diarrhea), children preferred some types of food and over feeding according to the caregivers stated that the health problem effect on their children appetite as less than quarter of children had loss of appetite. According to [1, 12] who stated that, food selectivity, food neophobia, and "picky eating" were prevalent among children with ASD and could contribute to the development of nutrient deficiencies. In addition to unusual microbial conformation and variations in metabolites, GI distress, such as diarrhea, constipation, or abdominal pain, is prevalent among children with ASD and has been suggested to contribute to behavioral problems and to associate with symptom severity in their studies about micro biome and nutrition in autism spectrum disorder: current knowledge and research needs and asthma and allergies in children with autism spectrum disorders: results from the charge study. autism .

Regarding to the studied caregivers' cognition and behavior for autistic children about definition, causes, clinical manifestation, types, risk factors diagnostic test, treatment method and nutrition program, the present study showed that there was an improvement in caregivers' cognition and behavior post-program mean scores and there were highly statistically significant differences ($P < 0.001$) between pre and immediately after program implementation. According to [26]; whofound that there were an improvement in patient knowledge, cognition and practice post-program mean scores and there were highly statistically significant differences ($P < 0.001$) in her study about effect of health education program on knowledge and practices for caregivers about autistic children among adolescents girls at Orphanage Home.

Figure (2): In the present study all studied children preferred a lot of carbohydrates and more than three quarter of children take soda drink and protein [2] supported the result in her study who foundall studied children eat a lot of carbohydrates and (64.3%) of children take soda drink in her study about study of eating habits for children with autism at Assiut city. The ideal diet of autistic children must be avoided gluten-free casein-free diet (GFCF), gluten is the protein found in wheat, rye, barley, spelt, kamut, and commercial oats, and casein, the protein found in dairy(milk and its content) and food additives and ingredients to avoid.

According to parents surveyed by Autism Research Institute, a gluten- and casein-free diet is useful for less than three quarter (65%) of children with ASD had a food sensitivity piece may or may not have revealed a response to these foods. Therefore,[24] who recommend a gluten- and casein-free trial period— often beginning the diet by eliminating first one, then the other in his study about the first step to biomedical intervention and autism recoveryautism nutrition specialist defeat autism now. Because of, The Specific Carbohydrate Diet(SCD) is considered the second most commonly carried out autism diet treatment program, and less than three quarter (66%) of parents state that, it has helpful effect for their child. It is very helpful children with inflammatory bowel conditions and chronic diarrhea, even though it can benefit constipation too ,SCD goals to decrease gut inflammation and help healing by "starving out" the bad gut bugs and avoiding carbohydrate foods that need to digesting enzymes Because of gut system of children with autism are routinely attacked bypathogenic bacteria such as clostridia, they often require specific nutrition and diet support. By eliminating problematic foods, the microbes cannot remain to feed, and they die out, [1] who stated that in her study about micro biome and nutrition in autism spectrum disorder: current knowledge and research needs.

On the same line, more than three quarters of the caregivers had unsatisfactory and negative behavior in their total scores of cognition and behavior followed by less than one quarter had satisfactory and positive behavior level preprogram intervention. While the same figure displayed that more than three quarters of the studied caregivers nearly all most had satisfactory level in their scores of cognition and behavior followed by less than one quarter had an unsatisfactory and negative attitude level post program intervention**.**In agreement with ***[27]*** who found that, nurses' knowledge scores were generally low in his study about quality of nursing care providing for preterm infants suffering from respiratory distress syndrome in Port Said. While after program implementation, the current study showed an improvement in level of nurses` knowledge and practice. This study supported by **[28]** who found an improvement in level of nurses` knowledge and practice after educational program implementation in her study about impact of educational intervention on knowledge and practice of universal precautions among at Patan Academy. The researcher stated that, the unsatisfactory and negative behavior preprogram implementation was due to lacking of workshop and training courses for the parents and satisfactory and positive behavior or an improvement post program was due to program implementation.

According to source of students' information the current study illustrated that the caregivers had more than half of their information from more than onesource and the minority having their information from friends, (figure 3). This incongruent with [29], who reported that media has a profound impact on young people's knowledge, beliefs, and attitudes related to reproductive health in his study about the need for reproductive health education in schools in Egypt. And three out of five female respondents considered their mothers as their main source of information about puberty. This may be explained that female blinded adolescents students, had

closed social relation only with friends in institute, their families, teachers, and media and supported by [2] who revealed that more than three quarters of their knowledge gaining from more than one source and the minority from mass media in her study about study of eating habits for children with autism at Assiut city.The researcher found the percentage of health team was 6%according to source of students' information aboutautism cognition andrelation between nutritional status and autism symptoms improvement educational program very low. Moreover, training program must be given to the parents, teachers and increase nurse and health care team role.

The present study showed that**,** there was highly statistically significant differences (P<0.001**) between cognition score and their socio demographic characteristics about pre and post-intervention program in educational level, residence, training courses and mother occupation. While there was no statistically significant differences between cognition or knowledge score and their socio demographic characteristics about pre and post-intervention program in father`s occupation and age in years p>0.05. More than the current study stated that there was highly statistically significant differences (P<0.001**) between behavior score and their socio demographic characteristics about pre and post-intervention program in educational level, years of experience, training courses and mother occupation, while there were no statistically significant differences (P>0.05) between behavior score and their socio demographic characteristics about pre and post-intervention program in residence and age in years**.** This finding supported by***[30]*** who found a statistical significant relation between nurses' knowledge and their level of education with p <0.001 in her study about compliance of nurses with neonatal care protocol regarding feeding in neonates ,in other hand this study unsupported by***[31]*** whostated that nurses with a diploma degree had higher performance than the bachelor degree in her study about establishing basic standards of nursing care protocol at neonatal intensive care unit. While, there was no statistical significant relation between total studied nurses' practice and their years of experience characteristics about intervention program. This would be correlated to acquiring more cognition experience through in the bachelor degrees' curriculum which educating new behavior because of positive relation between level of education and ability of acquiring newly cognition and behavior and interaction between family with autistic children and long term period of dealing with autistic children.

Regarding the correlation coefficient between total caregivers' cognition and behavior scores during pre/post discharge program implementation, the current study showed that there was a statistically significant positive correlation between students` total cognition scores after program implementation and their attitude immediately after program implementation. This finding is supported by **[32]** who found positive correlation coefficient between student total knowledge and attitude before and after counseling regarding premarital genetic counseling and their age and residence in her study about premarital genetic counseling among female adolescent students.

Moreover, according to caregivers' opinion of educational program about relation between nutritional status and autism recovery educational program, the present study result showed that more than 90% of the studied caregivers had positive opinion and satisfactory about cognition, place, time, language and discussion method of educational program.

V. Conclusion

Educational intervention had a significant role in increasing the level of cognition and behavior of relation between nutritional status and autism manifestation improvement

VI. Recommendations

It is recommended to exert more efforts in developing and applying similar educational endeavors for parents 'children with autism. These educational initiatives need to be improved periodically to ensure sustainability of their positive effects on cognition and behavior.

References

[1] Berding K., & Sharon M. D**.,**.,(2016):Micro biome and nutrition in autism spectrum disorder: current knowledge and research needs. Nutrition Reviews R Vol. 74(12):723–736

[2] Emad K. A.,, Sharkawy S.,A.,; Mobarak, A., A.,&Mohamed, N., T.(2013): Study of Eating Habits for Children with Autism at AssiutCity.Journal of American Science 2013;9(11),http://www.jofamericanscience.org.

[3] Centers for Disease Control & Prevention (2015): Community Report From the Autism and Developmental Disabilities Monitoring (ADDM) Network Prevalence of Autism Spectrum Disorders (ASDs) Among Multiple Areas of the United States in (Published December 9, 2015).

[4] Sandin S, Lichtenstein P,&Kuja-H. R.,(2014): The familial risk of autism. JAMA.;311:1770–1777.

[5] SchmidtRJ,TancrediDJ,KrakowiakP,etal.MaternalintakeofsupplementalironandriskofautismspectrumdisorderAmJEpidemiol.(2014);180:890–900.

[6] BienenstockJ,KunzeW,ForsytheP&hegut–B.,.NutrR. . 2015;73:28–31.

[7] Byrne CS, Chambers ES, &Morrison DJ, (2015):. The role of short chain fatty acids in appetite regulation and energy homeostasis. Int J Obes (London). 39:1331–1338

[8] De Angelis M, Piccolo M,&Vannini L(2013) :Fecal microbiota and metabolome of childrenwithautismandpervasivedevelopmentaldisordernototherwisespecified.PLoSOne.;8:e76993.doi:10.1371/journal.pone.0076993.

[9] Tomova A, Husarova V,&Lakatosova S. (2015) :Gastrointestinal microbiota in childrenwithautisminSlovakia.PhysiolBehav.;138:179–187

[10] Muller CL, Anacker AMJ, &Veenstra-e J.(2016): The serotonin system in autism spectrum disorder: from biomarker to animal models. Neuroscience.;321:24–41.

[11] Critchfield JW, van Hemert S,& Ash M,.(2011):The potential role of probioticsin the management of childhood autism spectrum disorders. Gastroenterol Res Pract. 161358.doi:10.1155/2011/161358.

[12] Lyall K, Van de Water J, &Ashwood P,.(2015):Asthma and allergies in children with autism spectrum disorders: results from the CHARGE study. Autism Res.;8:567–574

[13] Postorino V, Sanges V, &Giovagnoli G.,(2015):Clinical differences in children with autism spectrum disorder with and without food selectivity. Appetite.;92:126–132

[14] Sharp WG, Jaquess DL, &Lukens CT., (2013):Multi-method assessment of feeding problems amongchildren with autismspectrumdisorders.Res AutismSpectrDisord.;7:56–65

[15] Berry RC, Novak P, &Withrow N,(2015):Nutrition management of gastrointestinal symptoms in children with autism spectrum disorder: guideline from an expert panel.JAcadNutrDiet.;115:1919–1927

[16] Stewart PA, Hyman SL, &Schmidt BL,.(2015):Dietary supplementation in children with autism spectrum disorders: common, insufficient, and excessive. J Acad NutrDiet.;115:1237–1248

[17] Liu YW, Liu WH, &Wu CC.,(2016):Psychotropic effects of Lactobacillus plantarum PS128inearlylife-stressedandna¨ıveadultmice.BrainRes.;1631:1–12. 85. Savignac

[18] HM, Couch Y,& Stratford M,. (2016):Prebiotic administration normalizes lipopolysaccharide(LPS)-inducedanxiety and cortical 5-HT2A receptorandIL1-b levelsinmalemice.BrainBehavImmun.;52:120–131.

[19] Elkhzaay,R.,A.,(2012): Autism disease can be treated. Bilingual Arabic speaking communities in UK and Worldwide. Aldiyer London. Copyright © 2012. All Rights Reserved.

[20] Fombonne, E., (2003): Epidemiological surveys of autism and other pervasive developmental disorders: An update. J. Autism Dev. Disorders, 33: 365-382.

[21] Yamane, T. (1967):Statistics an Introductory Analysis. 2nd Ed. New York Harper and Row CO.USA,213

[22] Williams, P.G., Dalrymple, N. & Neal, J. (2014):A Parent's Guide to Exploring Feeding Behavior in Autism presented by Autism Speaks ATN/AIR-PAutism Treatment Network& (2000). Eating Habits of Children with Autism. Pediatric Nursing, 26 (3), 259-264.These materials are the product of on-going activities of the Autism Speaks Autism Treatment Network, a funded program of Autism Speaks. It is supported by cooperative agreement UA3 MC 11054 through the U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Research Program to the Massachusetts General Hospital. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the MCHB, HRSA, HHS. Images are copyright iStockPhoto. Published January 2014.

[23] Thomas R. F. ,&Director H., W. J., Associate Director for Science Joanne Cono, Chesley L. R., Deputy Michael F. I.,(2014):Prevalence of Autism Spectrum Disorder Among Children Aged 8 Years — Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2010Morbidity and Mortality Weekly Report.Surveillance Summaries / Vol. 63 / No. 2 March 28, 2014.

[24] Julie M.,(2016):Autism Diets: The First Step to Biomedical Intervention and Autism Recovery.Autism Nutrition Specialist Defeat Autism Now! (DAN!) Practitioner and Conference Educatoravailable at: www.prb.org

[25] Elbahnasawy H.T, &Girgis N.M. (2011): Counseling for Mothers to Cope with their Autistic Children Journal of American Science, 2011;7(7) http://www.american science.org.

[26] El-Mowafy R.,I.,MoussaM.,M.,& El-EzabyH.,H.,(2014):Effect of Health Education Program on Knowledge and Practices for caregivers about autistic children among Adolescents Girls at Orphanage HomeIOSR Journal of Nursing and Health Science (IOSR-JNHS) e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 3, Issue 6 Ver. I (Nov.-Dec. 2014), PP 48-55 www.iosrjournals.org

[27] Loutfy, A., Mohamed, A.,R., & Abed Ella N.,H.,(2014):Quality of nursing care providing for preterm infants suffering from respiratory distress syndrome in Port Said Scientific Journal of Nursing Vol 2, No 1, 12/2014.

[28] Shrestha I. (2014): Impact of Educational Intervention on Knowledge and Practice of Universal Precautions among. Nurses Journal of Patan Academy of Health Sciences. 2014 Jun;1(1):57-60

[29] Wahba M., &Fahimi F. (2012):The Need for Reproductive Health Education in Schools in Egypt, available at: www.prb.org

[30] Ahmed, S. (2013).:Compliance of Nurses with Neonatal Care Protocol Regarding Feeding in Neonates(Unpublished Master Thesis). Faculty of Nursing, Ain Shams University, Egypt. pp. 59-66.

[31] El sayed, S., Sabry, Y., Sharkawy, H., Elsayed E., & Ali, T. (2013). Establishing Basic Standards of Nursing care protocol at Neonatal Intensive care unit.Nature and Science 2013; 11(4): 86-92]. (ISSN: 1545-0740). http://www.sciencepub.net. 14.

[32] AbdElfattah,h., Soliman S.,M., &Amin F., M.,(2015): Premarital Genetic Counseling among Female Adolescents Students. J Am Sci 2015;11(6):218-225(ISSN: 1545-1003). http://www.jofamericanscience.org. 25.

SaharSedkyFaheim Nutritional Statusand AutismManifestationsImprovement:The Effect of Educational Program onCognition andBehavior for Caregivers` Children with Autism." IOSR Journal of Nursing and Health Science (IOSR-JNHS) , vol. 6, no.6 , 2017, pp. 01-13.