

## Effectiveness of Intervention Guidelines on Mothers of Children with Attention Deficit Hyperactivity Disorders

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### Abstract

**Background:** Attention-deficit hyperactivity disorder (ADHD) is one of neurobehavioral conditions that affect children most frequently. Mothers of children with ADHD frequently experience elevated stress levels, poor life quality, lower levels of maternal satisfaction, and confusing child behaviors that make them feel harshly disciplined. **The aim** of this study was to evaluate the effectiveness of intervention guidelines on mothers of children with attention deficit hyperactivity disorders. **Subject and Methods:** A quasi-experimental research design with pre-post and follow-up evaluation for one group was used in this study. **Sample:** This study was carried out on 150 mothers and their children who have been diagnosed with ADHD. **Settings:** This study conducted at the child psychiatric outpatient clinics at El-Fayoum & Zagazig University Hospitals, El-Tarbia El-Fekryia Schools and Development Referral Centers at El-Fayoum City as Sondos Academy, Ibny and Together Centers. **Tools:** The tools used to collect data are: I. Structured interviewing sheet, II. Mothers' knowledge questionnaire, and III. A self-reported practices checklists. The intervention guidelines involved 10 sessions. **Results:** There was highly statistical significant difference regarding mothers' knowledge and their reported practices before, immediately after, and at following-up phases of intervention guidelines implementation on children having ADHD. **Conclusion:** The intervention guidelines were effective in improving mothers' knowledge and reported practices regarding their children with attention deficit hyperactivity disorders. **Recommendation:** Continuous training for mothers having children with ADHD. Also, further studies will be needed to evaluate the effect of intervention guidelines on the mothers' coping, quality of life (QOL), mothering satisfaction, psychological well-being to enhance their knowledge, attitudes, and practices in improving their children's outcomes.

**Key words:** Intervention Guidelines, Mothers, Nursing, ADHD, Children.

### Introduction

Attention-deficit hyperactivity disorder is one of the most prevalent behavioral and psychiatric diseases in children. It is identified by the primary symptoms of inattention, hyperactivity, impulsivity, and easily becoming distracted from crucial tasks, mood swings, impaired executive function, and restlessness with early onset (*Wolraich et al., 2015*). Long before children begin school, some mothers observe impulsivity, hyperactivity, and inattention in their toddlers. But because children developed at different rates and have very different personalities, temperaments, and different levels of energy, it's helpful to get a professional's judgment on whether the behavior is suitable for the child's age or not.

The multidisciplinary team members that are most frequently trained in this field are typically pediatric developmental/behavioral doctors, behavioral neurologists, child psychiatrists, and psychologists, as well as specialized nurses (*Barkley, 2016*).

Whereas mothers have an exceptional role in ADHD children's controlling as the primary caregivers for their children, therefore, mothers' training is a means through which, social and psychological help can offered. It involves working with mothers to improve their caregiving behaviors using the intervention guidelines in order to increase positive outcomes in their children's care and treatment (*Bögels & Restifo, 2013*).

Furthermore, demands and mothering for ADHD child are a huge responsibility and imposes severe burden on mothers. So, the nurses must put into practice these intervention guidelines that are matched with the needs of mothers who have busy live, to assist them in becoming adequately aware of their own stressors and emotional reactivity, to increase their capacity to respond to their children's unplanned and stressful situations with skills, patience, compassion, and wisdom, and to cope with the numerous stressors associated with raising an ADHD child (*Brink & Koster, 2018*).

Additionally, these intervention guidelines can be a useful tool that supports mothers through a very stressful period for them and their families by encouraging them to stop and be in the moment rather than wishing something different was happening or thinking about tomorrow (*White, 2014*). In the light of this, creative instructions and guidelines may provide mothers dealing with the stress of having a child diagnosed with ADHD with an active coping mechanism and facilitate mothers' adaptation to the condition of the child and its most likely outcomes. Additionally, acceptance of their child's case has the potential to fundamentally alter the dynamic between mothers and their children and is frequently linked to decrease their levels of anxiety, fear, and worry (*Williams et al., 2015*).

Overall, the intervention guidelines can help mothers to enhance their attention, emotional, cognitive, and physiological processes. They can also help mothers increase their ability to self-regulate in the face of their children's demanding behaviors and change dysfunctional patterns in their behavior. As a result, mothers may be better able to understand that ADHD is a persistent and widespread condition by learning open, nonjudgmental techniques to pay attention to their children. Acceptance entails recognizing the truth of the situation, admitting the limits of one's ability to influence it, and taking action that is possible (*Carlin, 2017*). Therefore, this study aimed to evaluate the effectiveness of intervention guidelines on mothers of children with attention deficit hyperactivity disorders.

#### **Significance of the study:**

Mothers of children with ADHD have reported higher levels of stress, lower levels quality of life, and poor maternal satisfaction which increase the child's confusing behavior that causes severe motherhood (*Shata et al., 2014*). Furthermore, ADHD is a lifelong disorder, so, when the child transitions from childhood to adolescence and adulthood, inadequate management could have a negative impact on functional results. Children with ADHD display a variety of negative long-term psychosocial impact if they are not treated (*Amaravathi et al., 2019*). Because the condition frequently occurs with other conditions like disobedience and anxiety symptoms, its treatment and management are crucial (*Balagan & Tarroja, 2020*).

The prevalence of ADHD in children is between 3% and 4 % worldwide (*APA, 2013*). However, Egypt has a 20.5% prevalence rate for ADHD (*Aboul-Ata & Amin, 2015*). Boys are three times more likely than girls to have ADHD, which affects 3% to 11% of children or more. More than half of children with ADHD who were diagnosed in their early years continued to exhibit these symptoms throughout adulthood, which affects 2% to 9% of school-age children (*Solan et al., 2020*). According to World Health Organization (WHO), mental disorders are to rise by 50% in 2020 and are one of the chief causes of morbidity in children. Among, 6.5% to 7.9% of Egyptian primary school students were reported to have ADHD (*EL-Gendy et al., 2017*). Furthermore, *Young et al., (2016)* added that, the current literature does not provide the appropriate intervention, guidelines, randomized control trials, and treatment techniques for ADHD children that are based on the evidence and supports offered to their mothers. Children having ADHD face difficulties in multiple areas of functioning at school, in play, in social activities, and in family interactions. Mothers of ADHD need to know and apply a variety of management strategies. Mothers need to be prepared to provide care for those children effectively, understanding disease-specific symptoms, effective interventions to this disease, and the educational requirements of children with ADHD and their parents provide the foundation for the implementation of effective

treatment (*El-Azzab, Osman & Khashbah, 2006*).

So, the researchers carried out this study to enhancing pediatric and psychiatric nurses' role, because nursing guidelines for preventive interventions of psychological health problems are crucial for successful caring for the future well-being of the children, mothers, and families. Moreover, intervention guidelines can help mothers to notice painful thoughts, and uncomfortable emotions, increase their awareness to anxiety and worries when they arise, bring self-compassion, and increase attention regulation to increase satisfaction feeling.

#### **Aim of the study:**

This study aimed to evaluate the effectiveness of intervention guidelines on mothers of children with attention deficit hyperactivity disorders through:

1. Assessing mothers' knowledge and practices about ADHD before implementing the intervention guidelines.
2. Planning intervention guidelines for mothers having children with ADHD.
3. Implementing the intervention guidelines for mothers of children with ADHD.
4. Evaluating mothers' knowledge and practices about their children with ADHD after implementing the intervention guidelines.

#### **Study Hypotheses:**

1. Mothers of children with ADHD will gain high knowledge scores immediately post intervention guidelines implementation more than before.
2. Mothers of children with ADHD will gain high scores in their reported practices immediately post intervention guidelines implementation more than before.

#### **Subject and Method:**

**Design:** A quasi experimental research design with pre-post assessment for one group of mothers and their children was utilized. A cause-and-effect relationship between an independent and dependent variables is

identified using this sort of research design, where people are divided into groups according to non-random criteria and observed before and after the interventions (*Creswell, 2012*).

**Settings:** This study was conducted at the child psychiatric outpatient clinics at El-Fayoum and Zagazig University hospital and El-Tarbya El-Fekrya Schools and Development Referral Centers at El-Fayoum City as Sondos Academy, Ibny and Together Centers. These clinics provide services for children suffering from psychiatric disorders.

**Sampling type:** A non-probability purposive sampling techniques utilized to achieve the aim of the study.

**Sample:** The study sample consisted of 150 mothers and their children, who have been diagnosed with ADHD at outpatient clinics of the previously mentioned settings and recruited entirely during the study period (6 months from March 2022 to August 2022).

#### **Inclusion criteria:**

Mothers consistently accompany their children during receiving their medication regimen. Children aged from 5-12 years and diagnosed by physicians with ADHD from both sexes.

#### **Exclusion criteria:**

Children suffering from any other disorders (e.g., mental retardation, epilepsy, cerebral palsy, autism, and psychosis).

**Subject size:** A total of (150) mothers having children with ADHD were selected according to the following statistical formula, the sample size is determined by the statistical formula  $n = [2(Z/2+Z)^2 p(1-p)] / (p1-p2)^2$  where  $p$  = pooled proportion (percentage of event in group 1+ proportion of event in group 2)/2,  $p1-p2$  = difference in the proportion of events in two groups, and  $Z\alpha/2$ .  $N$  is the minimum sample size required for each group.

#### **Tools of data collection:**

The tools used in this study are three as the following:

- I. A structured interviewing sheet, which developed by the researchers after reviewing the related literature (*Abd-*

*Monem et al., 2018; Ali, 2019 and Jasem & Delpont, 2019*). It included two parts and used to evaluate the following:

(A) Children's characteristics as age, sex, education, birth order, degree of ADHD, and duration of disease.

(B) Mothers' characteristics as age, education, and occupational status, family history of ADHD, and sources of mothers' information.

II. Mothers' knowledge questionnaire: It was used to assess the studied mothers' knowledge about ADHD (pre/post and follow-up tests): It was developed by the researchers after reviewing the related literature (*Dodangi, Vameghi & Habibi, 2017; Young et al., 2016; and Solan et al., 2020*). It used to evaluate the main concepts in ADHD and includes 10 open-ended questions, about the definition, incidence, types, causes, signs & symptoms, diagnostic tests, criteria of ADHD child, complications, medical treatment, and nursing role. The same form of this questionnaire was given out three times (pre, post, and at one-month following-up the intervention guidelines implementation) for the same mothers' group. Alpha Cronbach's reliability test result for the questionnaire was 0.84.

**Knowledge scoring system:** Knowledge content was divided into 10 questions and each question was allocated to three score levels, 2 for complete and/or correct answer, 1 for incomplete correct answer, and 0 for don't know or wrong answer. The scores were added up, and the total scores were classified as either satisfactory (70 % or higher) or unsatisfactory (less than 70%) from the total score (20).

III. A self-reported practices checklists (pre/post and follow-up tests): Adopted from (*EL-Nagar et al., 2017 and Shattla et al., 2021*). The checklists form was consisted of eight checklists, which filled-in to evaluate mothers' reported practices about their children with ADHD as hygiene, elimination, nutrition, wearing clothes, control of tantrum, control of hyperactivity, making school tasks and interacting with friends & classmates.

**Practices scoring system:** Each step was allocated into two score level, which are, 1 for done step, and 0 for not done. The scores were added up; the total score was classified into competent (70% and more) and incompetent (< 70%) from the total score as the following: hygiene (15 steps) and total score = 15; nutrition (7 steps) and total score = 7, wearing clothes (15 steps) and total score = 15, control of tantrum (13 steps) and total score = 13; and control of hyperactivity (7 steps) and total score = 7, making school tasks (7 steps) and total score = 7; interacting with friends & classmates (15 steps) and total score = 15. The checklist's Alpha Cronbach's reliability test equals 0.86. The practices total score equals 64.

#### **Tools Validity:**

A jury group made up of seven experts from the academic and clinical nursing and medical fields tested and evaluated the tools for their face and content validity in order to determine whether they met the criteria for the reliability of the data collection tools and the intervention guidelines booklet. Five professors from various fields, including pediatric nursing, and medicine, community health, psychiatric mental health nursing, as well as two experts in rehabilitation and special needs centers, were present.

#### **Tools Reliability:**

The tools' internal consistency and construct validity were examined for reliability by calculating Cronbach's alpha coefficient, and it was found to be high. Cronbach's alpha is 0.84 and 0.86.

#### **Field Work:**

Mothers of 150 children having ADHD were allocated into ten groups; each group includes 15 mothers. Mothers were individually questioned by the researchers to get their informed consent to participate in the study and to explain its goals and methods. All mothers received a total of ten sessions once a week for three months, 45-60 min per session. The development of the intervention guidelines took place in a collaborative approach using a variety of techniques, including role playing, vignettes, brain storming, and illustrations. However, the study was carried out from data collection, implementation phase to guidelines

evaluation phase in 6 months from March 2022 to August 2022. Finally, evaluating the effect of the intervention guidelines was performed immediately post and at one month after completion of the guidelines' implementation using the pre-test tools.

**Ethical consideration:** When conducting the study, all relevant ethical considerations were taken into account, the Ethics and Clinical Research Committee, Faculty of Nursing; Zagazig University provided ethical permission to conduct the study. Participants' confidentiality and privacy were respected, and it was made clear to them that taking part in the study was entirely voluntary and that they could stop at any time. Additionally, mothers' voluntary informed consents to participate in the study were obtained.

**The intervention guidelines:** According to the needs and deficiencies of the mothers as determined by the pre-test assessment results, the researchers defined their objectives and contents. It aims to enhance mothers' practices, real knowledge, and understanding of their children's illness and management in order to help them manage their children's daily needs more effectively and skillfully.

#### **The intervention guidelines phases:**

These intervention guidelines were put into action, in four stages that followed one another: assessment, development, implementation, and evaluation.

#### **I. Assessment phase:**

A pre-intervention guidelines assessment was performed using the pre-constructed tools for data collections from the previously mentioned settings. This phase was aimed at assessing mothers' knowledge and reported practices regarding their children with ADHD.

#### **II. Development phase:**

The intervention guidelines were developed based on actual mothers' needs assessment about ADHD in their children.

Improving knowledge and practices of mothers according to their children's needs.

**The Intervention Guidelines contents:** It included:

A hand out was developed for mothers of ADHD children to help them be able to care for their children with ADHD. The researchers wrote the content of the intervention guidelines in Arabic in accordance with the related literature and the mothers' level of understanding.

In theoretical and practical sessions, the intervention guidelines were provided. Ten small groups of the subjects were formed, each group having 15 mothers, to include all mothers. There were ten sessions for each group of mothers (5 theoretical and 5 practical), they were given clear instructions before receiving an orientation regarding the purpose, contents, and anticipated results.

**First:** The theoretical sessions were presented into five sessions (each session for 45-60 minutes). Sessions were conducted in the form of lectures/discussions and covered the following items: Definition, incidence, types, causes, signs and symptoms, diagnostic tests, criteria of ADHD child, complications, medical treatment, and nursing role for caring of the child with ADHD, in controlling of tantrums, and hyperactivity.

**Second:** The five sessions of the practical part, which lasted 45 to 60 minutes for each, covered the following topics: hygiene, urination, nutrition, dressing appropriately, controlling tantrums and hyperactivity, creating school assignments, and interacting with friends and classmates. These topics were demonstrated and then repeated using role-play, simulators, real objects, discussions, and brainstorming. The researchers effectively communicated their findings through PowerPoint presentations and posters. After the intervention guidelines were put into place, mothers were given the intervention guidelines handouts as a resource.

#### **The Intervention Guidelines Objective**

#### **The intervention guidelines construction:**

- Contents of the intervention guidelines were written in the simple Arabic language by the researchers, consistent with the related literature and mothers' level of understanding.
- The intervention guidelines were discussed in theoretical and practical sessions. Ten small groups of 15 mothers in each were formed, with sessions being repeated to incorporate all the mothers. Ten sessions were held with each group (5 theories and 5 practices). Additionally, each mother was given clear instructions before orientation on the goal, contents, and anticipated results were completed.
- Mothers were instructed to call the researchers if they needed any advice.
- Evaluation for the effect of intervention guidelines on the studied mothers using the pre-constructed tools as follows:
  - Post-test was done after immediate implementation of the intervention guidelines.
  - Following up test one month later by using the same tools.

### III. Implementation of the intervention guidelines:

Implementations of the intervention guidelines were conducted in the previously mentioned settings as the following, at the beginning of the first session, an orientation of the intervention guidelines and its purpose was presented. Mothers were divided into 10 groups and each group involved 15 mothers approximately. Each session began with a summary of the information presented in previous sessions and the goals of the current topic, taking into account the use of simple language to meet the level of education of the mothers. Also, each session ended with a summary of its contents and the mothers' feedback.

The intervention guidelines were carried out through four sessions, the time of each session ranged from 45-60 minutes according to mothers' needs and the condition of the group. The theoretical component of the intervention guidelines was presented over the course into five sessions in the form of lectures

and conversations, and was then followed by the practical part also in five sessions of demonstration and re-demonstration using role-play, a simulator, actual objects, discussions, and brainstorming. PowerPoint presentations and posters were employed by the researchers as information-conveying tools. The intervention guidelines handouts were offered to mothers as a resource for use after implementation of the intervention guidelines.

### IV. Evaluation phase:

The evaluation phase was done immediately after implementation of the intervention guidelines and at one month following-up by comparing changes in mothers' knowledge and reported practices regarding ADHD before and after implementation of the intervention guidelines.

### Statistical Design:

The Statistical Package for Social Sciences (SPSS), version 22, was used to organize, sort, tabulate, and analyze data that were gathered. Using numbers, percentages, means, standard deviations, t-tests, and the Chi-square ( $\chi^2$ ) test, they were displayed in tables and charts. The level of significance was considered at  $p < 0.001$ .

### Results

**Table (1)** portrayed the characteristics of the studied mothers. It indicated that, 48% of mothers their age  $>30$  years with a mean age  $26.3 \pm 2.8$  years. Regarding the level of education, 40% of mothers had secondary education. As regards mothers' occupation, 78% of mothers were housewife and 80% of them were married, 70 % reside rural area and all of them (100%) had a negative family history of ADHD.

**Table (2)** Showed that, 62% of the studied children's age, ranged from 6-12 years, 74% of children were males and 78% of them were in schools. As regards the order of birth, 60% of children were the first child in their families and 50% of them having a mild degree of ADHD. Also, the duration of disease was two years in more than half of children (65%).

**Fig. (1)** Illustrates that the sources of mothers' information about ADHD in their children were the other families with ADHD child which constitute (35%), followed by the health care team (25%), then mass media (22%), and the least sources were their friends (18%).

**Table (3)** presented the distributions of mothers according to their knowledge about ADHDs throughout the intervention guidelines phases. There were highly statistical significance differences immediately after, post and at following-up phases regarding all items of mothers' knowledge about their children with ADHDs than before intervention guidelines implementations.

**Fig. (2)** described the total knowledge scores of mothers, 90% of them had an unsatisfactory level of knowledge before the intervention guidelines, which improved for 88% to have satisfactory knowledge level immediately after the intervention guidelines. Also, it showed that, 80% of the studied mothers had a satisfactory level in their total scores of knowledge in the following-up phase of intervention guidelines, with highly statistical significant differences.

**Table (4)** Mothers' reported practices about ADHDs in children throughout the intervention guidelines phases. It was showed that, highly statistical improvements in mothers' reported practices immediately after and at following-up phases of intervention guidelines implementation as regards all practices items about ADHDs in their children.

**Fig. (3)** Illustrated the mothers' total reported practices scores, 85% of mothers had incompetent level of practices before the implementation of the intervention guidelines, which improved for 85% of them to have competent in their practices' scores immediately post intervention guidelines implementation. Furthermore, the same figure showed that, 70% of studied mothers had adequate level in their total practices' scores in the following-up phase of intervention guidelines with highly statistical significant differences.

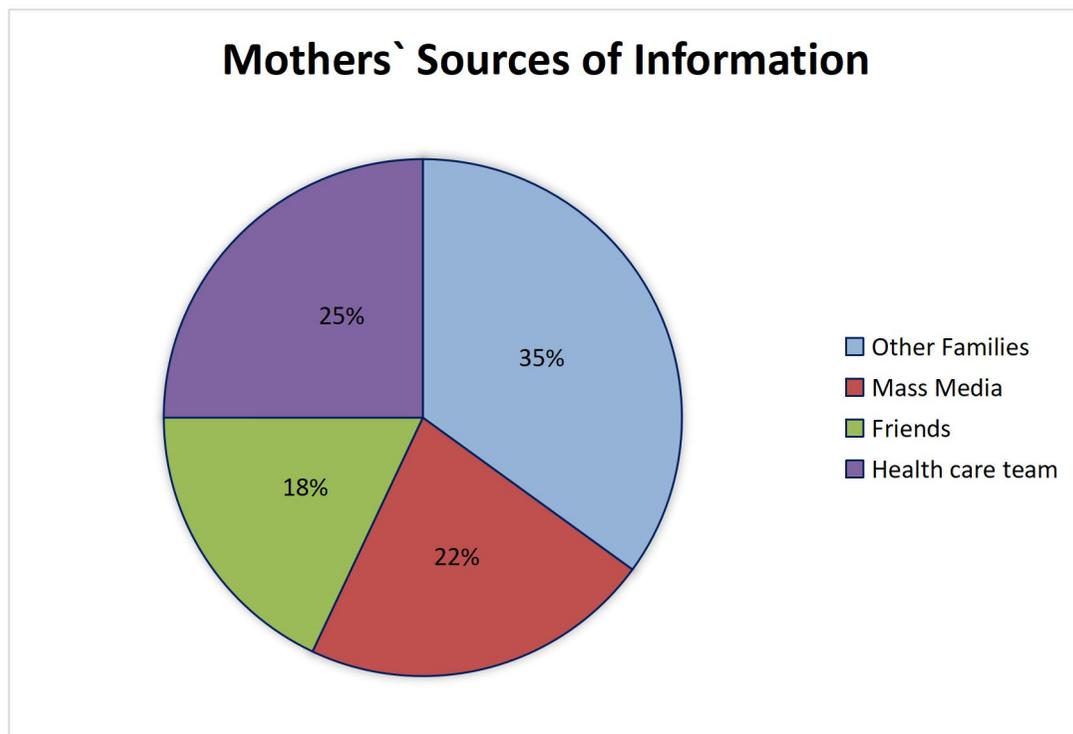
**Table (5)** showed that a highly statistical significant positive correlation between knowledge scores, practices scores with mothers' age and educational level at the post and follows up phases of intervention guidelines implementation ( $P < 0.001$ ). As well as, statistically significant positive correlations were found between knowledge and practices and mothers' occupation, and residence at the pre, post and follows-up intervention guidelines implementation phases ( $P < 0.05$ ).

**Table 1.** Characteristics of Studied Mothers having ADHD Children (n=150)

Mothers' characteristics	No.	%
<b>Mothers' Age</b>		
<20	30	20%
20-30	48	32%
>30	72	48%
M±SD	26.3± 2.8	
<b>Mothers' Educational Level</b>		
Illiterate	9	6 %
Read and Write	12	8%
Primary	39	26%
Secondary	60	40%
University	30	20%
<b>Mothers' Occupation</b>		
Working	33	22%
Housewife	117	78%
<b>Marital Status</b>		
Married	120	80%
Divorced	21	14%
Widow	9	6%
<b>Residence Area</b>		
Rural	105	70%
Urban	45	30%
<b>Family History of ADHD</b>		
Positive	0	0%
Negative	150	100%

**Table 2.** Attention Deficit Hyperactivity Disorder Children Characteristics (n=150)

Characteristics	No	%
<b>Age/years</b>		
< 6 Years	57	38%
6-12 Years	93	62%
M±SD	7.23±1.8	
<b>Sex</b>		
Male	111	74%
Female	39	26%
<b>Child Education</b>		
Nursery	33	22%
School	117	78%
<b>Order of Birth</b>		
First	90	60%
Middle	45	30%
Last	15	10%
Only	0	0%
<b>Degree of ADHD</b>		
Mild	75	50%
Moderate	45	30%
Severe	30	20%
<b>Duration of Disease</b>		
One year	27	18%
Two years	96	65%
Three years	18	12%
Four years	9	5 %

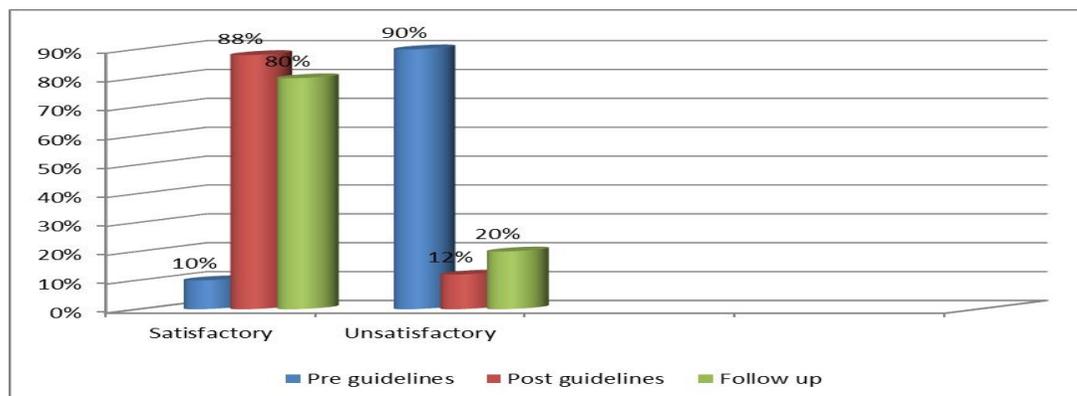


**Fig 1.** Mothers' Sources of Information about ADHD in Their Children (n=150)

**Table 3.** Mothers' Knowledge about ADHD throughout the Intervention Guidelines Phases (n = 150).

Mothers Knowledge about ADHD	Pre-guidelines		Post-guidelines		Follow-up	
	Satisfactory	Unsatisfactory	Satisfactory	Unsatisfactory	Satisfactory	Unsatisfactory
	%	%	%	%	%	%
Definition	5.0	95.0	88.0	12.0	85.0	15.0
Incidence	10.0	90.0	90.0	10.0	85.0	15.0
Causes	37.0	63.0	96.0	4.0	95.0	5.0
Types	5.0	95.0	88.0	12.0	85.0	15.0
Signs and symptoms	35.0	65.0	88.0	12.0	85.0	15.0
Diagnostic tests	10.0	90.0	90.0	10.0	85.0	15.0
Criteria	5.0	95.0	88.0	12.0	85.0	15.0
Complications	10.0	90.0	90.0	10.0	85.0	15.0
Medical treatment	20.0	80.0	90.0	10.0	88.0	12.0
Nursing role	30.0	70.0	95.0	5.0	92.0	8.0
<b>T-test</b>	$X^2_1 = 16.6$ pre-versus post-guidelines $X^2_2 = 24.5$ pre-guidelines versus follow-up $X^2_3 = 14.8$ post-guidelines versus follow-up					P value $< 0.001^{**}$

**\*\*** Highly statistical significant correlations ( $P < 0.001$ )

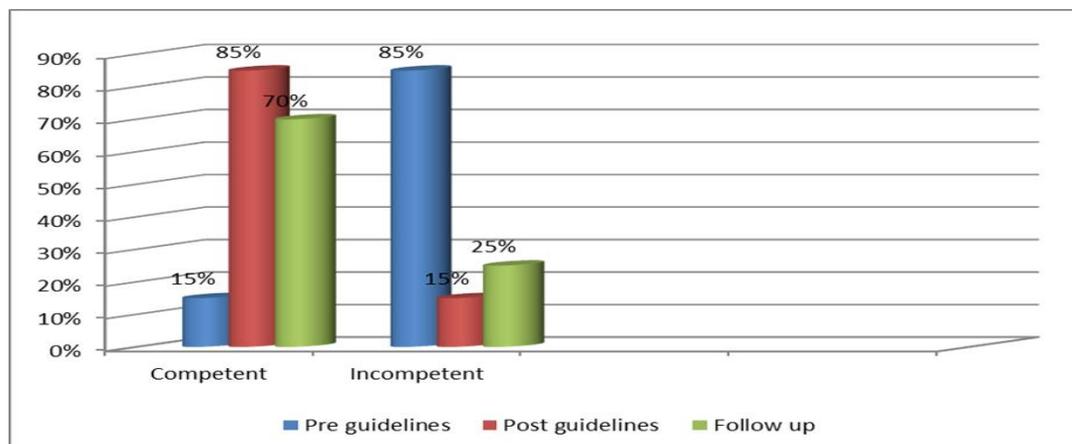


**Figure 2.** Total Knowledge Scores of the Studied Mothers about ADHD in Their Children throughout the Intervention Guidelines Phases (n = 150).

**Table 4.** Distributions of Mothers’ Reported Practices about ADHDs in Children throughout the Intervention Guidelines Phases (n = 150).

Mothers’ reported Practices	Pre-guidelines		Post-guidelines		Follow-up	
	Adequate	In adequate	Adequate	In adequate	Adequate	In adequate
	%	%	%	%	%	%
Hygiene	12.0	88.0	80.0	20.0	87.0	22.0
Elimination	11.0	89.0	75.0	25.0	75.0	25.0
Nutrition	75.0	25.0	96.0	4.0	96.0	4.0
Wearing clothes	10.0	90.0	90.0	10.0	85.0	15.0
Control of tantrum	8.0	92.0	85.0	15.0	82.0	18.0
Control of hyperactivity	28.0	72.0	94.0	6.0	92.0	8.0
Making school tasks	12.0	88.0	90.0	10.0	85.0	15.0
Interacting with friends & classmates	25.0	75.0	94.0	6.0	92.0	8.0
<b>T-test</b>	$X^2_1=28.2$ pre-guidelines versus post-guidelines $X^2_2= 56.2$ pre-guidelines versus follow-up $X^2_3= 24.4$ post-guidelines versus follow-up					P value < 0.001**

\*\* Highly statistical significance correlations (P< 0.001)



**Fig. 3.** Total Mothers' Reported Practices Scores about ADHD in Children throughout the Intervention Guidelines Phases (n = 150).

**Table 5.** Correlations Coefficient between Mothers' Total Knowledge Scores and their Reported Practices about ADHD at (Pre, Post & Follow-Up) Phases and their Demographic Characteristics (n=150).

Variables		Age		Education		Occupation		Residence	
		r	P	r	P	r	P	r	P
Knowledge	Pre-intervention guidelines	0.72	<0.05	0.248	0.001	0.40	<0.05	0.70	<0.05
	Post intervention guidelines	0.544	0.001	0.145	0.001	0.142	<0.05	0.041	<0.05
	Follow up	0.451	0.001	0.364	0.001	0.72	<0.05	0.152	<0.05
Practices	Pre-intervention guidelines	0.22	<0.05	0.42	<0.05	0.21	<0.05	0.031	<0.05
	Post intervention guidelines	0.433	0.001	0.405	0.001	0.64	<0.05	0.130	<0.05
	Follow up	0.232	0.001	0.224	0.001	0.25	<0.05	0.52	<0.05

\* Statistical significant ( $p < 0.05$ ) \*\* Highly statistical significant correlations ( $P < 0.001$ ).

## Discussion

Attention deficit hyperactivity disorder is a neurological syndrome which results in troubles with self-regulation, appears in the form of inattention, hyperactivity and impulsivity. These characteristics often appear in childhood and diminished during adolescence and disappeared by adulthood (*Johnston, 2018*).

ADHD is noticed in primary school children early; and this can give a chance for early diagnosis and early treatment. Mother is the most dynamic member of the team to provide diagnosis, management, and support services for child having ADHD. So, their exclusive skills and training were significant in supporting children's families in the hospital, school, and community. Children having ADHD are the most important stressors for their mothers and resulted in problems in mother-child relation. Therefore, this study aimed to evaluate the effectiveness of intervention guidelines on mothers' knowledge and practices on their children with ADHD. In addition, mothers dealing with a child having ADHD needing different approaches and practices. The current study hypothesized that the mothers who received the intervention guidelines would have high knowledge and better practices about ADHD than before.

Concerning mothers' sources of information about ADHD, the present study results revealed that, other families and health care team were the sources of information for about two-thirds of the

studied mothers. This result is supported by *Myrold and Wagner, (2015)* who found limited resources of information for caregivers of young children with disabilities, especially for children with ADHD, as he found that, the most common sources of information for 65% of mothers having ADHD children was the internet. *Al-Mohsin et al., (2020)* add that the first member in the family to request advice was the mother and the cause for the first visit to the ADHD clinics was poor social skills. But the current study finding is in contrast to the result of *Dodangi et al., (2017)* who mentioned that, the most common source of mothers' information about ADHD was TV. From the researcher point of view, the current study result reflected the needs of mothers to intervention guidelines and health education programs that could bring significant improvements in mothers' knowledge and practices about ADHD problems, so communication with mothers is a necessary factor in solving ADHD demands.

About mothers' knowledge regarding ADHD, the current study' results revealed that the mothers' knowledge before intervention guidelines implementation were poor. This may be related to that most mothers are ignored, and shy to asking for details about their children illness resulting in closed communities. This is supported by *Al-Mohsin et al., (2020)* who reported that 50% of mothers having ADHD children had poor knowledge regarding ADHD. Moreover, *Dodangi et al. (2017)* added that

mother with ADHD children are extremely ignorant and may have false beliefs. Similarly, *Ali (2019)* stated that teachers had a poor level of knowledge about ADHD in general.

Meanwhile, *EL-Nagar et al., (2017)*, stressed on that, ADHD is one of the serious problems that present in each community and mothering ADHD child required different knowledge, approaches, learning about ADHD, and need to have support and guidance in caring for their children. Also, can prevent complications by appropriate awareness and good knowledge of the mothers and communities, also early intervention improves the quality of care outcomes.

Improving mothers' knowledge was the major goal of the present study that help to gain more experience and more support. *Balagan and Tarroja, (2020)* illustrated that, the most urgent needs of mothers are to learn more about ADHD and developed their parenting abilities; as a result, a psycho-educational programme on parenting, self-management, and ADHD awareness is offered. In addition, these children require more care and direct supervision than normal children so, mothers require adequate experience in dealing with that case and more work has to be done by nurses to assist mothers of children with ADHD (*Abd El-Moneam et al., 2018*).

In evaluating the total scores of mothers' knowledge about ADHD, the majority of them had unsatisfactory knowledge before the intervention guidelines implementation. However, they have satisfactory knowledge immediately post and at following-up phases of intervention guidelines implementation. This may be attributed to that, after hearing about the guidelines interventions, mothers became interested in the information because they understood how dangerous the disease was, especially for children, so their information actually improved. Furthermore, *Shattla et al., (2021)* stated that after the implementation of protocol about ADHD, there was a statistical significant improvement in mothers' knowledge and practice when caring for their children. Consequently, *Abd El-Moneam et al., (2018)* mentioned that a psycho educational programme for mothers and their children with ADHD showed enhancement in mothers' knowledge, behaviors, and attitudes.

Additionally, *Zaki, (2013)* confirmed that about eight of caregivers their knowledge were good before program, whereas they improved to more than one-third post-program implementation. Moreover, low maternal knowledge generally might result in incorrect diagnosis or management of this common and significant disease and requires further interventions in terms of educating mothers about the disorders in media, especially on TV (*Dodangi et al., 2017*). From the researchers' point of view the progress in mothers' knowledge regarding their children with ADHD was the chief aim of the study and this reported improvement indicated that the research hypothesis regarding knowledge was achieved.

Concerning mothers' reported practices, the result of this study showed that there were highly statistical significance differences in mothers' practices immediately post and at following-up phases of guidelines implementation. This improvement may be related to that, the mothers cooperated with the researchers' guidelines and obtained correct and repeated training from them. In agreement with this, *Shata et al., (2014)* reported that there were significant changes in the total mean scores of mothering practices regarding ADHD children following a psychosocial intervention.

Additionally, the study conducted by *Shattla et al., (2021)*, reported that mothers' knowledge, practice, and children's symptoms all improved after receiving the protocol for mothers of children with ADHD. As they taught how to gently dealing with their children and encouraged to help them in making their daily life activities Mothers have an active role in helping their children and caring for them effectively. So, training mothers about practices related to ADHD are very important.

In addition, the current study showed that there were improved in the daily living activities such as hygiene, elimination, nutrition, and wearing clothes post intervention. What's more, there was a statistical significant improvement in control of tantrums, hyperactivity, and doing homework after mothers' education and during follow-up. The increased mothers' perception and awareness of practices related to ADHD may be related to that after guidelines there were enhancing better interactions with mothers and

their children and the mothers provided with confidence about effective care providing. In support to this result *EL-Nagar et al., (2017)*, mentioned that children with ADHD are dependent on their mothers to assist and caring in their daily life activities and mothers find it difficult to dealing with their children, therefore, the importance of improving mothers' practices provides them with experience in caring for their children.

On evaluating the relation between total scores of mothers' knowledge with their characteristics, the study result revealed that there were statistical significant positive correlations between total scores of mothers' knowledge and educational level pre, post, and at following up phases of guidelines implementation. These findings were consistent with *Dodangi et al., (2017)* who proved that mothers' knowledge significantly correlated with their educational level. The current study result may be related to that, mothers must be aware of knowledge and practices needed to care for their children because children care were the first responsibility of mothers and this further support the study hypothesis. Adding to the findings of the current study, it is clear that education and training programs are essential for enhancing mothers' understanding of and adherence to ADHD education.

Additionally, the result of the current study shown that mothers' total knowledge and practices were improved after guidelines implementation. This might be attributed to the significance and efficiency of intervention guidelines and training courses in enhancing mothers' practices, which are crucial to the standard of care and providing an effective outcomes. Also, the findings of this study reveal a significant unmet need for mothers of children with ADHD. The study's hypothesis is confirmed by these findings, as it suggested that educating mothers on ADHD and behavior management is a crucial component of treating the child as a whole. This result go in the same line with *Amiri et al., (2016)*, who found that a psycho-educational programme had a substantial impact on the overall mean scores of Australian mothers of children with ADHD. In agreement with a meta-analysis done by *Lee et al., (2012)* concluded that a mother-training programme could significantly improve mothers' capacity to

control their ADHD children and lessen their symptoms. In the same line outcome data of an American study carried out by *Danforth et al., (2016)* added that children's hyperactivity, deviation, and aggression were decreased by mothers' instruction.

Additionally, in the present study, there was a statistical significant development in total mothers' knowledge and their reported practices immediately after guidelines implementation. This may be attributable to the study setting and socioeconomic profile for most of the studying mothers. The study was conducted at psychiatric out-patient clinics in Zagazig and El-Fayoum University hospitals that is characterized by a high attendance rate, where team have very limited time to offer educational services for mothers. Furthermore, as expected, mothers' concerns are primarily focused on treatment alternatives rather than other topics like origins of the problem and facilitating programs because the majority of the mothers attending the clinic had poor levels of education, which limited their opportunities for self-education.

This progress can be linked to the researcher's utilization of a variety of teaching techniques, including lectures, videos, discussions, and the distribution of Arabic books to each mother. Many educational programs put an increased focus on the provision of written content in the form of booklets. As the booklets can use different methods to remind mothers of the lessons they have learnt, and for people that are particularly interested in a certain health practices, they can offer more information.

## Conclusion

Based on the study results, it can be concluded that, there were highly statistical significant improvements in mothers' knowledge and their reported practices immediately post and at following-up phases of intervention guidelines implementation. Moreover, there were significant positive correlations between mothers' knowledge, practices, age, and level of education pre, immediately post and at following-up phases of intervention guidelines implementation.

**Recommendation**

Accordingly, the following recommendations are suggested:

- Dissemination of the intervention guidelines to other similar settings for further confirmation and generalization of the results.
- Delivering specialized programs for mothers as a key element of a child management plan is part of an effective multimodal intervention.
- Further studies will be needed to evaluate the effect of intervention guidelines on the mothers' coping, quality of life (QOL), mothering satisfaction, psychological well-being to enhance their knowledge, attitudes, and practices in improving their children's outcomes.

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