

# Motivational based-Toilet Training Program for the Elimination Control of Children with Autism

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## Abstract

Independent toileting is a serious functional life skill. Therefore, gaining of this skill is often late in children with autism. **Aim:** This study aimed to evaluate the effectiveness of the motivational based toilet training program on the elimination control of children with autism. **Design:** A quasi-experimental research design (one group pre/posttest) was used in this study. **Setting:** This study was conducted at both children's Psychiatric Outpatient Clinic at El-Fayoum and El-Menia University Hospitals, Egypt. **Sample:** A purposive sample that was consisted of 64 mothers and their children at the previously mentioned settings. **Tools:** Three tools were used pre/ post toilet training program. A structured interview questionnaire to assess mothers' knowledge, observational checklist to evaluate mother reported practice regarding toilet training of their children with autism and fear assessment questionnaire to assess fear of children during toilet. **Results:** The study noted that, the mean age of studied children was 5.24±1.53 years and less than two third (62.5%) of them were males and 51.6% were first ranked. A highly significant difference between children urine accident, urine in toilet, bowel movement accident and bowel movement in toilet at pre and post program with p value <0.01\*\*. Also, highly significant difference in change routine by using toilet out of home and improve toileting communication problem at pre and post program with p value <0.01\*\*. **Conclusion:** the current study concluded that application of motivational based toilet training program had significantly positive effect on the elimination control of children with autism. **Recommendations:** the study recommended that, frequent maternal training about toilet training of their children with autism based on their actual need assessment.

**Keywords:** Autism-children – Motivational program –Toilet training - Elimination Control

## Introduction

Autism is a neurodevelopmental disorder with biological, genetic, environmental and developing reasons. Mothers' experiences raising children with autism spectrum disorder (ASD) convey a complex and extremely challenging life. The ASD is a lifelong developmental disability characterized by impairment in three domains: social interaction, communication and repetitive stereotyped behavior (Gobrial & Ereny, 2015). According to The World Health Organization (WHO), (2017) ASD, a global phenomenon affecting 1 in 160 children. The prevalence of ASD has been more frequently described in children, as being 1 out of 68 children worldwide and is considered as one of the most common chronic childhood disorders (Gobrial et al., 2018). Moreover, statistics

from the King Abdul-Aziz City for Science and Technology estimated that, 1 in every 180 children in Saudi Arabia is diagnosed with (ASD) (Alshaigi et al., 2020).

Toilet training (TT) is one of the key developmental milestones of early childhood. Appropriate toileting refers to the accomplishment of various unprompted behaviors including, recognizing the need for toileting and waiting before eliminating. Therefore, other behaviors such as undressing, sitting on the toilet, using toilet paper appropriately, dressing, flushing the toilet and washing hands (Francis et al., 2017). Unfortunately, acquisition of this skill is often delayed in children with ASD. Occasionally toilet training for children with autism is connected with other behavioral difficulties, like being afraid of the toilet, successful in seats other than the toilet, satisfying the toilet

with paper and other resources, repeatedly washing the toilet. Also, children with ASD exhibiting sensory processing issues often lack bladder and bowel control (**Sutherland et al., 2018**).

Competent toileting is a critical quality of life skill which necessary for independent living. However, learning to use the toilet by appropriate way can be a real challenge for some children with autism. Consequently, it is important to recognize that, there may be a variety of different reasons why some children with autism find the acquisition of toileting skills difficult, some related to the autism spectrum and others related to specific physical difficulties, or a combination of the two. In addition to the language and communication around toileting can be confusing. Moreover, many children experience sensory differences (**Leader et al., 2018**).

Toileting is an essential daily living skill, the lack of the skill acquisition that profoundly impacts on children with autism, their families, caregivers and society as a whole. However, pediatric nurses have an essential role in supporting children with autism and their parents. Meanwhile, the most common component of toilet training programs was gradual guidance, reinforcement-based training, scheduled sittings, elimination schedules, negative reinforcement procedures, hydration, manipulation of stimulus control and night-time training for diurnal continence (**MacAlister, 2014 and Sutherland et al., 2018**).

Toilet training for children with ASD can be more challenging because they are often very attached to their routines and don't like change, so that, toilet training for them might need some special strategies such as encouragement and rewards, visual aids and supports and social stories. Therefore, Mothers play an important role in teaching toilet training for their children with autism. Also, the mothers can help in develop and carry out of toilet training program goals and objectives because they know their children best to carry their role effectively. Meanwhile, mothers must see themselves as equal partners with professionals in planning and implementation toilet training programming for their children, (**Unlu, 2019**). So, it is very important to apply motivational

based toilet training program to enhance independent toileting skills for children with autism.

### Significance of the study

Teaching toileting skills are among the most essential educational objectives for children with autism and their parents. Therefore, several studies had shown a rapid increase in the prevalence of autism spectrum disorders. Throughout the world, it was reported to be 1 in 150 children (**Posar & Visconti, 2017**). Therefore, ASD in Egypt estimated by 3 to 6 children out of every 1,000 children and males were four times more than females (**Bayoumi et al., 2017**). However, the acquisition of independent toileting skills is often delayed in children with ASD and takes longer time and effort to learn due to a variety of factors that make toilet training difficulties including physical challenges, language and communication barrier, fear over the noise and misunderstanding or misreading body cues that would otherwise let child to know they need to use the bathroom (**Ferrier, 2017**). However, understanding the reason of children's difficulties will help the researchers to focus on applying appropriate motivational strategies based toilet training to improve independent toileting skills and elimination control for them.

### Aim of the study:

The current study aimed to evaluate the effectiveness of motivational based toilet training program on the elimination control for children with autism through:

1. Assess mothers' knowledge and practice about toilet training of their children with autism.
2. Assess the toilet training problems and fear of children with autism.
3. Design, implement and evaluate motivational toilet training program on the children elimination control based on actual needs assessment of the studied children and their mothers.

**Research hypothesis:**

H<sup>1</sup>: The application of motivational toilet training program will improve mothers' knowledge and practice and will have a positive effect on the elimination control of their children with autism post program than before.

**Theoretical definition:**

- **Motivation** is the process that initiates, guides and maintains goal-oriented behaviors (Abeysekera & Dawson, 2016).
- **Autism spectrum disorder (ASD)** is a complex developmental condition that involves persistent challenges in social interaction, speech and nonverbal communication, and restricted/repetitive behaviors (American Psychiatric Association, 2018).
- **Toilet training** is the process of teaching a young child to control the bowel and bladder and use the bathroom for elimination (Johnny and Matson, 2017).
- **Elimination disorders** are disorders in which a child urinates or defecates in inappropriate places such as their underwear or on the floor (Kapalu et al., 2019).

**Subjects and Methods:****Research designs:**

A quasi-experimental research design (one group pre/posttest) was utilized to achieve the aim of the study.

**Research settings:**

The current study was conducted at both Child Psychiatric Outpatient Clinic at both El-Fayoum and El-Menia University Hospitals, Egypt.

**Sampling:**

A non-probability purposive sampling technique was used. All available total number of children with autism and their mothers sample size (64) was collected from previously mentioned settings within a period of six months from the first of June(2019) to the end of December, (2019). They were eligible for

inclusion in the study sample whenever they met the following criteria:

**Inclusion criteria;** children with autism aged from 3-12 years old from both genders were having toilet training problems and their accompanying mothers regardless their age, residence and socioeconomic standard. **Exclusion criteria;** other children who had toilet training problems due to physical or neurologic disorders in addition to children were having previous toilet training program were excluded from the study as they were having past experience of training.

**Power of study** for sample 64 according to result of improvement in toilet control is 100%.

**Tools and technique of data collection (pre/posttest):**

Three tools were used in this study to collect the data, which developed by the researchers after reviewing the national and international related literatures.

**Tool I: A structured interviewing questionnaire** was developed in a simple clear Arabic language by the researchers based on relevant studies and references Coucouvanis, 2008 and Chebuhar et al., (2013), it consisted of the following parts:

**Part I:**

- Characteristics of mothers including age, educational level, occupational and marital status.
- Characteristics of autistic children including age, gender, rank, educational level, degree of disorder, intelligent quotient (IQ) score, duration of illness and family history of autism.

**Part II:** Mothers' knowledge regarding autism which consisted of 6 close ended questions. About meaning, causes, signs and symptoms, behavior impact, psychological impact and child care. Mothers' knowledge regarding toilet training which composed of (11 items) such as; using symbol and words for toilet, using visual time table for toilet, rewarding and reinforcing. Also, knowledge regarding child ability for entering bathroom which consisted of (7 items) about child's

ability to pull pants up and down, ability to setting for 5 to 10 minutes, follow up instruction, still drying for at least two hours, have plan table for bowel movement, ability to communicate about dirty diaper and ability to communicate about his/her desire to entering toilet when full bladder and bowel. Knowledge regarding child hygienic care after toilet which included (8 items) such as hand washing and drying. In addition to, mothers' knowledge regarding toilet training problems such as: change of children routine by using the toilet out of home and problem related to children's communication by using limited expressive language to express their needs for toileting. Also, mothers' knowledge regarding weekly follow up for elimination in toilet, elimination accident, urine in toilet and urine accident to assess the rate of elimination accident and children progress in toilet training.

#### Scoring system

Each question had a score that ranged from 0 - 2 grades, whereas, correct and complete answer scored 2 grades, correct but incomplete answer scored 1 grade and score zero for an incorrect or unknown answer. Knowledge obtained from the mothers was checked with a model key answer prepared by the researchers and accordingly the score from 0 <50% referred to poor knowledge, 50 <75% referred to average knowledge while score from 75 ≤ 100% referred to good knowledge.

#### Tool II: Observational checklist pre/post program.

The observational checklist was adopted from: **Kroeger & Sorensen-Burnworth, (2009) and Ardiç & Cavkaytar, (2014)**. It was developed and filled by the researchers to evaluate mothers' reported practices regarding motivational based toilet training program for their autistic children in relation to (discussing undressing, going, wiping, dressing, flushing, hand washing) with reinforce the child's success at each step.

#### Scoring system:

Each item of the observational checklist scored done (1) score, while the not done (zero). The total score was categorized into either unsatisfactory (less than 60%) or satisfactory (60% and more).

**Tool III:** Fear assessment questionnaire to assess fear of children with autism during toilet it was adopted from **National Autistic Society, (2020)** as afraid of loud sounds, hearing the sound of water flowing, afraid of using the bathroom in different places, afraid of their parents' anger as a result of urination or dirt, afraid when changes are made in the surrounding environment and afraid of sitting on the toilet seat.

#### Scoring system:

Each item scored as yes fear took one grade and no fear took zero score, then total score categorized into severe if score >70%, moderate if score 40 - 70% and mild if less than 40%

**Administrative phase:** An official approval letter was assumed from the Dean of Faculty of Nursing at both El-Fayoum and El Menia University, to the previously mentioned settings. This letter included the aim of the study and requesting permission for the researchers to carry out the study.

#### Pilot Study:

A pilot study was conducted before starting actual field work representative 10% of the study sample including (7) mothers accompanying their autistic children. It was done to estimate the time required for filling in the tools and checking the clarity, applicability and relevance of the questions. Based on the results of the pilot study, the necessary modifications were done; the involved mothers were excluded later from the main study sample.

#### Validity and Reliability:

It was ascertained by a group of three experts; two professors from the pediatric nursing department/Faculty of Nursing/ Ain Shams University and one professor from psychiatric nursing department / Faculty of Nursing/ Cairo University, Egypt. Their opinions elicited regarding the format, layout, consistency, accuracy and relevancy of the tools. The reliability of the tools was assessed through measuring their internal consistency consisted by Cronbach's Alpha coefficient test for knowledge tool (0.869), for practice (0.842), sheet related child (0.837).

### Ethical Consideration

Approval of the studied mothers and their children with autism was obtained orally before conducting the study; the researchers explained the objective and aim of the study to each study mothers. Confidentiality of obtained personal data, as well as the respect of participant's privacy were totally ensured. A summary of the interventions was explained to every mother who voluntarily agreed to participate in the study and they were informed that they could withdraw from the study at any time without giving any reason.

### Fieldwork:

The actual field work was carried out for 6 months started from the first of June, 2019 at the end of January, 2020. The researchers visited the study settings two days per week over a 6 months period. The questionnaire and fear assessment sheet took about 25 minutes and 15 minutes for checklist to be filled by the researchers, aim of the study was explained and the oral approval to participate in the study was taken before beginning the data collection as a prerequisite to include children with autism and their mothers in the study.

The motivational based toilet training program was designed based on analysis of the actual health needs of the studied mothers and their children in pre assessment by using the pre constructed tools. The content was written in simple Arabic language and consistent with the related literatures, moreover, the researchers educated the studied mothers to know how met their children' level of understanding.

The procedure included elimination scheduled sittings at 30 minute intervals. Prior to transitioning to the bathroom, the mother would prompt the child to request the bathroom by exchanging a picture icon of a toilet. As the child progressed the picture was switched to pointing to another picture of a toilet. This was done so that the child would eventually be able to independently using the bathroom. After that took child immediately to the bathroom and delayed for 5 second. Reinforced child to pull down his pants and sat on the toilet, when his sitting time was finished the mother exposed a picture of a child

standing up. If he urinated in the toilet, praise and highly preferred reinforces were given to the child such as favorite toys. The child did not have access to these toys at any other time except during the bathroom routine.

If the child did not urinate while on the toilet, the session ended and the child was prompted off of the toilet. Toys were provided to reinforce appropriate sitting. If the child urinated in his pants the mother immediately provided a full-physical prompt for the child to request the bathroom. The child was then immediately taken to the bathroom, prompted to remove his wet clothes, and instructed to sit on the toilet. If the child finished urinating in the toilet, highly preferred reinforces were given. If he did not finish urinating in the toilet, no reinforces were given. The child was then prompted to wipe himself with a wet wipe, put his wet clothing in disposable bag. All independent attempts from the child to complete part of the toileting routine were reinforced regardless if the task was completed correctly.

The motivational based toilet training program was presented in theoretical and practical sessions. Samples were divided into small groups including 5 – 6 children with their mothers and repeated sessions included all children, each group obtained 7 sessions (2 theories and 5 practices). In addition, each child was guided by simple written instructions and then orientation about objectives, contents and expected outcomes was done.

### Theoretical part

The theoretical part was conducted through lectures and group discussions, using data show and poster as a media. It was taken in 2 sessions (each session for 45 minutes) and covered the following items; meaning of autism, causes, signs and symptoms of autism, treatments, Toilet training and toilet training problems for autistic children. Additionally, the content of this part was concerned with the practical part.

### The practical part:

The practical part was conducted through demonstration, re- demonstration and video. It was taken in 5 sessions (each session for one hour) and covered the following items

(preparation of toilet training, technique of toilet training, and hygienic care after toilet and positive reinforcement to overcome toilet training problems).

**Evaluation:**

Upon the completion of the motivational toilet training program (after one month), the post test was done for mothers to evaluate the effectiveness of the motivational toilet training program on the elimination control of their children with autism.

**Statistical Analysis:**

Data collected from the studied sample was revised, coded and entered using Personal Computer (PC). Computerized data entry and statistical analysis were fulfilled using the Statistical Package for Social Sciences (SPSS) version 22. Data were presented using descriptive statistics in the form of frequencies, percentages and Mean SD. A t-test is a type of inferential statistic used to determine if there is a significant difference between the means of two groups. A correlation coefficient is a numerical measure of some type of correlation, meaning a statistical relationship between two variables.

**Significance of the results:**

- Highly significant at p-value < 0.01.
- Statistically significant was considered at p-value < 0.05.
- Non-significant at p-value  $\geq$  0.05.

**Results:****Table (1):** Number and percentage distribution of the studied mothers according to their characteristics (n= 64).

Items	No	%
<b>age:</b>		
20:< 25	16	25.0
25 : <30	21	32.8
30: ≤40	27	42.2
<b>X±SD</b>	<b>32.45±7.21</b>	
<b>Education</b>		
Illiterate	4	6.3
Read/write	6	9.4
Basic/secondary	21	32.8
University.	<b>33</b>	<b>51.6</b>
<b>Occupation</b>		
Working.	33	51.6
Housewife.	31	48.4
<b>Marital status</b>		
Married	<b>54</b>	<b>84.4</b>
Divorced.	8	12.5
Widow	2	3.1
<b>Number of children in the family</b>		
1:<3	<b>37</b>	<b>57.8</b>
3:<5	21	32.8
5:≤7	6	9.4

**Table (1)** revealed that, the mean age of the studied mothers were 32.45±7.21 years old, more than half (51.6%) respectively of them were university education and working and (84.4%) of them were married.

**Table (2):** Number and percentage distribution of the studied children according to their characteristics (n= 64).

Items	No	%
<b>Age in years</b>		
3: < 6 years.	<b>56</b>	<b>87.5</b>
6: ≤12 years. .	8	12.5
<b>X ± SD=</b>	<b>5.24±1.53 years</b>	
<b>Gender</b>		
Male.	<b>40</b>	<b>62.5</b>
Female.	24	37.5
<b>Child rank</b>		
Frist.	<b>33</b>	<b>51.6</b>
Second.	18	28.1
Third.	9	14.1
Fourth.	4	6.3
<b>Education</b>		
Beyond the age	22	34.4
Nursery school	<b>32</b>	<b>50.0</b>
Primary school	10	15.6
<b>Degree of autism</b>		
Mild.	2	3.1
Moderate.	<b>34</b>	<b>53.1</b>
Sever.	28	43.8
<b>Intelligence Quotient (IQ)</b>		
60 : <70	2	3.1
70 : < 80	<b>42</b>	<b>65.6</b>
80 : ≤ 90	20	31.3

This table clarified that, the mean age of studied children was  $5.24 \pm 1.53$  years and less than two third (62.5%) of them were males and 51.6% were the first ranked. While, 50% of studied children were in nursery school. Regarding degree of autism, more than half (53.1) of them were moderate degree and slightly two thirds (65.6) of them had IQ ranged between  $70 < 80$  degree

**Figure (1):** Frequency and percentage distribution of studied mothers regarding their total knowledge level about toileting control of their children with autism pre and post program (n=64).

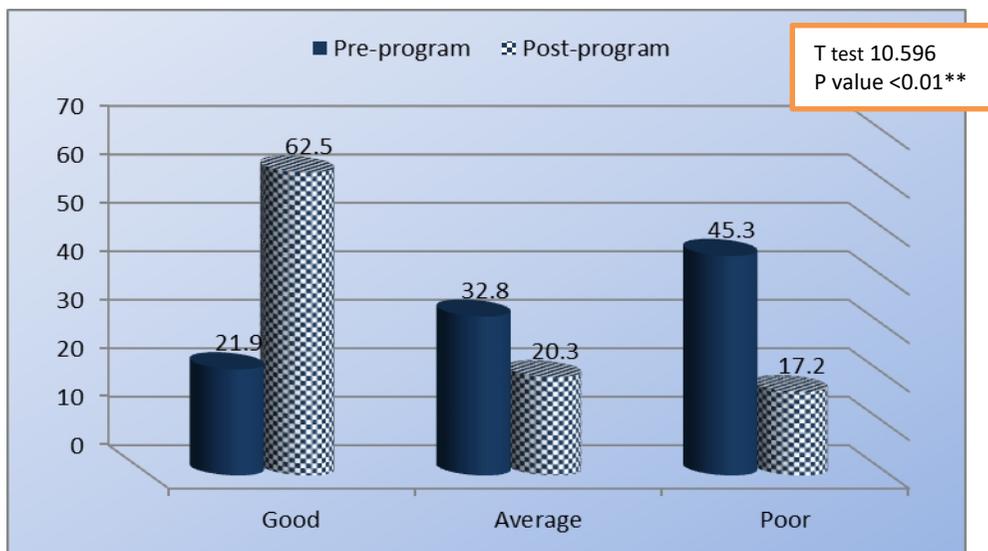
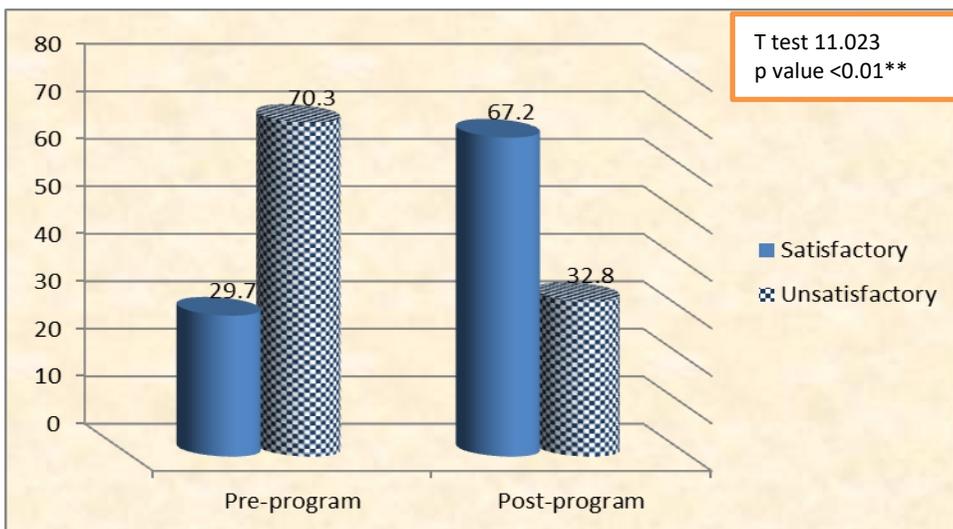


Figure (1) illustrated that, 21.9% of studied mothers had good knowledge preprogram, while less than two third (62.5%) of them improved post program.

**Figure (2):** Frequency and percentage distribution of studied mothers regarding total practices level about toileting control of their children with autism pre and post program (n=64).



Related total practice this figure illustrated that, 29.7% of studied mothers had satisfactory practice at preprogram, while more than two third (70.3%) of them improved post program.

**Table (3):** Comparison of the studied children according to rate of elimination accident progress pre and post program (n= 64).

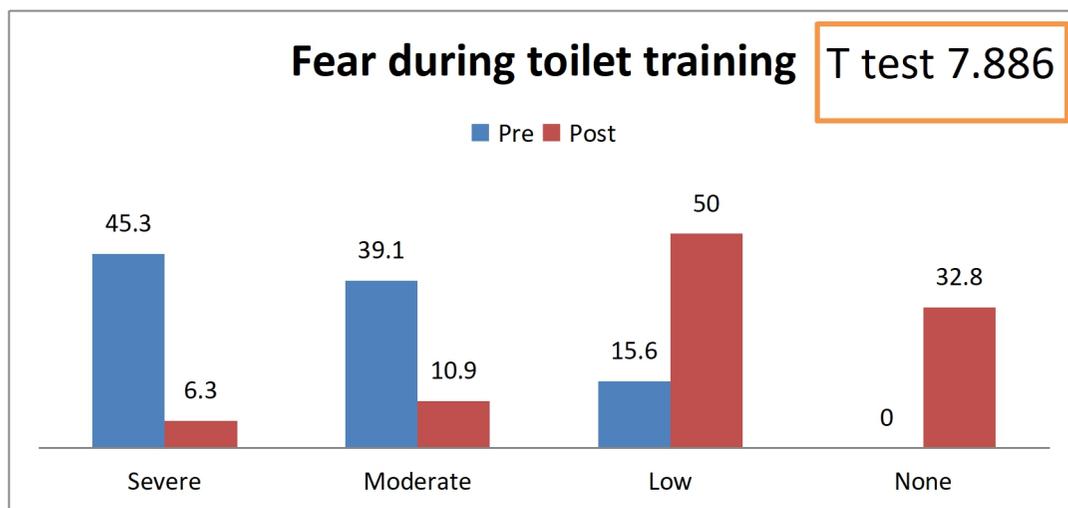
Items	Pre								Post								T test	P-value
	Week 1		Week2		Week3		Week4		Week 1		Week2		Week3		Week4			
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%		
Urine accident	48	75	46	71.9	42	65.6	37	57.8	24	37.5	19	29.7	14	21.9	9	14.1	9.255	<0.01**
Urine in toilet	16	25	18	28.1	24	34.4	27	42.2	40	62.5	45	70.3	50	78.1	55	85.9	13.005	<0.01**
Bowel movement accident	30	46.9	28	43.8	25	39.1	24	37.5	17	26.6	13	20.3	8	12.5	4	6.3	10.719	<0.01**
Bowel movement in toilet	34	53.1	36	56.2	39	60.9	40	62.5	47	73.5	51	79.7	56	7.5	60	93.7	9.118	<0.01**

**Table (3)** revealed that there was highly significant difference between the studied children urine accident, urine in toilet, bowel movement accident and bowel movement in toilet pre and post program with p value <0.01\*\*

**Table (4):** Comparison of the studied children according to their toilet training problem pre/ Post program (n= 64).

Items	Pre-program						Post-program						T test	P value
	Good		Average		Poor		Good		Average		Poor			
	No	%	No	%	No	%	No	%	No	%	No	%		
<b>Change routine</b> Use toilet out of home	0	0	19	29.7	45	70.3	31	48.4	34	53.1	6	9.4	13.647	<0.01**
<b>Toileting communication problem</b> limited expressive language	3	4.7	17	26.6	44	86.7	39	60.9	22	34.4	3	4.7	12.554	<0.01**

**Table (4)** there was highly significant difference between use toilet out of home and toileting communication problem at pre and post program with p value <0.01\*\*.

**Figure (3)** Percentage distribution of the studied children related to their fear during toilet at pre and post program (n=64)

**Figure (3)** showed that there was highly significant difference related to the studied children fear during toilet at pre and post program with t test 7.886 and p value <0.01\*\* where fear was low by 50% post program.

**Table (5):** Correlation between total knowledge and total reported practice level among the studied mothers pre and post program (n=64).

Total reported practices	Total knowledge	
	Pre program	Post program
	R	0.85
P-value	0.000**	0.000**

Table (5) clarified that, there was highly positive correlation between total knowledge and total practices among the studied mothers pre and post program with  $P= 0.000^{**}$ .

## Discussion:

Toilet training is a big step for autistic child, parents and caregivers. It can be an exciting time for parents with the thought of saving money and the child gaining independence. However, many children with autism may take longer to learn how to use the toilet. Therefore, there are many reasons such as children with ASD prefer routine and often find change very difficult, also they sometimes have sensory issues and repetitive behavior, which make transitions extremely challenging. In addition, the limited expressive language, it is not easy for children with autism to tell someone when they need to go to the bathroom (Queck, 2018). The present study aimed to evaluate the effectiveness of motivational based toilet training program on the elimination control of children with autism.

As regard characteristics of the studied mothers, the present results stated that, mean age of studied mothers were  $32.45 \pm 7.21$  years and more than half of them were university education and working, the most of them were married. These results were in accordance with the study performed by Nunen et al., (2015) who conducted their study in Belgium who study Parents' views on toilet training (TT): A quantitative study to identify the beliefs and attitudes of parents concerning TT they found that, most of the mothers were married and more than half of them were highly educated. These results were in agreement with Bahget et al., (2016) in Egypt who showed that, the mean age of studied mothers were  $30 \pm 8.09$  years and about half of them had university education. Also, this was supported by the study performed by Alshaigi et al., (2020) about Stigmatization among parents of autism spectrum disorder children in Riyadh, Saudi Arabia who stated that, more than half of studied parent were university education and the majority of them were married.

Regarding the studied children demographic characteristics, the current study revealed that their mean age were  $5.24 \pm 1.53$  years and more than half of them were male with moderate autism degree. These results were similar with the study conducted by Ibrahim et al., (2020) who study socio-economic and demographic factors associated with adaptive behavior among children diagnosed with autism spectrum disorder in Egypt and stated that, (74.4%) of children attending were males and the mean age of the sample was  $4.33 \pm 0.89$  years and 68.9% had moderate levels of autism. But, the current result was inconstant with Gobrial et al., 2018 about The Lived Experiences of Mothers of Children with the Autism Spectrum Disorders in Egypt who found that, (mean: 7.3 years, SD: 3.2 years).

In relation to total mothers knowledge level about toilet training of their children with autism pre and post program the present study detected that, there was high significant difference between pre and post program at p value  $<0.001$ . These results proved research hypothesis of the study who supposed that, mothers of autistic children who will receive motivational-based toilet training program will improve their knowledge and practices post program than before. These results supported by the study conducted by Bearss et al., (2015) about Parent Training in Autism Spectrum Disorder: What's in a Name? who reported that, program provide indirect benefit to the child by supporting the parent as caregiver and increasing parental knowledge about care of their autistic' child. Also, supported with the study by Dai et al., (2018) about A video Parent-Training Program for Families of Children with Autism Spectrum Disorder in Albania who found that, the program increased parental knowledge of behavioral strategies and self-efficacy regarding their child.

Regarding to total mothers' practice level about toileting training of their autistic' children pre and post program, the current study detected

that, slight more than one quarter of studied mothers had satisfactory practice while improved to two third post program. Findings from this study were consistent with the **Unlu., (2019)** who study Parent Implemented Program for Teaching Toileting Skills for Children with Developmental Disabilities and found that, data from the mothers of the children showed that, they practiced the skills they learned and these skills affected the performance of the children in a positive and fast way and toileting skills for families enabled mothers to acquire the skills of teaching toileting control to their children. These results may due to effective program training, using illustrative methods during program sessions and simple ways to communicate information.

According toilet training progress pre and post the motivational based toilet, the current study revealed that, there was highly significant difference between the studied children urine accident, urine in toilet, bowel movement accident and bowel movement in toilet with p value  $<0.01^{**}$ . Also, there was highly significant difference between change routine by using toilet out of home and improve communication problem at pre and post intervention with p value  $<0.01^{**}$ . These results may due to effective of training program for mothers that improve their knowledge and practice level which had significant positive effect on their children toilet training progress. These results supported with the study conducted by **Sutherland et al., (2018)** who reported that the time of dry-check intervals was extended from 5 to 15, then 30, and finally 45 minutes. After the time between dry-checks was extended. During the toilet training phase, children urine accidents were reduced to a mean of 0.5 accidents per day. They showed increases in in-toilet voids with a mean of 0.5 per day. For the last seven days of intervention they showed zero rates. Also, cohort with **Cagliani et al., (2020)** who revealed that, Classroom Based Intensive Toilet Training Treatment (ITT) had positive effect on toilet of children with ASD. While, in a component analysis, **Perez et al. (2020)** found that, ITT packages may not be necessary for some students with ASD. Also, **Greer et al. (2016)** found wearing underwear to be the most important component for toilet training packages for young children and for some, this component alone was sufficient in improving continent voids with young children.

Also, the current study detected that there was highly significant difference related to fear of children with ASD during toilet at pre and post program with t test 7.886 and p value  $<0.01^{**}$ . These results cohort with the study conducted by **Kurniawan et al., (2018)** who revealed that the ASD children show positive results for using the video game and decreasing fear level. Also, regular with **Pere et al., (2020)** who conducted study on 11 participants with ASD and found that toilet training procedures limit fear of children with ASD and enhance their toilet practice.

Regarding correlation between total knowledge and total practice among the studied mothers pre and post program, the current study showed that, positive correlation between mothers' knowledge and their practice regarding to toilet training of their children with autism. These results were in accordance with the study performed by **Bahget et al., (2016)** who clarified that, a significant positive correlation between mother's competency level of care provided to their children with autism and their knowledge and practice. The need for conducting more training programs for mothers related needs of their children with autism to increase mothers' awareness and to empower the quality of life of their children.

## Conclusions

Based on the results of the current study, it can be concluded that, the motivational toilet training program significantly improved mothers' knowledge and practice regarding toilet training and had significant positive effect on children elimination control. A highly significant difference between children urine accident, urine in toilet, bowel movement accident and bowel movement in toilet at pre and post program with p value  $<0.01^{**}$ . Also, highly significant difference in change routine by using toilet out of home and improve communication problem at pre and post program with p value  $<0.01^{**}$ .

## Recommendations

**Based on the previous findings, the following recommendations are suggested:**

- Frequent maternal training about toilet training of their children with autism based on their actual need assessment

- Further researches to empower the quality of life of children with autism.
- Simple illustrated booklets, posters and guidelines for mothers about toilet training for their children with autism should be available in each setting providing care for those children.
- Frequent maternal workshops about toilet training of their children with autism.
- Orientation to the mothers of children with autism about community resources and care settings.

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