Efficacy of Counseling Program to train Mothers on Dental Care to Improve Oral and Dental Health for their Children with Autism

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ABSTRACT:

Purpose: To estimate the impact of Mothers Training for Dental Care and providing WhatsApp educational messages as well as making online meeting on prevention of dental caries in group of autistic kids. Materials and Methods: 40 kids with autism ranging from 3 to 6 years of age from both genders were randomly assigned to a test group (n = 20) and a control group (n = 20) regarding to receiving educational messages and making online meeting: The test group included kids whose mothers received educational messages and facilitated online meetings, and control group ; whose mothers did not receive any messages or facilitated online meetings. The test group was given educational messages every 14 days via WhatsApp messages and made online meeting every month. The Visible Plaque Index (VPI), Decayed, Missed, Filled (dmf), and International Caries Detection & Assessment System (CDAS) indices were assessed at the beginning of the study, at 3, 6, and 9 months follow-ups, respectively. The Health Literacy level and dietary habits were assessed at the start and at 9 months follow-up. Results: Educational messages increased HEALS scores for mothers, enhancing oral health of kids and reducing the severity of dental caries. Conclusions: Cellphone educational messages provided through WhatsApp and online meeting through blackboard program were efficient in reducing dental caries among autistic kids and enhancing health literacy of the Mothers.

Key words: Autistic kids, WhatsApp, ICDAS, Educational messages, Health education

INTRODUCTION

Autism or ASD is a neurodevelopment disorder that has been on the rise in recent decades. A child or adult with ASD is characterized by repetitive and stereotypical behavior with reduced communication and social interactions (1,2). Kids with ASD often have difficulty with facial expressions which are different from those of their peers. Some kids with ASD may also have a general vocal capacity and a normal IQ and may attend normal schools (3). Although ASD is a disease with no known cure, early diagnosis can help kids develop communication skills. Not all autistic kids exhibit similar behaviors. Some kids exhibit abnormal language development and vision and hearing impairments (4). Others develop epilepsy or intellectual retardation (5, 6). Dental treatment for autistic kids is often accompanied by anxiety and fear, which is often expressed through challenging behaviors and challenging responses (7). Some kids with ASD develop bad oral habits, such as tongue-rusting, lip-biting, and bruxism (8,9). Some studies found that patients who had neurodevelopmental diseases tended to have increased gingival disease and caries. Dental caries causes difficulties in chewing and phonation, pain and esthetic problems, affecting a child's weight and growth. About 94 percent of kids with caries also develop caries on the permanent teeth (10,11). Numerous studies have demonstrated that kids with ASD have poor oral health compared to typical kids. This is due to a number of factors, including a lack of education in the dental community about how to improve caregiver oral hygiene for kids, barriers to dental care for kids, and attitudes and knowledge among dental professionals towards kids (12, 13). Communication between autistic kids and the dental team in the clinic can also be very challenging or limited. For instance, 40% of autistic kids are totally nonverbal. In addition to not wanting to communicate, some autistic kids do not make compensatory efforts like using gestures. In addition, some autistic kids may have some ability to speak but may not be able to speak fluently or fluently. These communication difficulties can have an impact on oral health care both in the clinic and outside of it (14, 15, 16). At home, poor verbal communication and lack of comprehension between Mothers/guardians and autistic kids can lead to issues with self-care, such as brushing or flossing teeth. This poor communication skills can also become a serious issue when the patient experiences oral pain, as they may not be

able to communicate this pain to the caregiver (18). In the dentist office, poor communication between patients and providers could be dangerous during procedures, as the patient may feel pain or be scared and unable to communicate these sensations to the provider, but may react out of anger as a result (19, 20). Therefore, dental care providers should be aware that they may need to use specific behavior management strategies, such as using visual communication tools and rewarding and behavior-forming strategies (21, 22). As dental disorders and their treatment present several challenges in this group, simple dental treatments, such as conservative and endodontic treatment, can be life-threatening (23, 24, 25). Anesthesia for autistic kids should be administered local or general, and should be performed under close supervision. Several agents, including ketamine, enfluralane, and others, have been shown to induce seizures, and are therefore contra-indicated in patients with cerebral palsy (26, 27, 28).

Recently, newer strategies were used for prevention of dental caries and conservation of tooth structure instead of disease management by restorative treatment. Strategies used to prevent caries include tooth brushing, dental flossing, fluoride application, pit-and-fissure sealants (29, 30), the use of sugar substitutes, the development of a dental caries vaccine, and the role of primary caregiver or Mothers for kids (31). The Mothers or primary caregiver plays vital role in regulating the interaction between the child and its surroundings through the dietary habits, oral hygiene and other preventive behaviors and services provided to the child (32, 33). Therefore, it is important to provide proper dental health information to Mothers. One of the ways to reduce the rate of caries/gingivitis among these kids worldwide is by educating Mothers, guardians and caregivers about the causes of dental disease and how self-care can prevent it. The lack of awareness among Mothers about oral health is largely due to the absence of appropriate oral health programs in special kids's institutions or schools. Most mothers do not know enough about oral health and their instruction aids are often outdated and inadequate (34, 35).

Many health-related apps available on smartphones and tablets, electronic mobile health interventions could help a large number of people by making information accessible even when there are no physical or human resources available. This is why electronic applications can be very useful in oral health education (36, 37, 38).

WhatsApp, one of the world's most popular smartphone apps, has more than 300 million users worldwide. Another useful program is black board which allow researchers to make awareness meeting with mothers of autistic kids. All you need is a Wi-Fi connection so that you can send free electronic messages to each other and made online meeting. WhatsApp and black board has proven to be a great tool for patients and professionals to communicate and share health information (39, 40, 41, 42). The aim of this research was to how effective Mothers training for dental care through providing mobile educational messages transmitted via WhatsApp as well as online meeting on black board on preventing the development of dental caries among their autistic kids.

Study problem:

Autistic children often have high levels of periodontal disease and dental caries. These patients present a variety of challenges when it comes to dental treatment. Recently, newer strategies were used for prevention of dental caries and conservation of tooth structure instead of disease management by restorative treatment

Study Questions

Since the field of research is one of the fields that in Arab countries is still largely confined to the specialty of dentistry, it was necessary to present a new vision about the importance of involving the topic of healthy oral and dental behavior between the psychological educational specialist and the dentist, and all those who are in direct relationship with autistic kids from Mothers, educators and others. The main focus of the present study is to answer the following questions:

1-What was the ICDAS level among autistic children in the experimental group and in the control group prior to the program being implemented with their Mothers?

2- How was ICDAS in autistic children after the program was implemented with their Mothers?

3- Is there a correlation between DMF and gender (boys vs. girls) for autistic children in both the control and study groups prior to program implementation with their Mothers?

4- Is there a correlation between DMF and gender (boys vs. girls) among autistic children in the control and study groups after the implementation of the program with their mothers?

5- What is the difference between the autistic children in the experimental and control groups in the VPI case before and after the program implementation with their Mothers?

6- What is the difference between autistic children in the experimental and control (VPI) groups in the pre-applications and after-applications with their Mothers?

Study hypotheses:

1- There were no statistically significant (a = 0.05) differences in ICDAS between autistic children in the experimental group and in the control group prior to program implementation with their Mothers.

2- There are statistically significant (a = 0.05) difference in ICDAS between experimental and control autistic children after program implementation with their Mothers.

3- No statistically significant difference in DMF (0 = 0.05) between autistic children in the control group and the experimental group. Gender (males, females) prior to program implementation with Mothers.

4- There are statistically significant differences at the significance level (0=0.05) in the health condition (DMF) between autistic kids in the control and experimental group. Gender (male, female) after implementing the program with Mothers.

5- No statistically significant differences at the significance level (0=0.05) in the case of (VPI) between autistic kids in the two groups (experimental and control) before implementing the program with their Mothers.

6- There are statistically significant differences at the significance level (0=0.05) in the case of (VPI) between autistic kids in the two groups (experimental and control) after implementing the program with their Mothers.

The importance of studying

The main reasons for this study are:

1- lack of Arab studies that focus on the oral health of people with mental health issues.

2- The need to plan oral health care programs that take into account the prevalence of these issues.

3- lack of dental clinics that provide adequate services and resources for those with special needs, in general, and the mentally ill in particular.

4-High cost of dental treatments and prosthetics, and the fact that the number of mentally ill people is increasing due to an increase in population numbers and an increase in average age.

 Terminology of study

Autism (AAD) is a neurodevelopmental disorder characterized by long-term difficulties in social communication, limited interests and repetitive behaviors. Although autism is a lifelong condition, the level of disability caused by these difficulties varies from person to person.

Dental caries, also known as dental decay, is the decay of teeth caused by acids produced by bacteria. Caries can range in color from yellow to black, and can cause pain, loss of teeth, and infections or abscesses.

Dental Plaque is a biofilm made up of microorganisms (usually bacteria, but sometimes fungi) that grow on surfaces inside your mouth. Dental plaque is initially a sticky, colorless deposit, but when it develops tartar, it often develops a brown or pale yellow color. Dental plaque can be found between your teeth, on your front and back teeth, on your chewing surfaces, along your gumline, and is one of the leading causes of tooth decay and gum disease.

Health literacy refers to the ability to access, read, comprehend, and utilize health information to make informed health choices and follow treatment guidelines.

The International Caries Detection and Assessment (ICDAs) system was created to bring the most up-to-date knowledge on the initiation and course of tooth caries into the realm of epidemiology and clinical practice. The ICDAS enables us to document the status and prevalence of tooth caries along its course.

Aim of the study

New methods have been developed for the prevention of dental caries and the preservation of tooth structure, as opposed to the treatment of disease through restorative techniques.

Method and Design:

Participants

The size of the group population was (87) autistic kids, with an average chronological age (five years and four months), between males and females. (17) cases were excluded due to problems with the structure of the jaw structure, and (4) cases required orthodontic treatment. (9) cases of delay in tooth growth, (3) cases requiring surgical intervention, and **(7) cases of advanced caries.**

Based on the previous step, the initial study group was limited to (47) cases, (26) males and (21) females. The case of a male child was excluded due to his frequent absence from kindergarten, in light of the absence sheets from the kindergarten teacher. Two cases were also excluded (Male and female "brothers" for moving to another kindergarten outside the geographical boundaries of the study due to changing their place of residence. A number of (4) Mothers of male kids participating in the experiment also apologized.

In light of the above, the final study group settled on (40) autistic kids, males and females, divided into two groups (control/experimental), each of which consists of (10) males and (10) females.

Mothers and kids were recruited using the following selection criteria: High Caries Risk Kids 3 to 6 years of age as defined in the caries risk assessment (0 to 6 year old) Kids who drink bottle with anything but water before going to sleep Kids who have had caries or restoration in the last 24 months Kids with a ICDAS score of 3 or lower (no cavities) Mothers or caregivers with a smartphone with internet connection signing a written informed consent from mothers and caregivers who already have WhatsApp and Blackboard on their devices or agreed to install them.

The equality of the two study groups in terms of intelligence and autism was verified by reviewing the kids's data in their files from the autism centers affiliated with them, which numbered (13) centers in Cairo and Giza governorates:

The following table illustrates the significance of the rank differences between the experimental and control groups in intelligence and autism. The Mann-Whitney results show no statistically significant difference between the two groups.

Table No. (1)

Results of Mann-Whitney Test for the Significance of Differences Between the Ranks of an Experimental Group and a Control Group in Intelligence and Autism Disorder

statistical variable	group	Number	Average rank	Total ranks	U	Z	Significance level
Intelligence	Experimental	20	65.4٧	1309.4	83.73	.١07٢	٠,٢11
	Officer	20	66.13	1322.6			
Autism	Experimental	20	36.78	735.6	80.92	١,٠3 8	٠,٢07
	Officer	20	36.29	725.8			

Subjects grouping:

Mothers and kids were randomized into two equal groups (n=20) based on parameters of stratification, as follows: the ICDAS index, caries risk assessment and age of kids: group I (test group): made meeting on black board as well as received educational messages via WhatsApp and group II (control group): didn't make meeting or receive educational messages.

Interventions:

Researchers made online meeting via black board every month Mothers or caregivers in the test group to explaining some instructions and preventive measures to prevent tooth decay and maintain oral and dental health, in addition they received mobile educational messages about dental caries prevention every 14 days through WhatsApp. The messages included dietary and tooth brushing tips. The messages were written in simple Arabic for ease of reading. In the test group, Mothers had to enable read verification to confirm their consent and participation. Mothers and kids were contacted for follow up at three, six, and nine-month intervals. The kids were evaluated by a trained dentist who determined their primary results and then administered dentistry prophylaxis. Decalcified surfaces were coated with fluoride varnish, and localized enamel lesions were sealed with Glass ionomer cement (ICDAS = 1, 2).

Measurements and outcomes:

Oral and dental examination for all kids was performed by a trained dentist at the beginning, 3-, 6- and 9-months follow up visits. The visible plaque index (VPI) was first calculated by examining the buccal surfaces of six primary teeth (#55, #53, #51, #71, #73 and #75). Subsequently, all teeth surfaces were cleaned then dried to evaluate dental caries using the decayed, missed, filled index (dmf) and the international caries detection and assessment system index (ICDAS)

In addition, Health Literacy Scale (HEALS) was also used to measure the health literacy of Mothers and caregivers. The HEALS scale was translated into Arabic and used on Google forms as a sheet containing 9 questions related to the skills needed to correctly absorb health information. The data were collected at the start and end of a 9-month follow up period. Mothers or caregivers were asked a series of questions

related to their kids's socio-economy and health status (Dates of birth, Gender, Education Status).

Statistical method:

SPSS version 24 was used for data management and statistical analysis. The Fisher's exact test was used to compare categorical variables. For summary of numerical data, mean values (SD), standard deviations (Medians), and ranges were used. Kolmogrov, Smirnov, and Shapiro-Woolke tests were used for the normality of data. Statistics were calculated using numbers and percentages. Independent t-tests were used to compare groups on commonly distributed numerical variables. Repeated measure ANOVAs were used for the robustness of Mann Whitney test. Bonferroni, Post hoc was used for overtime comparisons. P-values were always 2-sided. Before and after paired t-tests were compared. Statistical significance was considered to be greater than 0.05.

Results of the experimental study

The first hypothesis: which states

"There were no statistically significant (a = 0.05) differences in ICDAS between autistic children in the experimental group and in the control group prior to counseling program implementation with their Mothers." In order to know the status of ICDAS among autistic kids before applying the program to their Mothers, the arithmetic averages and standard deviations for the pre-ICDAS condition were calculated according to the difference in the levels of the study variables (n=40), treatment (control and experimental); Gender (male, female). Table 2 shows this

Table No. (2)

Explains that Arithmetic mean and standard deviation for the ICDAS among autistic kids in the pre-application for the control and experimental groups (n 40)

Sex				Group
		Control (n=20)		Experimental (n=20)
	AM	SD	AM	SD
Male	2.14	0.61	2.51	0.44
Female	2.31	0.55	2.49	0.41
Total	2.23	0.58	2.5	0.42

Table (2) shows that there are no statistically significant differences in the arithmetic means for the pre ICDAS (before applying the guidance

program) case, depending on the difference in the levels of control and experimental variables and gender (male vs. female). To validate these results, we performed a 2-way variance analysis for the arithmetic means for pre ICDAS according to the 2 variables of the study. Table (3) shows this.

Table (3)

Results of a two-way analysis of variance (ANOVA) for the arithmetic means of the (ICDAS) condition in the pre-application for autistic kids (n=40)

Variance	(TSS)	(DF)	mean square	F	Significance level
Teeth brushing method	1.703	1	1.703	7.201	0.008
Sex	0.079	1	0.079	0.339	0.571
Teeth brushing method * Sex	0.091	1	0.091	0.378	0.537
Error	9.498	36	0.541		
Total	١1.371	39			

Table (3) shows no statistically significant difference between the arithmetic means of both study variables (treatment), nor is there a statistically significant effect for either the study variable, gender, or the interaction of the study variables, treatment and gender

The second hypothesis: which states:

"There are statistically significant (a = 0.05) difference in ICDAS between experimental and control autistic children after counseling program implementation with their Mothers."

The calculation of the arithmetic mean and standard deviation for the ICDAS condition was based on the difference in the concentrations of the study variables, the control and experimental groups, and the sex (male vs. female), as shown in Table 4.

Table (4)

Arithmetic means and standard deviations for the ICDAS condition in the post-application for autistic kids in the control and experimental groups (n=40)

Sex				Group
	Control (n=20)		Experimental (n=20)	
	AM	SD	AM	SD
Male	2.44	0.57	0.51	0.31
Female	2.51	0.41	0.59	0.32
Total	2.46	0.49	0.55	0.31

Table (4) shows that there are significant differences in arithmetic mean values for the post ICDAS condition depending on the difference in the levels of the two variables (group and gender).

To verify these results and reveal these apparent differences, an analysis of variance was used accompanying the arithmetic means for the post-ICDAS condition according to the two variables of the study, and Table (5) shows this.

Table (5)

Results of the analysis of variance accompanying the arithmetic means of the (ICDAS) case for the post-application of the control and experimental group (n=40)

Variance	(TSS)	(DF)	mean square	F	Significance level
Oral and dental care	5.101	1	5.101	*50.299	0.000
Teeth brushing method	42.703	1	42.703	*414.987	0.000
Sex	0.042	1	0.042	0.429	0.507
Teeth brushing method * Sex	0.015	1	0.015	0.158	0.701
Error	0.237	35	8.296		
Total	48.098	39			

Table (5) shows that there is a statistically significant effect of the group variable at the significance level (0.05) on the two arithmetic means for the post-ICDAS condition, depending on the difference in the levels of this variable, in favor of the autistic kids in the experimental group whose Mothers were exposed to treatment, as the arithmetic mean reached For the ICDAS condition, it has a value of (0.49), which indicates an improvement in the condition of oral and dental health compared to the autistic kids in the group whose Mothers were not exposed to treatment. The arithmetic mean for her ICDAS condition was (2.46), which indicates a very weak improvement, and it can also be seen with the naked eye around the neck of the tooth in autistic kids in this group.

While it was not proven that there was a statistically significant effect for the gender variable and the interaction of the variables (group and gender) at the significance level (0.05) on the arithmetic averages for the post-ICDAS condition.

The third hypothesis: which states:

"No statistically significant difference in DMF (0 = 0.05) between autistic children in the control group and the experimental group. Gender (males, females) prior to program implementation with Mothers."

Table (6) shows this.

Table (6)

Arithmetic means and standard deviations for the health status of (DMF) among autistic kids in the control and experimental groups before applying the counseling program to their Mothers (n=40)

dental health condition	Sex	Group			
		Control (n=20)		Experimental (n=20)	
		AM	SD	AM	SD
decayed teeth	M	٥.71	٢.71	5.10	3.19
	F	5.09	3.09	٤.90	٣.01
	Total	٥.39	2.60	4.٨9	2.81
missed teeth	M	1.04	2.87	1.10	1.31
	F	1.61	١.11	١.51	1.19
	Total	1.32	2.١1	١.٢9	1.30
filled teeth	M	0.24	0.52	0.29	0.91
	F	0.68	1.41	0.88	1.90
	Total	0.45	1.04	0.60	1.46
Total (DMF)	M	5.06	٤.81	٥.51	4.٤09
	F	7.29	4.79	٦.21	٤.59
	Total	6.18	4.39	5.90	3.٨9

Table (6) shows that there are no differences appear between the arithmetic means of the pre-test DMF health status for each of the following: (cavity surfaces, missing surfaces, filled surfaces, and their sum) according to the differences in the levels of the study variables (group and gender).

To verify these results between the arithmetic means of the health status of (DMF) before implementing the extension program, for each of the decayed tooth surfaces, missing surfaces, and filled surfaces (and their sum), For their arithmetic means, a 2-way variance analysis was performed according to the two study variables group and gender, and Table (7) shows this.

Table (7)

Results of ANOVA for Arithmetic Mean for DMF in Pre-Approval for Autistic Children (n = 40)

dental health condition	Variance	(TSS)	(DF)	mean square	F	Significance level
decayed teeth	Teeth brushing method	0.029	1	0.029	0.006	0.951
	Sex	0.051	1	0.051	0.008	0.929
	Teeth brushing method * Sex	15.401	1	15.401	*3.171	0.027
	Error	267.948	36	6.798		
	Total	303.429	39			
missed teeth	Teeth brushing method	3.031	1	3.031		
	Sex	0.041	1	0.041	1.560	0.220
	Teeth brushing method * Sex	3.979	1	3.979	0.009	0.919
	Error	220.913	36	2.901	1.799	0.179
	Total	233.964	39			
filled teeth	Teeth brushing method	0.401	1	0.401	0.239	0.629
	Sex	5.298	1	5.298	3.359	0.069
	Teeth brushing method * Sex	0.069	1	0.069	0.043	0.827
	Error	62.013	36	1.601		
	Total	67.781	39			
Total (DMF)	Teeth brushing method	1.699	1	1.741	0.181	0.669
	Sex	5.409	1	5.409	0.349	0.560
	Teeth brushing method * Sex	30.019	1	70.019	*4.601	0.040
	Error	875.012	36	15.403		
	Total	953.139	39			

significant effect of the interaction of the two study variables (group and gender) at the significance level (0.05) on the arithmetic averages

of the carious DMF, while it has not been proven that there is a statistically significant effect for each of the variables (group and gender). On the same dependent variable (cavity surfaces).

It is also evident from Table (7) that there is no effect of either of the variables (group and gender) or their interaction on the rest of the dependent variables: missing surfaces, filled surfaces, and their total).

The fourth hypothesis: which states:

"There are statistically significant differences at the significance level (0=0.05) in the health condition (DMF) between autistic kids in the control and experimental group. Gender (male, female) after implementing the program with Mothers."

In order to know the health status of the DMF in the post-test for the control and experimental groups, the arithmetic averages and standard deviations for the chipped, missing, and stuffed DMF were calculated, and their sum according to the difference in the levels of the two variables of the group (control and experimental); Gender (male, female). table (8) shows this.

Table (8)

Arithmetic means and standard deviation of the health status of (DMF) on the posttest for the experimental and control groups (n=40)

dental health condition	Sex	Group			
		Control		Experimental	
		AM	SD	AM	SD
decayed teeth	M	٥.٢٩	٢.٣٩	٣.٨٠	٣.٢١
	F	٧.29	٤.٧9	2.70	1.47
	Total	٦.٣١	٣.٧٩	3.٨١	2.٦9
missed teeth	M	٧.49	١٤.٤9	٣.٦١	٦.٢7
	F	٨.٢٩	٩.٠٣	٢.٤1	٥.٨9
	Total	٧.٨٩	١١.٩٩	٣.١٩	٦.39
filled teeth	M	0.٣٣	0.٦٧	1.٦9	1.٧9
	F	0.٨٣	1.٦٧	1.99	2.40
	Total	0.٥٤	١.١٩	1.81	2.03
Total (DMF)	M	٧.01	١٢.٤١	١٤.٩٩	12.91
	F	5.82	6.99	11.91	16.39
	Total	٦.89	9.79	13.59	14.49

Table (8) shows that there are significant differences in the arithmetic mean post-hoc post-health condition of the surfaces for each decayed tooth, missing tooth, filled tooth, and total tooth, based on differences in group and gender levels.

To determine whether these differences are statistically significant, a 2-way variance analysis was performed for the arithmetic mean of the above-mentioned DMF status by the two variables used in the study, Table (9) shows this.

Table No. (9)

Results of the two-way analysis of variance associated with the arithmetic means of the health status (DMF) in the post-test for the experimental and control groups (n=40)

dental health condition	*Variance*	(TSS)	(DF)	mean square	F	Significance level
decayed teeth	decayed teeth	169.003	1	169.003	23.309*	0.000
	Teeth brushing method	49.988	1	49.988	62.013*	0.000
	Sex	0.719	1	0.719	0.502	0.501
	Teeth brushing method * Sex	8.997	1	8.997	5.539*	0.019
	Error	60.012	35	1.459		
	Total	288.719	39			
missed teeth	missed teeth	140.001	1	140.001	504.897*	0.000
	Teeth brushing method	2.039	1	2.039	6.317*	0.012
	Sex	0.703	1	0.703	1.999	0.161
	Teeth brushing method * Sex	0.019	1	0.019	0.064	0.801
	Error	16.219	35	0.319		
	Total	158.981	39			
filled teeth	filled teeth	63.984	1	113.984	86.984*	0.000
	Teeth brushing method	16.002	1	16.002	13.600*	0.000
	Sex	0.002	1	0.002	0.000	0.979
	Teeth brushing method * Sex	0.003	1	0.003	0.003	0.961
	Error	57.399	35	1.296		
	Total	137.387	39			
Total (DMF)	Total (DMF)	589.009	1	589.009	362.112*	0.000
	Teeth brushing method	15.001	1	15.001	11.007	0.000
	Sex	2.879	1	2.879	1.999	0.159
	Teeth brushing method * Sex	5.429	1	5.429	3.801	0.061
	Error	58.010	35	1.429		
	Total	670.328	39			

Table (9) shows that: there is a statistically significance effect at the significance level (0.05) of the treatment variable on the post-health status of the surfaces of each of the decayed, missing, and filled teeth, and their sum, respectively, according to appearance, in favor of the post-health status of the surfaces of each of the carious teeth, with an arithmetic mean of (3.81).), missing teeth, with an arithmetic average of (3.19), filled teeth, with an arithmetic average of (1.81), and their sum, with an arithmetic average of (13.59), respectively, according to appearance among the autistic kids who were exposed to treatment, compared to the autistic kids who were not exposed to treatment, as their arithmetic averages were (6.31), (7.89), (0.54), (6.89) respectively in order of appearance, corresponding to their previous arithmetic averages.

However, there was no statistically significant effect on DMF (missing arithmetic means) at significance level (=0.05) with the treatment variable.

As for the study variable (gender), there was no significant ($p < 0.05$) impact of gender on the arithmetic mean post-heath status of each cavity, missing and filled tooth, and total (40) tooth surfaces.

As for the interaction of the two study variables (group and gender), it was not proven that there were statistically significant effect of the interaction of the two variables (group and gender at the level of (0.05) on the arithmetic averages of the post-health status of the surfaces of each of the decayed, missing, filled, and total teeth.

The fifth hypothesis: which states

"No statistically significant differences at the significance level (0=0.05) in the case of (VPI) between autistic kids in the two groups (experimental and control) before implementing the program with their Mothers."

Arithmetic means and standard deviations are calculated based on the differences in the levels of study variables for the groups (control and experimental) and Gender (male vs. female) to determine the pre- test (VPI) values for control and experimental groups.

Table (10) shows this.

Table (10)

Arithmetic means and standard deviations for the health status of (VPI) on the pre-application for the experimental and control groups (n=40)

Sex				Group
	Control		Experimental	
	AM	SD	AM	SD
Male	1.64	0.78	1.77	0.39
Female	1.88	0.70	1.71	0.41
Total	1.76	0.74	1.74	0.40

It is noted from Table (10) that there are no apparent differences between the arithmetic averages of Plaque's pre-health status depending on the differences in the levels of the study variables (group and gender).

To verify the statistical significance of these apparent differences, a two-way analysis of variance was used on the arithmetic means of Plaque's pre-health status according to the two variables of the study, as in Table (11).

Table (11)

Results of the two-way analysis of variance associated with the arithmetic means of health status (VPI) in the pre-application for the experimental and control groups (n=40)

Variance	(TSS)	(DF)	mean square	F	Significance level
Teeth brushing method	0.000	1	0.000	0.002	0.971
Sex	0.359	1	0.359	1.091	0.299
Teeth brushing method * Sex	0.246	1	0.246	0.751	0.389
Error	16.701	36	0.329		
Total	17.306	39			

It is clear from Table (11) that there is no statistically significance effect for any of the two variables (group and gender) interacted at the level of (0.05) on the arithmetic averages of the pre-VPI.

The sixth hypothesis: which states:

"There are statistically significant differences at the significance level (0=0.05) in the case of (VPI) between autistic kids in the two groups (experimental and control) after implementing the program with their Mothers."

To determine post-test VPI levels for the control (control) and experimental (experimental) groups, arithmetic mean and standard deviation were calculated based on the difference in study group levels

(control vs. experimental) and sex (male vs. female). Table (12) shows this.

Table (12)

Arithmetic means and standard deviations for Plaque's health status in the posttest for the control and experimental groups (n=40)

Sex				Group
	Control		Experimental	
	AM	SD	AM	SD
Male	1.89	0.639	0.339	0.209
Female	1.99	0.528	0.457	0.268
Total	1.95	0.600	0.449	0.231

It is noted from Table (12) that there are apparent differences between the arithmetic means of Plaque's post-hoc health status, and for the purpose of verifying the fundamentality of these apparent differences, they were selected using the accompanying two-way analysis of variance at the significance level (5) according to the two variables of the study, and table (13) shows this.

Table (13)

Results of the two-way analysis of variance accompanying the arithmetic means of (VPI) in thepost-test for the experimental and control groups (n=40)

Variance	(TSS)	(DF)	mean square	F	Significance level
Degree of Plaque	5.359	1	5.359	63.719*	0.000
Teeth brushing method	26.299	1	26.299	332.139*	0.000
Sex	0.000	1	0.000	0.005	0.951
Teeth brushing method * Sex	0.000	1	0.000	0.001	0.981
Error	3.349	35	0.078		
Total	35.387	39			

It is clear from table (13) that there is a statistically significance difference at the significance level (0.05) between the two arithmetic means for the post-Plaque health status due to the group variable, and in favor of the autistic kids who were exposed to treatment, as their arithmetic mean reached (0.449) compared to the arithmetic mean (0.195) for those who were not exposed. For processing.

In order to know the average condition of (ICDAS) for the control and experimental groups and to know the average (VPI) and (DMF), arithmetic means and standard deviations were calculated, and table (14) show this

Table No. (14)

Post-test arithmetic mean and standard deviation for (ICCDAS), (VPI), and DMF for control and experimental groups (n = 40).

dental health condition			Teeth brushing method	
	Control		Experimental	
	AM	SD	AM	SD
ICDAS	2.39	0.46	0.51	0.29
DMF	7.67	4.29	3.31	2.49
VPI	2.01	0.57	0.47	0.21

It is clear from table No. (14) that the ICDAS status of the experimental group exceeded the ICDAS status of the control group by five times in favor of the experimental group, and the arithmetic average reached (2.39) compared to (0.51) in favor of the autistic kids in the experimental group. While the arithmetic mean for the total number of cavities, missing and filled teeth (DMF) was (7.67) compared to (3.31) in favor of the autistic kids in the experimental group, and the arithmetic average for the (VPI) case was (2.01) compared to (0.47) in favor of the autistic kids in the experimental group, as was shown by This table shows the clear differences between the two groups of autistic kids in the experimental and control groups in teeth health and (ICDAS). These differences are large and statistically significant, indicating the great success of the training program.

Discussion

Oral health care for autistic children represent very important aspect in preventing dental caries and periodontium disease which in hence overcome challenges that face dentist and autistic Kids in dental office. The current study evaluates the effectiveness of mother training on oral health care for their autistic kids via receiving educational WhatsApp massages and black board meeting on preventing development dental caries and periodontium disease. children aged 3 to 6 years old were included in the study, as it is believed that good dental habits instilled in children at an early age will remain with them for the rest of their lives.

In this study, ICDAS was used for the detection of caries due to its ability to detect any carious alternation of tooth occlusion, proximal surface, smooth surface, restoration and sealants.

This study concluded that training mothers on the dental preventive measures and following them through electronic applications as WhatsApp (via educational massages) and Blackboard (by online

meeting) increase levels of health education of mothers. Hence increase the awareness of mothers in oral hygiene of their autistic kids and their commitment to dental preventive measures decrease the caries incidence and protect periodontium from any damage, which was shown by the results of the current study. Another research showed that the use of WhatsApp Messenger to prevent oral diseases led to a significant decrease in the amount of dental plaque in the teen (43). Also education and instruction through Blackboard application consistence with Asim et al., as they have proven effectiveness of blackboard in E-learning (44).

According to the results of this study, the oral health of autistic children in the test group improved, this was reflected in the high proportion of children in the study group who had no change in their maximum ICDAS. These results are consistent with Borrelli et al., 2019, they found that educational messages positively impacted the involvement and attitudes of vulnerable groups towards (45).

The current study revealed that the ICDAS status of the control group exceeded by five times in favor of the experimental group, and the arithmetic average reached (2.39) compared to (0.51) in favor of the autistic kids in the experimental group. While the arithmetic mean for the total number of cavities, missing and filled teeth (DMF) was (7.67) compared to (3.31) in favor of the autistic kids in the experimental group, and the arithmetic average for the (VPI) case was (2.01) compared to (0.47) in favor of the autistic kids in the experimental group. It is clear that there are differences between the two groups of autistic kids in the experimental and control groups in teeth health and (ICDAS). These differences are large and statistically significant, indicating the great success of the training program and this agreed with other study (46). Therefore, it can be suggested that sending educational WhatsApp massages as well as making online meeting on Blackboard with autistic kids mother's helped reduce the number of cares in autistic kids and raised the mother's awareness of oral health.

Conclusion:

The study found that the effectiveness of counseling mothers of autistic children through WhatsApp messages and meetings on the Blackboard platform.

The study also highlighted the importance of research integration between the educational and medical role in serving people with special needs in general, and autism in particular, and the necessity of enriching the scientific library with such complementary studies.

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