

THE EFFECT OF EDUCATIONAL INTERVENTION ON TEACHERS' KNOWLEDGE OF ATTENTION-DEFICIT HYPERACTIVITY DISORDER

By

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Abstract

Introduction: Attention-deficit/hyperactivity disorder (ADHD) symptoms have a negative impact on children's cognitive, emotional, behavioral, social, and academic performance. Therefore, greater focus should be directed toward increasing awareness of this condition. **Aim of Work:** To evaluate the effect of an interventional educational program focused on ADHD knowledge among elementary school teachers. **Materials and Methods:** A Randomized Controlled Trial was conducted among 72 elementary school teachers in the Zagazig educational administration, Sharkia governorate, Egypt, during the second term of the 2021–2022 school year. Sample participants were selected from the elementary schools' teacher lists provided by the educational administration using a simple randomizing technique and were divided into two groups. Each group (control and intervention) included 36 teachers assigned in matched pairs. Both groups had their knowledge regarding ADHD assessed using a predesigned scale (Knowledge of Attention Deficit Disorders Scale) (KADDS) and were reevaluated three months later after the educational intervention was administered to the intervention group. **Results:** A statistically significant improvement was observed among teacher knowledge regarding ADHD postintervention in the intervention group compared to the control ($p = 0.001$). **Conclusion and Recommendations:** Educational interventions significantly improved teachers' understanding of ADHD and will allow them to better support students who have ADHD. The possibility of incorporating an ADHD knowledge enhancement

program into teacher education and preparation programs should be considered.

Keywords: ADHD, Educational Intervention, Elementary Teachers, and Teachers' knowledge.

Introduction

Attention-deficit/hyperactivity disorder (ADHD) is one of the most frequent neurodevelopmental dysfunctions in children and teenagers. It can be identified by a pattern of persistent impulsivity, hyperactivity, and inattention behaviors. As a result, ADHD can affect student performance in school and social life (Alshehri et al, 2020). Although the precise etiology of ADHD is unknown, environmental, organic, and genetic variables are thought to have a role in its development. It is commonly diagnosed before the age of 12 years, with 30%–50% of cases persisting throughout adolescence and adulthood (Dessie et al., 2021).

ADHD affects 2.2% to 17.8% of all school-aged children worldwide. In Africa the prevalence was found to be 7.47% and was observed to be greater in boys than girls, with a male: female ratio of 2.01:1 (Ayano et al., 2020). In Arab countries, the prevalence is higher, reaching 9.4%–21.8% in Egypt, 11.6% in Saudi Arabia, and 6.24% in Jordan (Azzam H et al, 2021). Even with this high prevalence, research studies

which have assessed teachers' ADHD awareness have found unsatisfactory levels of knowledge in diverse locations; these include southern Texas (46.49%), Canada (68%), Colombia (48.52%), Pakistan (45.30%) (Dessie et al., 2021), and finally Egypt (76.1%) (Aly et al., 2015).

Primary school teachers are crucial in evaluating children's actions and behavior, providing guidance to parents, and in having the ability to identify children with ADHD characteristics early (Alkahtani, 2013). Teachers are also essential for carrying out and assessing the progress of ADHD treatment programs for students. Therefore, teachers' knowledge should be continuously improved, and if it is not, there is a greater chance of delayed diagnosis or misdiagnosis. This can ultimately result in the improper treatment of these children (Fahmy et al.2020).

Aim of Work

To evaluate the effect of an interventional educational program focused on Attention-deficit/

hyperactivity disorder knowledge among elementary school teachers.

Materials and Methods

Study design: A Randomized Controlled Trial (RCT)

Place and duration of the study:

The study was conducted at The Zagazig educational administration during the second term of the 2021–2022 educational years.

Study sample: The sample was $n = 72$ elementary school teachers. The sample size was calculated using Open Epi software and assumed the posttest of the teachers' knowledge regarding ADHD were 28.54 ± 7.93 , and 34.45 ± 9.01 , for the control and intervention groups, respectively (Hosseinnia et al., 2020). The calculation was based on a 95% confidence interval, 80% power, with nonresponse rate of 10%. The Zagazig educational administration was selected by a simple random technique to represent the Sharkia governorate, Egypt (which is divided into 20 educational administrations: (sharkia.gov.eg/modiriat/Education/default.aspx). Sample units were drawn from the elementary schools' teacher lists provided by the educational administration using a simple random technique and were divided into two

groups. Both groups (control and intervention) included $N = 36$ teachers assigned using block randomization technique.

Study methods: the study was carried out through three stages:

I - **Pre intervention:** all participants were met face to face, welcomed then filled the questionnaire which consisted of demographic data, Knowledge of Attention Deficit Disorders Scale (KADDS) and personal data for further communication; demographic data e.g.: gender, age, school location and years of experience. The KADDS is a 36-question rating scale developed by Sciutto and colleagues (Sciutto et al., 2000) to measure teachers' levels of knowledge about ADHD. The subject matters addressed included ADHD symptoms and diagnosis (9 questions), ADHD treatment (12 questions), and general knowledge on the nature, causes, and effects of ADHD (15 questions). The KADDS questions were presented with three answer options: true (T), false (F), or do not know. Regarding scoring, the correct answer got two, the incorrect one got zero and do not know got one. Total Knowledge score was 72, it was divided into Adequate and Inadequate at median of data, where cut off point

was at 36; so Adequate knowledge ≥ 36 and Inadequate knowledge < 36 . The scale's reliability has been proven in a previously published study (Soroa et al., 2013) where it was 0.89. Panels of specialists from the Community and Family Medicine departments verified the scale once it had been translated into Arabic. Ten percent of the total sample was used for a pilot study to assess the questionnaire after translation and to identify any technical problems. The pilot sample was included within the total sample since there were no editions made following the pilot study.

II- Intervention stage: for intervention group, health education message was guided by the National Institute of Mental Health (<https://www.nimh.nih.gov>, 2021). It consisted of power point, videos, and brochure. The sessions were face to face and online through prescheduled Zoom meetings with the selected teachers.

III- Post intervention: Reevaluation occurred three months later using a google form of predesigned questionnaire for both groups.

Consent

Informed written consent was

received from the participants after clarification of the study objectives and methodology.

Ethical Approval

Official approval was received from the Zagazig University Institutional Review Board (IRB) (ZU-IRB #9319). This work has been carried out in accordance with the code of ethics of the world medical association (Declaration of Helsinki) for studies involving humans. Each participant was identified with a code to ensure confidentiality. In accordance with ethical principles, the control group received the same educational program following the study's completion.

Data Management

Data analysis was conducted using SPSS software, version 20 (Spss, IBM. (2011). Categorical variables were described using their absolute frequencies and were compared using the chi-square test for the intervention and control groups, and McNemar's test to compare pre- and postintervention. Binary logistic regression was utilized to detect factors affecting adequacy of knowledge. The level of statistical significance was set at $p < .05$.

Results

Table (1): Comparison between intervention and control groups as regard sociodemographic characteristics.

Factors	Intervention group	Control group	p value
	No (%)	No (%)	
Gender			
Male (No =30)	16(44.4)	14(38.9)	0.63
Female (No =42)	20(55.6)	22(61.1)	
Age / years			
< 40	23(63.9)	24(66.7)	0.8
≥40	13(36.1)	12(33.3)	
Educational level			
Diploma (No=12)	7(19.4)	6(16.7)	0.63
Bachelor degree (No=53)	25(69.4)	28(77.8)	
Master degree(No=6)	4(11.1)	2(5.6)	
School location			
Rural (No=28)	13(36.1)	15(41.7)	0.7
Semi urban(No=13)	6(16.7)	7(19.4)	
Urban (No=31)	17(47.2)	14(38.9)	
Education role			
General education(No=60)	30(83.3)	30(83.3)	1.0
Special education (No=12)	6(16.7)	6(16.7)	
Years of experience			
<10 (No=57)	30(83.3)	27(75.0)	0.38
≥10 (No=15)	6(16.7)	9(25.0)	

There was no statistical difference between both studied groups as regards the considered sociodemographic characteristics

Table (2): Comparison between intervention and control group (pre and post intervention) as regard knowledge.

Variables	Groups	Before intervention	After intervention	p value
		No (%)	No (%)	
General knowledge about (nature, causes and outcome)	Interventional (No =36)	14 (38.9)	34(94.4)	† ≤ 0.001*
	Control (No =36)	17 (47.2)	22(61.1)	†† 0.06
	p value	#0.47	#0.001*	
Knowledge about symptoms and diagnosis	Interventional(No=36)	14 (38.9)	33(91.6)	† ≤ 0.001*
	Control(No=36)	14 (38.9)	17(47.2)	† 0.25
	p value	#1.0	# ≤0.001*	
Knowledge about treatment	Interventional(No=36)	1(2.8)	34(94.4)	† ≤ 0.001*
	Control(No=36)	2(5.6)	3(8.3)	1.0
	p value	§0.5	§ ≤0.001*	
Total Knowledge (KADDS)	Interventional(No=36)	4(11.1)	33(91.6)	† ≤0.001*
	Control(No=36)	8(22.2)	13(36.1)	0.18
	p value	§0.2	# ≤0.001*	

#= Chi square test ,

§= Fisher 's exact test,

†= Mc- Namar test ,

KADDS: Knowledge of Attention Deficit Disorders Scale,

*: Statistically significant

Table 2 showed a statistically significant improvement (post intervention) among the intervention group compared with the control group regarding knowledge about the nature, causes and outcome of ADHD, knowledge about symptoms and diagnosis, knowledge about treatment, and total knowledge (KADDS) ($p = 0.001$). Additionally, statistically significant improvement postintervention was observed compared with preintervention in the intervention group ($p \leq 0.001$).

Table (3): Relations between teachers' knowledge and their characteristics pre-intervention (No=72):

Factors	Inadequate knowledge	Adequate knowledge	p value
	No (%)	No (%)	
Gender Male (No=30) Female (No=42)	25(83.3) 35(83.3)	5 (16.7) 7(16.7)	[§] 1.0
Age / years < 40 ≥40	36(76.6) 24(96.0)	11(23.4) 1(4.0)	[§] 0.03*
Educational level Diploma (No=12) Bachelor degree(No=53) Master degree(No=6)	9(69.2) 49 (92.5) 2(33.3)	4(30.8) 4 (7.5) 4(66.7)	#≤0.001*
School location Rural (No=28) Semi urban(No=13) Urban (No=31)	28 (100.0) 11(84.6) 21(67.7)	0(0.0) 2 (15.4) 10 (32.3)	#0.004*
Education role General education(No=60) Special education(No=12)	51 (85.0) 9 (75.0)	9(15.0) 3 (25.0)	[§] 0.39
Years of experience <10 (No=57) ≥10-(No=15)	55(96.5) 5(33.3)	2(3.5) 10(66.7)	§≤0.001*

#: Chi square test ,

§: Fisher's exact test,

*:Statistically significant

There was a strong association between Adequate knowledge and age, educational level, school location, and years of experience ($p = 0.03, 0.001, 0.004, \leq 0.001$, respectively)

Table (4): Binary Logistic regression to detect factors that affect adequacy of knowledge.

Variables	B	S.E.	p value	Odds ratio	95% CI	
					Lower	Upper
Age/ years <40 versus >40	2.35	1.36	0.08	0.09	0.007	1.37
Educational level	0.325	0.8	0.68	0.72	0.15	3.46
School location	1.10	0.89	0.21	1.05	0.52	7.28
Years of experience	3.49	1.01	0.001*	32.8	4.5	239.3

*: Statistically significant difference.

Binary logistic regression identified that the most effective factor associated with Adequate knowledge was years of teaching experience (AOR = 32.8, 95 CI 4.5–239.3, $p \leq 0.001$)

Discussion

About 11% of school children are believed to have ADHD. For children, teachers, family members, and siblings, this disorder poses serious issues. Teachers spend a great deal of time with their students at school, and they frequently observe how children behave in various educational settings. As a result, they anticipate being the first to notice and identify ADHD in their pupils (Al-Moghamsi and Aljohani, 2018). Consequently, the present study's aim was to evaluate how an educational intervention affected primary school teachers' knowledge of ADHD. The study's findings about the personal characteristics of the

sample teachers showed that more than half of them were less than 40 years old, and that most had less than 10 years of teaching experience (Table1). This is corroborated by (Alanazi, and Al Turki, 2021)study from Saudi Arabia; on primary school teachers' misconceptions about ADHD which sought to identify teachers' awareness of the condition. They found that 43% of primary school teachers were under the age of 40. In contrast, a Zewiel et al. (2015) study carried out in Tanta, Egypt, found that over half of the teachers studied were over 41 years old and had job experience of between 25 and 30 years. Also, Bussing et al. (2002) from USA found that 54% of

teachers sampled were between the ages of 30 and 50. This may be due to the Egyptian national campaign to contract with 30,000 newly graduated elementary teachers during the last few years.

The current study showed statistically significant improvement postintervention in the intervention group compared with the control group regarding general knowledge of the nature, causes and outcome of ADHD, knowledge about ADHD symptoms and diagnosis, knowledge about treatment, and total knowledge ($p = .001$) (Table 2). Additionally, statistically significant improvements ($p \leq .001$) postintervention compared with preintervention in the intervention group were observed (Table 2). Numerous prior studies have supported this finding. In Nigeria, teachers' awareness of ADHD was improved after receiving brief ADHD training utilizing a common training package (Lasisi et al., 2017). Similarly, an Australian study showed that short professional interventions might improve teachers' understanding of ADHD (Latouche and Gascoigne, 2019). According to research findings in Saudi Arabia, teachers' training was successful in increasing their awareness

of ADHD (Khalil et al., 2019). This shows the importance and effectiveness of educational intervention for teachers regarding ADHD, since they are important unofficial sources of information for others, and can expand ADHD knowledge among their peers, parents, etc.

Regarding adequate preintervention total knowledge scores, only 11% and 22% were deemed to have adequate knowledge among the intervention and control groups, respectively (Table 2). This finding was consistent with studies conducted in Egypt, Thailand, and Nepal, where the assessed adequate total knowledge score was 19.4%, 23.9%, and 24.2%, respectively (Aly et al., 2015), (Muanprasart et al., 2014) and (Srignanasoundari et al., 2016). But it was relatively high in other studies carried out in India ((Fahmy et al.2020).) and Ethiopia (Alabd, 2018) (40% and 44.8%, respectively). This difference may be due to different study design types and sampling techniques. The present RCT(Randomized Control Trail) study used a relatively small sample size, while other studies were cross sectional and had large sample sizes.

According to the multivariate

logistic regression model utilized, having more years of experience was a predictor of adequate knowledge about ADHD (Table 4). This result is consistent with research done in Ethiopia that found a highly statistically significant relationship between the studied teachers' overall knowledge score and their years of experience (Dessie et al., 2021). These results were in contrast with those of (Perold et al. (2010)(Patidar et al., 2016) who claimed that KADDS measurements of general knowledge of ADHD were unrelated to the number of years of general teaching experience among teachers .This may be due to study differences, including frequent contact among teachers with many students with different behavioral conditions.

Conclusion: Based on the results of the present study, educational interventions were shown to have a significant impact on improving teachers' understanding of ADHD. Additionally, in contrast with the control group, the majority of the studied teachers in the interventional group had an adequate level of understanding which help them to cope with students who had ADHD.

Recommendations:

The possibility of incorporating an ADHD knowledge enhancement program into teacher education and preparation programs should be considered. This training should be included in the curriculum of ongoing teacher professional development education. It is advised that teachers receive periodic refresher training to update and revise their knowledge.

Limitation of the study: The geographic distribution of the study was not reflective of the Egyptian population at large.

Conflict of interest

None

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References

1. Alabd AMA, Mesbah S K, and Alboliteh M (2018):Effect of educational program on elementary school teachers' knowledge,

- attitude, and classroom management techniques regards attention deficit hyperactivity disorder
Int J Stud Nurs; 3(3): 159.
2. Alanazi F and Al Turki Y (2021): Knowledge and attitude of Attention-Deficit and Hyperactivity Disorder (ADHD) among male primary school teachers, in Riyadh City, Saudi Arabia. *J Fam Med Prim care*; 10(3):1218
 3. Aljohani A (2018): Elementary school teachers' knowledge of attention deficit/hyperactivity disorder. *J Fam Med Prim care*; 7(5):907.
 4. Alkahtani KD (2013): Teachers' knowledge and misconceptions of attention deficit/hyperactivity disorder. *Psychology*; 4(12): 963.
 5. Alshehri AM, Shehata SF, Almosa KM, and Awadalla NJ (2020): Schoolteachers' Knowledge of Attention-Deficit/Hyperactivity Disorder-Current Status and Effectiveness of Knowledge Improvement Program: A Randomized Controlled Trial. *Int J Environ Res Public Health*; 17(15): 5605.
 6. Aly S E, Mohammed F, and Ahmed Z (2015): Teachers' perception and attitudes toward attention deficit hyperactivity disorder in primary schools at Assiut City. *The Asian Academy of Management Journal*; 13(4), 165-173.
 7. Ayano G, Yohannes K, and Abraha M (2020): Epidemiology of attention-deficit/hyperactivity disorder (ADHD) in children and adolescents in Africa: a systematic review and meta-analysis. *Ann Gen Psychiatry*; 19(1):1-10.
 8. Azzam H, Hasan H, Elhabiby M, El Ghamry R, Mansour M, et al. (2021): Perceived parenting attitudes in relation to ADHD symptoms and aggressive behaviors in a sample of Egyptian children with ADHD. *Middle East Current Psychiatry*;28(1):1-8
 9. Bussing R, Gary F , Leon C, Garvan C, and Reid R (2002): General classroom teachers' information and perceptions of attention deficit hyperactivity disorder. *Behavioral Disorders*; 27(4): 327-39.
 10. Dessie M, Techane M, Tesfaye B ,and Gebeyehu D (2021): Elementary school teachers knowledge and attitude towards attention deficit-hyperactivity disorder in Gondar, Ethiopia: a multi-institutional study. *Child Adol Psych Men*; 15(1):1-10.
 11. Fahmy E M, El-Bakry S T, Hegab A M, and Kasem S M (2020): Knowledge and Attitude of Primary School Teachers on Attention Deficit Hyperactivity Disorder. *Benha Journal of Applied Sciences*; 5(1): 31-41.
 12. Hosseinnia M, Mazaheri M A and Heidari Z (2020): Knowledge, attitude, and behavior of elementary teachers regarding attention deficit hyperactivity disorder. *J Educ Health Promot*; 9(2):12.
 13. Khalil AI, Alshareef FA, and Alshumrani HG (2019): Knowledge, Attitude, and Behavioural Practice of Elementary Teacher of ADHD Children: Impact of an Educational Intervention. *Am J Nurs* ; 8(6): 330-41.
 14. Latouche AP and Gascoigne M (2019): In-service training for increasing teachers' ADHD knowledge and self-efficacy. *J Atten Disord*; 23(3):270-81.
 15. Muanprasart P, Traivaree C, Arunyanart W, and Teeranate C (2014): Knowledge of attention deficit hyperactivity disorder and its associated factors among teachers in 3 large primary schools in Phra Nakorn Sri Ayutthaya Province, Thailand. *J Med Assoc Thai*; 97(107):14.
 16. Patidar P, Chaudhary J, Parikh N, Shah N, and Darji V (2016): Knowledge of attention deficit hyperactivity disorder (ADHD) among primary school teachers of Ahmedabad. *Int J of Adv Res*; 6(12):53-5. <https://doi.org/10.36106/ijar>.
 17. Perold H, Louw C, and Kleynhans S (2010): Primary school teachers' knowledge and misperceptions of attention deficit hyperactivity disorder (ADHD). *S Afric J Educ*, 30(3)
 18. Scitutto MJ, Terjesen MD, and Frank AS (2000): Teachers' knowledge and misperceptions of attention deficit/hyperactivity disorder. *Psychology in the Schools* ;37 (2):115-22.
 19. Soroa M, Gorostiaga A, and Balluerka N

- (2013): Review of tools used for assessing teachers' level of knowledge with regards attention deficit hyperactivity disorder (ADHD). Attention deficit hyperactivity disorder in children and adolescents:151-177. Available at: <https://pdfs.semanticscholar.org/c06d/b9faad04f6b381bd36737405c3b2c63e0c1f.pdf>
20. SPSS IBM (2011): IBM SPSS statistics for Windows, version 20.0. New York: IBM Corp, 440, 394.
 21. Srignanasoundari E, Vijayalakshmi S, and Kokilavani N (2016): A study to assess the knowledge on attention deficit hyperactivity disorder among primary school teachers at selected schools of kancheepuram district, Tamilnadu. *Tamilnadu Int J Nurs Educ*; 8(4): 66-70.
 22. Zewiel A, Abd Elfatah M, and Elsherif ZA (2015): Effect of an Educational program about Attention Deficit Hyper Activity Disorder on Teachers Knowledge and skills in primary schools. *Tanta Scientific Nursing Journal*; 9(2): 62-89.
 23. <http://www.sharkia.gov.eg/modiriat/Education/default.aspx> (accessed February 2022).
 24. https://www.nimh.nih.gov/sites/default/files/documents/health/publications/21-MH-8159_ADHDInChildrenTeens.pdf, 2021 (accessed February 2022).