Effect of Web-Based education on Mothers' Anxiety regarding Behavioral Changes among their Children with Autism during Covid-19 Lockdown

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Abstract:

Egyptian mothers with autistic children have experienced psychological harm as a result of the coronavirus pandemic 2019 (COVID-19) lockdown. Social distance prevented mothers with autistic children and their therapists from providing face-to-face assistance, preventing them from taking part in outpatient therapy, and preventing them from remaining at home. Aim: The study aimed to evaluate the effect of webbased education on mothers' anxiety regarding behavioral changes among their children with autism during the Covid-19 lockdown. Subjects and method: A purposive sample of 200 women with autistic children living in Sohag City, Egypt, participated in this study using a quasi-experimental research approach. Five tools were used in this study: A self-administered questionnaire, the Adaptive Behavior Assessment System, The ASD Behavior Inventory, The Short Sensor, and Beck Anxiety Inventory (BAI). The link to the survey using the questionnaire, the scale, and the web-based education content was sent to the participants' mothers through Facebook and WhatsApp groups. Results: More than one-third of the participants in the study displayed an increase in repeated and constrained behaviors. Before the web-based education, mothers' anxiety was high; after the web-based education, it was low. Conclusion: The web-based education has a beneficial impact on lowering mothers' anxiety about behavioral changes in their autistic children during the Covid-19 lockdown. Recommendations: By offering mothers psychological assistance, web-based education about the behavioral changes seen in autistic children, COVID-19, and its preventive strategies should be taught to all mothers.

Keywords: Anxiety, Autism, Coronavirus, Mothers, Web-based education.

Introduction

A public health emergency has been brought on by the coronavirus respiratory illness pandemic disease (COVID-19) which is extremely contagious and has spread throughout the world. Mothers and parents of autistic children are concerned about the rapid rise in confirmed cases and fatalities (Bai et al., 2020). In addition to possible increases in co-occurring mental health conditions, such as anxiety, which may affect children with disabilities by conflating measures with a disability, resulting in functional challenges, physical distancing is a significant risk factor for routine changes, loss of coping mechanisms, increased social isolation, and a lack of communication (Cassidy et al., 2020). Children with developmental disabilities are prevalent in Egypt at a rate of 33.6%, according to Seif Eldin et al. (2018). There are 800,000, says the Social Solidarity Ministry (Al-Masry Al-Youm, 2017).

Children with severe symptoms of autism may have trouble understanding what is going on in their environment, why their school is closed, or why their routines have changed. Some of them might therefore find it difficult to adapt to changes in their environment. As a result, those with autism are a more vulnerable population that needs special consideration in the context of COVID-19 epidemic prevention and control strategies (**Istituto Superiore di Sanità**, **2020**) due to the inherent characteristics of autism, such as disruption in social communication and interaction, repetitive and restricted behaviors, and interests (**Christensen et al., 2018**).

Some children find it difficult to communicate their feelings when something unexpected happens. Others may struggle with receptive and expressive communication have limited verbal or nonverbal abilities, have difficulty with perspective and/or social communication, and/or has any of these issues (Logan et al., 2017).

The coronavirus epidemic and the disruptions it has wrought in people's lives have been difficult for them to handle. According to this new study, there is disconnect between mothers' concerns and perceptions of how stress caused by the coronavirus affects their kids' mental health and well-being. Mothers are affected physically and psychologically by these variables. Most of these mothers experience anxiety, stress, and sadness (Campbell, 2020).

Changes in food habits, sleep patterns, and wake/sleep rhythms, an increase in repetitive behaviors, a rise in irritation and agitation, and a decrease in self-care are just a few behavioral manifestations of fear and anxiety (Hume et al., 2020). Additionally, autistic children spend a lot of time each day on electronic devices like televisions, tablets, and smartphones, which makes switching between activities challenging. These transitions can be particularly challenging for some persons with autism because they might be stiff and unyielding (ISS, 2020).

Stress and anxiety among mothers concerning behavioral changes suggest a higher level of concern. Mothers are more inclined to worry about the well-being and safety of their offspring, relatives, or other people. Because the coronavirus pandemic has a significant detrimental effect on children mothers are likely to be concerned about their children's behavior during the coronavirus pandemic because they have personally experienced distinct negative consequences from anxiety associated with this infection and behavioral changes throughout the pandemic (Lunna et al., 2020).

Social media is being used by more people than ever, with over 3.2 billion people using it daily. Social media play different roles based on who uses it and who doesn't, as well as on age groups and demographic groups. Social media's function is constantly changing since technological advancement is correlated with linguistic and cultural shift patterns (Statsita, 2019). Following the COVID-19 lockdown, social media has gained popularity in the healthcare industry as a way to increase communication efficiency, disseminate accurate information, and promote knowledge of support, treatments, and self-care options to raise awareness, educate, and keep track of healthrelated events (Kamel Boulos, 2019 & Cherak et al., 2020).

Prevention of infection transmission should be the main emphasis of nursing care for COVID-19. Pediatric nurses have a vital role in educating service users and carers, disseminating health information in society, and supporting the development of other multidisciplinary team members as teachers and consultants. Mothers should be instructed on proper hand washing techniques, maintaining a safe distance from others, using disinfectant substances like alcohol, not shaking hands, using tissues for mouth and nose when coughing or sneezing, and using a mask to minimize infection transmission. Mothers should receive instruction on how to persuade their kids not to touch their eyes, noses, or mouths, as well as how to properly wash their hands after coming into contact with others, sneezing, or coughing, and how to discourage them from sharing towels and washcloths (WHO, 2020).

The importance of the program for the rehabilitation of autistic children cannot be overstated. These programs concentrate on helping mothers manage their children's autism issues and improve their communication and social skills. Staying at home and closing daycare centers harm results and raise the likelihood of challenges (Chaturvedi, 2020).

Significance of the study:

In Egypt in 2020, the number of kids with COVID-19 is increasing. Mothers struggle to reconcile the requirements of their autistic children while also being concerned about the stress caused by the corona virus's impact on their wellness and behavioral changes during COVID-19 (Ministry of Health and Population in Egypt "MOHP", 2020).

One of the most efficient ways to acquire ongoing Web-based education is through WhatsApp reminders. It might facilitate the development of necessary autistic skills and information. Because WhatsApp reminder messages rely on autistic youngsters repeating and memorizing messages via images, videos, and PowerPoint presentations.

Aim of the study

The purpose of the study was to evaluate the effect of web-based education on mothers' anxiety regarding behavioral changes among their children with autism during the Covid-19 lockdown.

Research hypothesis:

Immediately following the adoption of web-based education, mothers of autistic children are expected to experience a low level of anxiety regarding behavioral changes among autistic children during COVID-19.

Subjects and Methods:

Research design:

Pre- and post-tests were used in this study's quasiexperimental research design.

Setting:

The study was conducted in Sohag City, Egypt.

Subjects:

200 mothers and their autistic children were included in the study's purposive sample to achieve its objective. A Google form spreadsheet made available in groups on Facebook and WhatsApp featured 200 women who had previously raised autistic children. All of the mothers included in the study met the following criteria for inclusion: they were educated, had internet access, were free of cognitive disease, were free of physical, mental, and chronic disease, were over 18, lived in the same home as their children, and were willing to participate in the study. The children had to fit the following criteria: they had to be between the ages of five and twelve, be of both sexes, and not have any other chronic conditions.

Tools of data collection:

The following five tools were employed in the current study: After evaluating the pertinent literature and research data, the researchers created

Tool I: a self-administered questionnaire in before and post-test formats. It had the following two components:

Part 1: The demographic data of the participants under investigation, divided into:

- Age, educational level, place of residence, employment position, autistic family history, and consanguinity were among the characteristics of the moms who were the subjects of the study.
- The children's characteristics included age, gender, educational level, and medical history, which included the child's age when autism was first recognized, how long it remained, and the severity of the disability.

Part (2): Mothers' knowledge about COVID – 19: Such as definition, mode of transmission, clinical images, complications/risks, high-risk individuals, treatment, and personal protective measures like hand washing, mask wear, alcohol use as a disinfectant, avoiding shaking hands, putting tissues on the mouth and nose when coughing or sneezing, and maintaining social distance.

Mothers were educated online via Whats App, Facebook groups, and zoom meetings about the meaning of autism and its causes, the typical age at which autism first manifests, the symptoms of autism and their impact on children, the length of treatment, the child's needs, different treatment modalities, drug side effects, and how to deal with their children.

Scoring system for mothers' knowledge about COVID-19 and rehabilitation:

For both known and unknowable responses, the percentages of mothers' overall knowledge were determined. Zero points were awarded for incorrect or unidentified responses, whereas two points were awarded for a fully correct response and one point for a partially correct response. The sum of the item scores and the total answers were divided by the number of items to produce the mean score for each knowledge area. These scores were afterwards transformed into a percentage score. If the percentage score was 60% or more or less than 60%, mothers' knowledge was deemed satisfactory. If it was less than 60%, it was deemed unsatisfactory.

B-Mothers reported practice: the optimal hand washing technique, which was demonstrated and evaluated via a video by the Whats App and the Facebook group as well as Zoom meetings. For mothers' stated practice, a scoring system was used. How to properly wash your hands that were carried out correctly received a score of 1, while those that were skipped or performed improperly received a score of 0. The total of the item scores for each region was divided by the number of items, yielding the mean score for the component. These results were transformed into percentage scores. If the percentage score was 60% or higher, the mother's practice was deemed satisfactory; if it was lower than 60%, it was deemed unsatisfactory.

<u>Tool II</u>: The Adaptive Behavior Assessment System (ABAS):

The researchers created a tailored assessment of adaptive behavior using the Adaptable Behavior Assessment System-II. The study by **Harrison and Oakland (2003)** addresses the domains of adaptive skills. Both at-home and community adaptive functioning are examined in this study. It has 232 items, each of which is rated in terms of frequency from 0 to 30 (always/almost always).

.Ten skill areas (Communication, Community Use, Functional Academics, Home Living, Health and Safety, Leisure, Self-Care, Self-Direction, Social, and Work [Work is only for individuals17]) make up the test, which is broken down into three composites: Conceptual (CON; Communication, Functional Academics, Self-Direction), Social (SOC; Leisure, Social), and Practical (PRAC; Self-Care, Home Living, Community Use, and Health and Safety) (GAC). Mean SD (10-15) for composite scores and Mean SD (10-15) for skill area scores have been established using norms (03). While the reported average internal consistency reliability estimates for skill area scales range from 0.86 to 0.93, they range from 0.95 to 0.98 for composites. All skill

area scores and composite scores for children aged 5 to 12 had a corrected test-retest reliability of.87. It is supported that age-difference sensitivities are valid (i.e., increased scores for each skill area as age increases). Strong to moderate correlations with different adaptive functioning measures point to concurrent validity.

Tool III: The ASD Behavior Inventory (ASDBI):

The ASD Behavior Inventory (Cohen & Sudhalter, 2005) is a standardized assessment tool for parents that have several subscales that address specific maladaptive or adaptive behavior types separately. The following maladaptive subscalesarousal difficulties, which evaluated hyperactivity, fears brought on by novel situations, and sleeping used in this studv. issues-were (b) Aggressiveness, which evaluated self- and other (directed aggression, as well as overall moodiness and irritability.

Tool IV: The Short Sensory Profile (SSP):

Using 38 items, the Short Sensory Profile (McIntosh et al., 1999) evaluates sensory symptoms in seven domains to determine how the child regulates sensory inputs through the sensory systems and whether behavioral and emotional responses are linked to sensory processing. In this study, just the Taste/Smell Sensitivity subscale was applied. Parents were questioned about the frequency of their kids' sensory behaviors. According to a five-point Likert scale, "always" receives a score of 0, while "never" receives a score of 4. A high frequency of dysfunctional behaviors is indicated by low scores.

Tool (V):- Beck Anxiety Inventory (BAI)

Beck et al. (1988) created the Beck Anxiety Inventory (BAI) to assess the degree and manifestations of anxiety. It has 21 questions with a total score range of 0 to 63. On a somatic, emotional, and cognitive level, it evaluates anxiety and the fear of letting go of control. The range of scores for each item was 0 to 3, with 3 being the best score that could be given. Internal consistency and retest reliability co-efficiency for Beck's first version were both 0.92 and 0.75, respectively.

Validity:

The BAI items and the revised Hamilton Anxiety Rating Scale had a moderate (.51) and a weak connection, respectively (.25). Calculating the sum of the 21 items yields the overall score. A score of 0–21 indicates mild anxiety. A 22 to 35 scale indicates moderate anxiety Severe anxiety is indicated by a score of 36 or above.

The web-based education:

After analyzing the relevant literature and considering the real needs of the moms who were the subjects of the study, the researchers created and implemented an Arabic-language web-based teaching program regarding COVID-19 and autism. Theoretical information as well as the described actual approach were covered. Theoretical material includes information on the definition, clinical picture, mechanism of transmission, diagnostic testing, therapy, and preventive measures for COVID-19, as well as mothers' awareness of autism; the description of autism and its origins, the typical age at which autism first manifests, how it affects a child, the length of therapy, the demands made of the child, the techniques used to treat them, the side effects of the medications, and how to handle their children. In the practical component that was described, the best handwashing technique to prevent the spread of infection was indicated.

Validity and reliability of the tool:

The assessment form was initially designed in English and then translated into Arabic after a thorough analysis of the literature. Before using it and delivering web-based instruction to the study's receptive mothers, five experts in the fields of pediatric nursing and mental nursing examined the tool's face validity, clarity, appropriateness, and relevance. On Cronbach's alpha test, the tool achieved an 89% reliability rating.

Ethical considerations:

Before starting the administered questionnaire, the mothers were informed of the current study's purpose in the first portion, which didn't harm or cause any difficulty. They also assured me that the information would be kept confidential and used only for research. The study was fully voluntary, the researcher told the participants, and they could withdraw at any time.

Research process:

Preparatory phase:

From the first of April 2020 to the first of April 2020, the preparatory phase began (One month). To create the tools for data collecting and producing web-based educational content, the researchers analyzed the recent and earlier literature that was accessible as textbooks, papers, periodicals, and internet searches.

A pilot study

A pilot study on 10% of the mothers was conducted (20 mothers of children with autism). It was removed from the sample as a whole. The feasibility of the research process that required modifications were tested and clarified based on the pilot study's findings.

Fieldwork:

The actual fieldwork was conducted between May 15 and May 30, 2020 (Half a month). The study was produced by the researchers using an online Google form spreadsheet. The participant mothers were given a link to a data collection tool, which contained an online survey. This link was shared in groups on Facebook and WhatsApp. The moms were provided with background information, the study aims, and anticipated results on the first page of the questionnaire.

The ABAS, ASDBI, SSP, and BAI were utilized twice, as well as the online survey. These were utilized for the first time as a pretest to gauge mothers' level of worry as well as their awareness about COVID-19, autism, and hand-washing practices. After a month, these tools were used once more as a follow-up to assess the impact of web-based education on mothers' anxiety levels over behavioral changes in autistic children during COVID-19. All inquiries and answers followed the most recent WHO recommendations.

The average amount of time needed by mothers to complete the online questionnaire, the ABAS, ASDBI, SSP, and BAI was about 30 minutes. The purpose of the current study, the elements of the tools, and instructions on how to complete the online questionnaire and scales were explained to each mother who participated in the study. After outlining the purpose of the study and providing the mothers with instructions on how to use the web-based educational information, the researchers gave the web-based education to the participant mothers in Whats App, Facebook groups, and Zoom sessions.

50-60 minute sessions, three times a week, followed by a post-test survey: Initial session: "Introduction on the purpose of the online education" was included. Give information on the COVID-19 introduction, Definition, mode of transmission, clinical examples, complications/risks, high-risk people, treatment, and personal protective measures like hand washing, wearing a mask, using alcohol as a disinfectant, avoiding hand shaking, using tissues for the mouth and nose when coughing or sneezing, and keeping social distance. Following session: Includes information on the meaning of autism and its causes, typical autism onset age, autism manifestation and impact on the child, diagnosis, length of treatment, child needs, treatment approaches, side effects of drugs, rehabilitation, and parenting techniques, as well as relaxation training as a progressive muscle relaxation technique. The third session covered "Practice COVID-19 prevention measures and relaxation training as a progressive muscular relaxation

approach." Progressive muscular relaxation was introduced through WhatsApp and Facebook groups, and the researcher asked participants to observe it. To demonstrate how to perform progressive muscle relaxation, the researcher exhibits photographs and videos. The study subjects are instructed to practice gradual muscular relaxation.

Evaluation phase: Through a link shared on WhatsApp and Facebook groups using the same pre-test methods, a post-test was administered one month after the web-based education was implemented.

Statistical analysis

SPSS for Windows, version 20, was used for both data entry and statistical analysis. To present the data, descriptive statistics were used. For qualitative variables, frequencies and percentages were used, and for quantitative variables, means and standard deviations. The ttest for differences between the two means was applied. It was thought to have statistical significance at a P-value <0.05.

Results:

Table 1 shows that 75% of the mother in the study lived in cities, 37% had a university degree, and 66% of the mothers were between the ages of 18 and 28. There was consanguinity among them (24%) and 83% of them had a poor family history of autism.

Table 2 shows that the mean age of autistic children was 7.28 ± 1.46 years and that 53% of them were between the ages of 5 and 12. 70% of them were males, 58% of them were in nursery schools, and 54% of them were children aged 5 to under 7 years. The table also revealed that 72% of the children checked between the ages of 2 and 5 were found to have autism that 60% of the children had the condition from less than one year, and 50% of the children had autism to a moderate degree.

According to their mothers' observations during COVID-19, Table 3 shows the changes in autistic children. Along with a rise in mannerisms, motor stereotypes, and verbal stereotypes, they also observed an increase in limited and repeated behaviors. When asked about behavior changes in autistic children during the COVID-19 lockdown, mothers did not detect any differences in the autonomies connected to using the bathroom, washing, or dressing themselves (F = 3.155; p =.09). The scores on the ASDBI subscales significantly increased, indicating a worsening of arousal issues, particularly in hyperactive behaviors such motor restlessness, agitation, and movement around the room, as seen in Table 3 for maladaptive and sensory disorders. (F = 48.03; p < .01), in fears induced by new situations (F =

12.62; p < .01), and in sleep regulation problems, such as difficulty falling asleep, nocturnal awakenings, and difficulty in waking up (F = 14.61; p < .01).

A significant worsening of aggressiveness was also evident, particularly in moodiness (F = 11.74; p.01), which is characterized by a child becoming frightened for no apparent reason, becoming irascible or upset, and abruptly changing his mood, and irritability (F = 25.85; p.01), which is characterized by tantrums and difficulty being pleased. But no significant changes were observed in the Self- and Other-Directed Aggression Subscales (hitting, scratching, and biting themselves or others). Parents did not detect any appreciable changes in their children's taste or smell sensitivity scores on the Short Sensory Profile.

According to large increases in the proportion of autistic children who "frequently" had issues with all four of the hyperactive subscale items (**Table 4**), concerns were raised concerning anxiety brought on by unfamiliar circumstances and issues with sleep management as the percentage of autistic children who "frequently" had trouble going to sleep and waking up sharply increased. The proportion of autistic children who "frequently" showed issues in moodiness and irritability items also grew noticeably, particularly when it came to feeling afraid without cause and dramatically changing one's mood.

Table (5) shows that 75% of mothers had insufficient knowledge about autism before the adoption of web-based education, but 94% did so one month later, and their knowledge of the researched subjects significantly improved (P>0.05).

After obtaining web-based education, mothers were more likely to rate their practices as 92% satisfied and 5% unsatisfied than they were 20% satisfactory and 80% unsatisfactory previously, as shown in **Table (6).** When the reported practices' mean scores were (23.4 ± 57.1) before training and (58.5 ± 62.3) after one month, the difference was statistically significant (P 0.05).

Figure 1 from the study revealed that 73% of the mothers experienced severe anxiety, 21% had moderate anxiety, and 6% had light anxiety in response to changes in the behavior of their autistic children during COVID-19.

Table (7) shows substantial differences in average BAI scores between autistic children before and after web-based education for COVID-19, with a p-value of 0.001.

Table (8) shows a substantial relationship between the mother's level of anxiety and their general knowledge both before and after getting web-based education (P 0.05).

According to **Table (9)**, behavioral changes in autistic children during and after web-based education were associated with anxiety mean scores SD among the mothers who were the subject of the study ($r=0.05^*$). This was true for all demographic factors. Compared to before their web-based education, the mothers in the study reported much less anxiety.

Table (1): Frequency and percentage distribution of the studied mothers regarding their demographic characteristics (n=200)

Demographic characteristics	N=200	%
Age(years):		
18->28		
28-38	132	66.0
>38	58	29.0
Mean and SD(28.3±2.1)	10	5.0
-Educational level:		
Postgraduate	10	5.00
Bachelor's degree	74	37.00
Technical Institute	54	27.00
Secondary school diploma	62	31.00
- Working status:		
Working	144	72.00
Not working	56	28.00
-Residence		
Urban	150	75.00
Rural	50	25.00
Consanguinity		
Yes	48	24.0
No	152	76.0
Family history of Autism		
520		

Positive	34	17.0	
Negative	166	83.0	

Table (2): Frequency and percentage distribution of the studied children regarding their demographic characteristics (n=200)

Demographic characteristics	No	%
Age		
• 5->7	108	54.0
• 7-> 10	70	35.0
• 10-12	22	11.0
Mean± SD 7.28±1.46		
Gender		
Boys	140	70.0
• Girls	60	30.0
Educational class		
Nursery	116	58.0
• School-age	84	42.0
Age (in years) when autism discovered		
• 1	36	18.0
• 2->5	144	72.0
• >5	20	10.0
Duration of disease (in years)		
• <1	120	60.0
• 1-5	66	33.0
• >5	14	7.0
Degree of autism		
• Mild	70	35.0
Moderate	100	50.0
• Sever	30	15.0

Table (3): Relation between the scores averages of the ABAS-II self-care subscale, the ASDBI subscales, and the SSP

Test	Subscale	Pre	Post	F	Р
ABAS-II	Self-Care	1.3	2.4	3.155	.09
ASDBI	Hyperactivity	2.1	2.5	48.03	< 0.01
	Fear of New situations	0.5	0.7	12.62	< 0.01
	Sleep Regulation Problems	0.5	0.8	14.61	< 0.01
	Moodiness	0.6	0.7	11.74	< 0.01
	Irritability	0.7	1.8	25.85	< 0.01
	Self-Directed Aggression	1.9	2.8	0.215	.64
	Other-Directed Aggression	0.6	0.9	3.184	.08
SSP	Taste/Smell Sensitivity	2.3	4.7	3.253	.08

* Statistically significant differences

Table (4): Relation between response rates regarding the ASDBI subscales

Subscale	Item	Answer	Pre	Post	Chi- square	Р
Hyperactivity		N/A	39.4	62.7		
Restless	S/t	24.6	37.7	20.71	.001	
		Oft	1.9	36.9		
	Fidgets	N/A	35.8	64.7		
		S/t	35.8	37.7	11.64	.01
		Oft	0.0	32.4		
	Climbs on furniture	N/A	67.9	72.5	78.19	.001

		S/t	15.4	18.7		
		Oft	12.4	18.2		
		N/A	48.4	62.5	53.54	.001
	Wanders around room	S/t	28.2	35.7		
		Oft	4.8	25.9		
	Becomes upset when things don't	N/A	82.7	88.7	32.41	.001
	occur at their usual times	S/t	9.6	11.2		
		Oft	2.7	6.4		
	Desists allowed from and activity to	N/A	46.2	57.3	60.39	.001
	Resists changing from one activity to	S/t	33.8	37.6		
Fear of New	another	Oft	7.4	18		
Situations		N/A	68.4	79.5	61.50	.001
-	Becomes upset when owning schedule	S/t	15.7	20.7		
	or order of the routine is changed	Oft	4.9	11.3		
	Desists shanging own lagstion in the	N/A	69.8	83	63.91	.001
	Resists changing own location in the	S/t	12.8	17		
	room	Oft	6.4	11.3		
		N/A	68.3	88.7	19.70	.001
	Falling problems asleep	S/t	8.5	14.4		
		Oft	1.7	17.8		
		N/A	67.2	81.3	50.77	.001
01	Awakens one or more times at night	S/t	12.5	15.7		
Sleep D:cc		Oft	6.4	15.7		
Difficulty		N/A	74.3	87.7	62.26	.001
regulation	They Awaken unusually and stay	S/t	7.8	12.6		
	awake early the rest of the day	Oft	4.7	11.3		
		N/A	86.4	95.7	11.28	.01
	Difficulty awakening in the morning	S/t	3.1	7.7		
		Oft	0	4.9		
		N/A	83.6	92.4	38.68	.001
	Becomes fearful for no reason	S/t	9.8	11.5		
Maalin		Oft	0	4.9		
woodiness		N/A	92.7	97.5		
	Cries for no reason	S/t	1.4	4.9	ns	
		Oft	0	1.7		

Continued Table (4):

Subscale	Item	Answer	Pre	Post	Chi- square	Р
	N/A	84.8	86.3			
	Angry for no reason	S/t	6.4	7.9	N	ls
		Oft	4.8	7.9		
		N/A	67.7	76.3	56.10	.001
	The shift in mood quick		18	18		
		Oft	4.9	14.4		
		N/A	37.3	64.6	34.21	.001
	Cranky	S/t	32.1	35.6		
		Oft	6.2	25.6		
		N/A	69.7	79.4	53.00	.001
	Difficult to please	S/t	15.8	15.8		
Innitability		Oft	4.7	14.7		
Innaointy	Talvas a lang tima ta salm daym when	N/A	71.3	77.9	67.02	.001
	Takes a long time to cann down when	S/t	15.8	15.8		
	upset	Oft	6.4	12.6		
		N/A	50.9	67	32.61	.001
	Easily frustrated	S/t	28.7	30.4]	
		Oft	4.9	20.7		

Note: ASDBI: Autism Spectrum Disorder Behavior Inventory; N/A: Never/Rarely; S/t: Sometimes; Oft: Often.

* Statistically significant differences

		No =				
Total Knowledge of mothers	Pre		Post		X 2	p-value
	No	%	No	%		_
Unsatisfactory	150	75.0	12	6.0		
Satisfactory	50	25.0	188	94.0	95.33	< 0.05*
Mean ±SD	13.8±7.7 32.7±8.3					

Table (5): Effect of the web-based education implementation on the total level of knowledge among studied mothers during COVID-19

Significance at <0.05 levels

Table (6): Effect of the web-based education implementation on the total score of care of autistic children performed as reported by mothers during COVID-19

		No =				
Total practices of mothers	Pre		Post		X 2	p-value
	No	%	No	%		
Unsatisfactory	160	80.0	16	8.0		
Satisfactory	40	20.0	184	92.0	51.8	<0.05*
Mean ±SD	23.4±57.1		58.5±62.3			

*Significant p <0.05



Figure (1): Frequency and percentage distribution of the studied children according to their BAI levels (n=200)

Table (7): Pre- and post-web-	based education tot	al means scores o	of mothers' anxiety	y regarding
behavioral changes in autistic chi	ldren during COVID	-19.		

BAI Average Scores	No =	=(200)	X 2	p-value
	Pre	Post		
BAI Average Scores	38.61 ± 14.52	23.74 ± 11.52	19.68	<0.001*

*Significant p <0.001

Table (8) Association between mothers' BAI average scores and their total level of knowledge pre and post-web-based education (No-200)

		Pre				Post				p-value
BAI level	Satisf	Satisfactory		actory	Satisfactory		Unsatisfactory		Λ2	
	No=	%	No=	%	No=	%	No=	%	26.0	<0.0001*
BAI average level	44	22.0	156	78.0	122	94.0	8	6.0	- 36.9	<0.0001
0	1					1				1

*statistically significant difference

Mothers' characteristics	BAI Mean+SD		
	Pre	Post	p-val
Mother age:			
- 18->28	37.54 ± 3.50	20.14 ± 1.63	< 0.0
- 28-38	36.61 ± 3.40	22.73 ± 1.12	
- >38	35.70 ± 1.15	21.84 ± 1.12	
-Educational level:			
- Postgraduate	36.70 ± 1.13	22.84 ± 1.11	<0.0
- Bachelor's degree	39.54 ± 3.50	20.13 ± 1.40	
- Technical Institute	37.62 ± 3.70	30.13 ± 1.50	
- Secondary school	37.83 ± 1.14	31.86 ± 1.16	
- Working status:			
- Not Working	34.62 ± 3.62	23.14 ± 1.62	< 0.0
- Working	36.83 ± 1.13	21.85 ± 1.14	
- Residence			
- Urban	36.60 ± 2.63	24.13 ± 2.64	< 0.0
- Rural	38.80 ± 1.14	25.85 ± 1.11	
Consanguinity			
• Yes	39.50 ± 3.40	20.14 ± 2.33	< 0.0
• No	34.70 ± 1.14	21.84 ± 1.17	
Family history of Autism			
• Positive	38.73 ± 3.45	24.17 ± 2.74	<0.0
• Negative	33.83 ± 1.13	21.66 ± 1.11	

Table (9) the relationship between the examined mothers' demographic data and their BAI Mean+SD before and after receiving web-based education. (N=200)

Discussion:

The current study's findings showed that web-based education was successful in lowering mothers' anxiety about behavioral changes in autistic children during COVID-19 following installation.

According to the current study, approximately two-thirds of the mothers were between the ages of 18 and 28, and they were all unemployed. This may be related to the fact that mothers of children with ASD must spend more time with them to meet their needs rather than choosing to work. Children with ASD require specific care.

The mothers of autistic children claim that during COVID-19, changes in autistic children took place. Increases in limited and repetitive behaviors, mannerisms, motor stereotypes, and vocal stereotypes were among these alterations. When it comes to behavioral changes in autistic children under COVID-19 confinement, the mother did not report any alterations in autonomy like toilet usage, washing, or dressing. The same claim and finding were reported by **Magda et al. (2020)**, who also made this observation.

Regarding the maladaptive and sensory issues that were reported in this study, the scores on the ASDBI subscales significantly increased, indicating a worsening of arousal issues, particularly in hyperactive behaviors like motor restlessness, agitation, moving back, and anxiety brought on by novel environments. This might be because there aren't any established routines; during the lockdown, regular activities like school and counseling helped the parents manage their children's behavior.

In this study, the scores of the ASDBI subscales were significantly higher, indicating a worsening in arousal difficulties, particularly in hyperactive behaviors like motor restlessness, agitation, moving back, and anxiety produced by novel surroundings. This study also reported maladaptive and sensory problems. This might be a result of the absence of established patterns; during the lockdown, routine pursuits like school and therapy assisted them in maintaining parental control over their children's behavior (Golberstein et al., 2020).

The findings of the present study revealed a significant increase in aggression, notably moodiness; the children begin to become frightened for no apparent reason, begin to cry or become furious, change their moods abruptly, and act out. This is due to the youngsters having to quickly learn new coping mechanisms, such as social isolation and full-time living with their parents, as a result of the abrupt change in daily routines.

According to the study's findings, the majority of mothers were very concerned about behavioral changes in autistic kids during COVID-19. The COVID-19 pandemic, routine-interfering social exclusionary practices, and lack of access to resources like hospitals and rehabilitation centers all contribute to this.

According to the current study, the use of web-based education improved the BAI average scores for behavioral changes among autistic children during COVID-19. These findings are consistent with those of Walsh et al. (2013), who discovered that providing mothers of autistic children with educational support and a stress reduction program was effective in lowering their stress levels (McIntyre and Brown 2018). The current research revealed a strong relationship between the researched mothers' anxiety and their general level of knowledge following the adoption of web-based education (P <0.05). This demonstrates the benefit of providing web-based education.

The current study discovered a highly statistically significant relationship between all demographic factors and the mothers who were studied's anxiety mean scores SD during COVID-19 regarding behavioral changes in autistic children, as well as a decline in anxiety among the mothers who were studied following the implementation of web-based education. (r= $<0.05^{*}$). Before the web-based instruction, the moms who were the subjects of the study were more stressed on average when they lived in rural locations. This may help to explain why mothers are more stressed when their autistic children begin to show symptoms during COVID-19 and why rural areas have different values, cultures, and beliefs. It may also help to explain why mothers in urban areas find it challenging to reach a health facility, facility for rehabilitation, or hospital. A significant correlation between the moms' stress levels and their jobs was also found. This may be because working mother often leaves their children with ASD unattended for long periods while they are at work, and since these children also need particular care, their concern for their children when they are alone at home grows.

Gao et al. (2020) claimed that web-based education was very beneficial for mothers and was associated with decreased levels of anxiety, and the results of the current study supported their claim. The results of a study by Sharma et al. (2020) on psychological and anxiety/depression level assessment among quarantine persons during the COVID-19 outbreak, which indicated anxiety among mothers during the COVID-19 outbreak, are also compatible with this conclusion.

Conclusions:

The study's findings showed that mothers' anxiety about behavioral changes in autistic children during coronavirus pandemic outbreaks was successfully reduced by web-based education. Children with autism were more likely to exhibit repetitive activities, motor restricted and restlessness, sleep disturbances, irritability, and dysregulation after contracting the mood coronavirus. In addition, before the introduction of web-based education, mothers' anxiety levels were high; but, after its implementation, they began to decline. After the web-based education was put into place, there was a highly statistically significant difference in mothers' knowledge of and anxiety over behavioral changes in autistic children during coronavirus pandemic outbreaks. The webbased education has a positive effect on reducing mothers' anxiety regarding behavioral changes among their children with autism during the Covid-19 lockdown.

Recommendations:

1- Web-based education regarding behavioral changes of children with autism, COVID-19, and its preventive measures should be taught to all mothers by providing psychological support for them.

2- Pediatric nurses should enroll autistic children in the intervention program and educate the mothers during counseling and rehabilitation sessions with the mothers about the importance of having contact with professionals, whether online or in person.

2- The Sohag Governorate should host workshops and educational activities for both educated and illiterate mothers during COVID-19, as well as offer parents appropriate and continuous training in child care.

3. The media should provide psychological assistance to help mothers become stronger during the epidemic of disease to prevent mental health difficulties.

4- All mothers of children with ASD should get booklets that provide adequate information about COVID-19 and its preventive measures.

5- To generalize the results to a wide population, the study can be applied to a big sample in a different setting.

6- Pay close attention to mothers' anxiety to spot their mental problems and help them in the time of behavioral changes of their autistic children.

Limitations of the study:

First, the researchers were unable to conduct inperson interviews with the mothers, which was a drawback of the current study. To prevent infection transmission and implement a state of lockdown, the study online-based questionnaire method was employed during the coronavirus pandemic epidemic. As a result, a biased sample of mothers who only had internet access and were educated was included in the online study, which did not accurately represent and reflect all mothers.

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