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Determinants of teachers' attitudes toward inclusion of pupils with attention deficit hyperactivity disorder: The role of teacher education

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Given that teachers' attitudes are an essential constituent of most academic and social processes taking place in their classrooms, the authors of the current study examined teachers' attitudes and their origins specifically toward the inclusion of pupils with ADHD, taking into account demographic variables, teachers' professionalism, and either a personal diagnosis of ADHD or prior acquaintance with it through relatives. The data, gathered from 475 participants' responses to questionnaires, revealed that professional teacher training was only a secondary factor influencing attitudes regarding the inclusion of children with ADHD. A more prominent factor was teachers' own diagnosis of ADHD or prior experience with children/relatives with ADHD. Study results are followed by practical suggestions for improving teacher education based on these findings.

KEYWORDS

ADHD, teachers with ADHD, inclusion, teachers' attitudes, teacher education

Introduction

Among the variety of disorders learners with special needs (SN) may have, Attention Deficit Hyperactivity Disorder (ADHD) is the most common, and the number of children diagnosed with it continues to rise (Montague and Dietz, 2006). It is defined as a neuropsychological disorder characterized by an individual's inability to organize learning behaviors in order to achieve the expected results, and it may be expressed in a variety of learning processes or behaviors alongside certain multi-factorial perspectives (Goldstein and Naglieri, 2008; Francesco et al., 2013; Barkley, 2020). These pupils are usually assessed as having normative intelligence skills but requiring some changes that can be implemented in the classroom to help them learn more efficiently. The core adaptations teachers usually implement in their classes include: providing extra time to finalize class assignments, writing complex instructions clearly on the board, dividing

complex tasks into subtasks, etc. However, when teachers are informed of the core characteristics of ADHD, they tend to focus on the dysfunctional behavioral elements displayed by these pupils (Chandler, 2010; Sjoberg, 2017). Therefore, establishing an effective inclusion process for these pupils is essential for all teachers. Moreover, inclusion of pupils with ADHD contributes to the attainment of two main benefits: their learning becomes more efficient, and they can cope better with their behavioral challenges (Karhu et al., 2018). While inclusion processes for pupils with SN lasts throughout the years they spend in school, their teachers' attitudes toward inclusion play a significant role in promoting their success (Anderson et al., 2012; Klopfer et al., 2017; Masse et al., 2022). Methods of inclusion have changed over the years, and while educators are familiar with the notion of "integration" referring to a diversity of pupils learning together in the same environment, nowadays the focus must move to "inclusion," which requires educators to learn how to enable pupils with SN to study in mainstream schools and classes (Jahnukainen, 2014). The current study examines factors determining teachers' attitudes toward the inclusion of pupils with ADHD in their classes and their possible implications for the enhancement of teacher education.

Theoretical background

Regulation processes of inclusion of pupils with attention deficit hyperactivity disorder

Since the early 20th century, theoreticians, pedagogues, education leaders and practitioners around the world have claimed that education should be available for all and should truly represent society's norms, ideologies, and culture. As a result, numerous theories and approaches were developed to promote the desire to increase the access of learners with SN to mainstream education, while providing all children with an opportunity to study with their age group, regardless of their personal challenges (Vermeulen et al., 2012; Masse et al., 2022). Although different theoreticians have approached inclusion from different perspectives, the common criterion highlights the fact that efficient inclusion can only occur in schools that welcome a variety of learners (Boyle et al., 2013). Moreover, in many countries, education leaders and policy makers acknowledge that parents should take an active part throughout the inclusion processes in order to contribute to the social changes needed, as well as to successful inclusion within their communities (Test et al., 2004; Timor and Burton, 2007; Hunter et al., 2019). In addition to the social approach to inclusion, some researchers claim that educating pupils with SN separately from others is

worthless and may even be harmful (Kauffman and Farkas, 2021).

The immediate result of this inclusion policy is an increase in the number of pupils with SN, mainly those with ADHD, in mainstream classes (Masse et al., 2022). This means that in recent years, teachers have been required to conduct differential learning activities in class so that pupils with a variety of needs can participate. By devising a variety of assignments and activities, teachers address the practical meaning of inclusion, as well as the pursuit of academic goals (Vermeulen et al., 2012; Flavian, 2019).

Needless to say, the new policy was imposed on teachers and schools from the top down and, as in other education reforms, apart from the publication and distribution of the new regulations, no efforts were made to prepare teachers for this significant change (Uziely, 2018). Apparently, the implementation of such an important reform did not include ensuring that inservice teachers received the necessary training to carry out effective inclusion, nor did anyone plan any process to help these teachers change their attitudes toward it. This is despite the fact that previous studies (e.g., Boyle et al., 2013) have indicated that the success of inclusion in mainstream schools relies on teachers' beliefs that pupils with SN are indeed capable of managing their learning efficaciously.

The role of teachers' and peers' attitudes in the inclusion process

When referring to teachers' interactions with mainstream pupils or with those with SN, it is essential to understand that teachers are often influenced by the attitudes they developed throughout their life and their ongoing teaching experiences (Treder et al., 2000; Masse et al., 2022). Moreover, teachers with positive attitudes toward inclusion efficiently contribute to its success, as their practices model the significant impact inclusion of pupils with SN has on the school learning community (Steen and Wilson, 2020). Exhibiting and modeling positive attitudes also form positive and trusting relationships between teachers and pupils. In turn, the establishment of positive teacher-pupil relationships motivates those with SN to cooperate with their teachers and promotes academic motivation among all learners (Curtis et al., 2014). Although most preservice teachers support the notion of inclusion of pupils with SN, once they have completed their first year of active teaching most of them expressed significant negative attitudes toward inclusion (Boyle et al., 2013).

Prior personal or professional interactions with people or learners with ADHD are among the personal experiences that may influence teachers' attitude toward the inclusion of pupils with ADHD in their classes. Furthermore, it has been shown that the development of teachers' attitudes and inclusion

practices is based not only on their experiences, but also on their acquired knowledge (Vermeulen et al., 2012; Klopfer et al., 2017). In terms of theoretical knowledge, teachers rely on the studies and medical reports published about pupils with ADHD, the majority of which present them in a negative light by highlighting their difficulties (Freedman, 2016). The attitudes of both preservice and veteran teachers are influenced – if not entirely shaped – by such publications.

The stigma that informs society's negative attitudes toward people with SN is one of the main obstacles that must be addressed. Deconstructing teachers' stigmas about pupils with SN posits that teachers who have had negative experiences with pupils with ADHD will be less motivated to contribute to the successful inclusion of such pupils in the future (Kozminsky, 2003). Weisel and Tur-Kaspa (2002) suggested that constructed sessions in which teachers come into contact with learners with SN be prepared, in order to overcome this obstacle. In other words, experiencing positive situations will develop and maintain positive attitudes toward inclusion (Stump and Newberry, 2021).

Nowadays, teacher education programs include teaching activities aimed at preparing teachers to better address the needs of pupils with ADHD within mainstream educational programs, thereby aiming for better inclusion processes (Flavian and Kass, 2020). Moreover, the understanding that optimal inclusion relies on educators' positive attitudes toward pupils with ADHD, these academic programs aim to develop positive attitudes by integrating theories and practices throughout the teacher education process. Nevertheless, there is still much to be done in this area (Hopkins et al., 2018). Hence, in this study, we wish to consider the role of teacher education programs in the development of teachers' positive attitudes regarding the inclusion of pupils with ADHD. Specifically, we examined this in regard to the particular domain in which the teacher candidates were trained, and their previous acquaintances with people with ADHD. Given that preservice teachers in the special education track are taught strategies for working with pupils with various types of SN (Flavian and Kass, 2020), we expected graduates of the special education track to present more positive attitudes toward inclusion of pupils with ADHD, compared to the attitudes exhibited by preservice teachers preparing to teach in mainstream programs.

Teachers with attention deficit hyperactivity disorder and promotion of inclusion

While it is possible to learn strategies to minimize the challenges of ADHD, the disorder never vanishes entirely. Accordingly some adults with ADHD enroll in teacher education programs and become professional teachers. Their

choice to develop a teaching career entails a commitment to focus on learners' knowledge and academic needs, while modeling for other teachers and for their pupils the meaning of inclusion as adults (Neca et al., 2020). Consequently, these teachers must be doubly aware of their own challenges, observing themselves daily to make sure they remain attentive to their pupils' learning needs. While principals have expressed concern regarding the ability of teachers with ADHD to appropriately prepare for and manage their pupils' learning, they also claim that the teachers' personal experiences as learners with ADHD can be more advantageous in daily teaching than practices based on the application of theoretical knowledge about ADHD in the context of specific classroom situations (Flavian, 2016). Thus, by "sharing their own experiences, teachers [with ADHD] could develop strong interpersonal relationships with their pupils, which would serve as a source of encouragement for these pupils" (Flavian, 2016, p. 38). Through that study Flavian identified three main advantages related to the employment of teachers with learning disabilities (LD) and/or ADHD: (1) these teachers were more sensitive to, and thus quicker to detect, learning difficulties among their pupils, even before these pupils developed significant academic gaps; (2) understanding their challenges, teachers with ADHD consistently used a variety of teaching strategies and thus successfully addressed the needs of diverse learners; and (3) the inclusion of teachers with LD/ADHD as staff members exposed pupils to different role models, thus teaching them to appreciate diversity in the classroom.

The goals of the study

The current study was based on the understanding that teachers' positive attitudes are essential to the successful inclusion of pupils with ADHD. However, many educators are seeking the key factor that promotes such attitudes. Therefore, this study sought to examine teachers' attitudes in relation to (a) their personal background, in terms of either their own experience managing ADHD or their personal acquaintance with other people or pupils with ADHD, and (b) whether or not they had received prior training in special education. Accordingly, the researchers formulated the following hypotheses:

1. Teachers with ADHD or who have a close relative with ADHD will have more positive attitudes toward the inclusion of pupils with ADHD than their colleagues who do not.
2. Teachers with an academic background in special education will have more positive attitudes toward inclusion than teachers with no background in special education.

These hypotheses served also as basis for the following research questions:

- (1) Will teachers with personal familiarity with ADHD have more positive attitudes about including students with ADHD than their colleagues?
- (2) Will teachers who have studied teaching in special education programs present more positive attitudes toward inclusion than their colleagues?

Materials and methods

Study population and sample

Participants totaled 475 teachers from various locations around Israel. Researchers asked the participants to complete the questionnaire voluntarily when they arrived at inservice workshops at different academic colleges of education. Their ages ranged from 21 to 68; 90% of them were women; 38% were new teachers (up to five years of teaching experience); 45% had more than 10 years of teaching experience; 62% were teaching in elementary schools; and the rest were teaching either in kindergartens, high schools, or higher education institutions.

Seventy-six percent of the participants taught pupils without SN in mainstream schools, 16% were special education teachers working with pupils integrated into mainstream schools, and a further 8% taught in separate special education schools. Two-thirds had a bachelor's degree; the remaining had a master's or PhD. Eight percent of the participants declared that they had ADHD, and 47% reported having at least one close relative with ADHD.

Procedure

The research was based on a questionnaire of 36 statements. Initially, 40 statements were collected from previous questionnaires focused on the general inclusion of pupils with a variety of SN. This study is based on the questionnaires developed by Lifshitz and Naor (2001), who conducted the statistical requirements for validation and signification. After conducting a sample with five educators who completed the questionnaire and participated in a focus-group, the statements were rephrased and reduced to 36. The 475 participants indicated their agreement with the statements on a Likert-type scale ranging from 1 (totally disagree) to 6 (agree completely). When completed, the questionnaire was independently assessed for reliability by five teacher educators, other than those who had previously evaluated the questionnaire.

Variables and measures

Demographic variables

Acknowledging that teachers' backgrounds and experiences influence their attitudes toward inclusion led the researchers to refer to background variables such as gender, age, personal status, education, seniority in teaching, as well as the educational framework in which they routinely work (mainstream or special education) and their pupils' ages. Participants were also asked whether they had been diagnosed with ADHD and whether there were people diagnosed with ADHD in their immediate environment (i.e., close relatives, friends, etc.).

Dependent variables

As mentioned, the questionnaire consisted of 36 statements about participants' attitudes toward teaching pupils with ADHD. An exploratory factor analysis was performed using a principal component analysis and varimax rotation. This process revealed four distinct content areas, which were then used to define the following four dependent variables: (1) positive stereotypes and (2) negative stereotypes about pupils with ADHD; (3) stereotypes about the contribution of pupils with ADHD to the learning environment; and (4) the stereotype of pupils with ADHD posing a challenge for teachers. Few of the statements were not included in any of the four factors listed. Thus, one of them was referred to separately, whereas others were removed after data analysis revealed that they were probably unclear for the participants.

Positive stereotypes about pupils with attention deficit hyperactivity disorder

To better understand the positive stereotypes about pupils with ADHD, we grouped together nine items, including: "The academic skills of pupils with ADHD are higher than average." "The ability of a pupil with ADHD to cope with numerous stimuli simultaneously is an advantage." "Pupils with ADHD are creative," etc. Due to the relatively high level of internal consistency between the statements ($\alpha = 0.750$), the average score for the nine items was considered a reliable measure of positive stereotypes about pupils with ADHD.

Negative stereotypes about pupils with attention deficit hyperactivity disorder

To examine participants' potentially negative stereotypes about pupils with ADHD and their integration in schools, seven of the 36 items were used. These statements included: "ADHD hampers pupils learning processes." "The ability of pupils with ADHD to learn is lower than the age-appropriate average." "Pupils with ADHD have behavioral disorders," etc. The internal consistency between these statements was even higher ($\alpha = 0.756$), so that the seven items constituted a reliable measure of negative stereotypes about pupils with ADHD.

Stereotypes about the contribution of pupils with attention deficit hyperactivity disorder to one's classroom

To better understand participants' potential stereotypes regarding the contribution of pupils with ADHD to the educational environment, five questionnaire items were used, including: "Integrating pupils with ADHD in class encourages cooperative learning." "Pupils with ADHD can greatly contribute to classroom learning processes." and "ADHD is a gift that needs to be appreciated and used." Cronbach's alpha for internal consistency was relatively high ($\alpha = 0.718$); hence, these five items were considered a reliable measure of stereotypical perceptions regarding the contribution of pupils with ADHD to the learning environment.

Stereotypes about pupils with attention deficit hyperactivity disorder as posing a challenge for teachers

Six statements from the questionnaire were used to measure participants' stereotypical perception of pupils with ADHD as posing a challenge to their teachers, including: "The presence of pupils with ADHD in the classroom requires the teacher to teach in a variety of ways." "Teachers are concerned about their inability to teach pupils with ADHD." "The success of pupils with ADHD depends on teachers' motivation to cope and succeed" etc.

Internal consistency was found to be slightly low, (0.573 Cronbach's alpha). However, a closer look revealed two items that referred to a somewhat different topic – the effect of teachers' seniority and experience on their ability to cope with pupils with ADHD. Removing these two items increased the internal consistency coefficient to 0.695, which is sufficient. Item average was calculated for this content area.

Ethical perspectives

From the outset and throughout the study, the researchers made sure to follow the necessary ethical standards to allow reliable results. The ethical standards employed were: (1) the Ethics Committee of the college authorized the study; (2) the research rationale was presented to the participants in a fully transparent manner; (3) members of the sample were given the opportunity to refuse to participate; (4) the questionnaires contained no hurtful statements, as approved by the college Ethics Committee; and (5) the participants' identities remained completely anonymous.

Data analysis

The data were first analyzed descriptively. To this end, the distribution of variables was examined and means (M) and

standard deviation (SD) were calculated. Next, factor analysis was conducted for the 36 statements, and four distinct content areas (factors) were defined. Internal reliability (Cronbach's alpha) was examined for each factor, and the averages of the factors' items were then used as the study's dependent variables.

Finally, correlations between the study variables were calculated to find significant relationships. For dichotomous variables, t -tests for independent samples were used to test the statistical significance of the differences found. One-way ANOVA, followed by Bonferroni Alpha *post hoc* tests were used to examine the differences between participants based on their personal and occupational backgrounds.

Results

Distribution of the dependent variables

While most of the responses to the different statements were mainly mid-scale, three items clearly stood out: 76% of the teachers strongly agreed (ranking 5–6 on a 1–6 scale) that having a personal relationship with the teacher helps pupils with ADHD cope with their studies. Another statement widely accepted by teachers (72%) was that having pupils with ADHD in the class requires the teacher to teach in a variety of ways.

A statement rejected by 76% of the participants (ranking 1–2 on a 1–6 scale) declared that 'There are no pupils with ADHD, only unskilled teachers.' Thus, the teachers effectively claimed that ADHD is an objective diagnosis and not a by-product of a dysfunctional education system.

Relationships between the main research variables

Main finding regarding the relationships between main research variables are presented in [Table 1](#).

Significant differences were found between teachers with and without ADHD. A t -test [$t(44.8) = -2.01, p < 0.05$] revealed that teachers with ADHD had more positive opinions about pupils with ADHD ($M = 3.79, SD = 0.82$) compared to their colleagues without ADHD ($M = 3.51, SD = 0.81$). They also tended to have a more positive assessment of the contribution of pupils with ADHD to their learning environments [$M = 4.10, SD = 1.13; M = 3.70, SD = 0.99$ for teachers with and without ADHD, respectively; $t(43.4) = -2.12, p < 0.05$].

Significant differences were also found between teachers who had a close relative with ADHD and those who did not. The former had less-negative stereotypes about pupils with ADHD [$M = 3.12, SD = 0.85$ vs. $M = 3.37, SD = 0.91; t(470) = 3.11, p < 0.005$]. Furthermore, teachers who had a relative with ADHD were also more aware than their colleagues of the potentially positive contribution of pupils with ADHD to their

TABLE 1 Significant differences between means of main research variables.

		Positive stereotypes	Negative stereotypes	Stereotypes about the contribution to the environment	Stereotypes about pupils as challenging
Teachers with ADHD	M	3.79	–	4.10	–
	SD	0.82	–	1.13	–
Teachers without ADHD	M	3.51	–	3.70	–
	SD	0.81	–	0.99	–
Teachers who have a close relative with ADHD	M	–	3.12	3.83	–
	SD	–	0.85	1.02	–
Teachers who do not have close relative with ADHD	M	–	3.37	3.65	–
	SD	–	0.91	0.99	–
Teachers teaching in SE schools	M	3.74	–	–	4.65
	SD	0.95	–	–	0.84
Teachers in mainstream schools	M	3.37	–	–	4.21
	SD	0.86	–	–	0.98

– Differences not significant.

learning environments. [$M = 3.83, SD = 1.02$ vs. $M = 3.65, SD = 0.99; t(463) = -1.99, p < 0.05$].

Finally, teachers in special education schools had significantly ($p < 0.05$) more positive opinions about pupils with ADHD ($M = 3.74, SD = 0.95$) than did teachers in mainstream schools ($M = 3.37, SD = 0.86$). Also, more of them perceived pupils with ADHD as challenging, rather than as upsetting, for the teacher ($M = 4.65, SD = 0.82; M = 4.21, SD = 0.98$, respectively).

To our surprise, ANOVA did not point out any relations between the age of the pupils nor seniority in teaching and any of the dependent variables.

Discussion

In order to obtain a clear overview, studies exploring teachers' attitudes toward the inclusion of pupils with ADHD should be based on a variety of participants teaching in different educational settings. The 475 participants in this study indeed represented a wide range within the teacher population, from kindergarten through high-school and academic studies, as well as mainstream classes and special education environments.

It seems that despite the variety of teachers in this sample, no significant correlations were found between demographic factors and attitudes toward pupils with ADHD, as neither age nor years of teaching experience was a factor affecting their attitudes toward pupils with ADHD. These findings were somewhat unexpected, given that previous studies have shown that life experience influences teachers' attitudes and may positively affect willingness to include pupils with ADHD in

all types of education programs (Gaastra et al., 2020; Steen and Wilson, 2020).

All participants reflected on the 36 statements, which were grouped into the four factors of positive and negative stereotypes about pupils with ADHD, the contribution of pupils with ADHD to their learning environment, and pupils with ADHD posing a challenge for teachers. According to participants' responses, they viewed pupils with ADHD as contributing positively to their learning environment but also indicated that the inclusion indeed constitutes a daily challenge for teachers.

The main conclusion of the study was likewise unexpected. Whereas previous studies emphasized that teachers with special education training presented more positive attitudes toward inclusion (Desombre et al., 2018), this study offers to expand the perspective about this issue. Apparently, having a family member with ADHD contributes to one's willingness to promote the inclusion of pupils with ADHD and to the recognition that these pupils can contribute positively to learning processes. In other words, teachers with personal ties to someone with ADHD presented more positive attitudes toward the inclusion of pupils with ADHD. These results suggest that developing modules in teacher education programs through which preservice teachers meet pupils with ADHD could help them shift their acquired knowledge from the theoretical to the practical plane.

In addition to its academic aspects, education also reflects society's goals and norms. From the perspective of this study, education should thus promote inclusion in order to educate learners how to contribute to the environment in which they live. This can only occur with teachers' understanding of their own attitudes toward the inclusion of pupils with ADHD from early childhood. Based on the results presented herein,

educators' prior experience as learners with ADHD or of relatives with ADHD significantly correlates with their belief that such pupils can contribute to their learning environment. These results expand the range of perspectives presented in previous studies focusing on teachers' attitudes, their enthusiasm to assist in social integration, and their willingness to tailor their teaching strategies to address these pupils' needs (Reed et al., 2017; Gaastra et al., 2020; Masse et al., 2022).

Regarding the different streams of teacher education programs, findings indicated that teachers with special education training had more positive attitudes toward the inclusion of pupils with ADHD than counterparts trained for mainstream frameworks. Thus, as further detailed in the following section, educational leaders should seriously consider integrating themes regarding ADHD throughout all teacher-education programs. Additionally, teaching in a special education program had about the same effect on teachers' attitudes as did having been diagnosed with ADHD, even though special education teachers did not deny that pupils with ADHD pose challenges for them on a daily basis. Hence, educational leaders should also consider how to integrate through teacher training programs experiences, that will promote preservice teachers' positive attitudes toward inclusion of pupils with ADHD.

To conclude, these results strengthen the significance of addressing the issue of inclusion early in preservice teacher education, while according equal emphasis to the existing positive views of people and pupils with SN, together with providing a variety of experiences of teaching pupils with ADHD. This is because, as previous researchers claimed, once attitudes are developed, shaped and internalized, it is extremely difficult to reshape them (Na and Mikami, 2018). Additionally, it has been shown that teachers' positive attitudes toward inclusion constitute a core parameter for a successful inclusion process (Boer et al., 2010). In this manner, novice teachers will have a head start in getting to know pupils with ADHD closely and thus will have the opportunity to develop positive attitudes toward their inclusion in their classes. Taking such a step will also enable pupils with ADHD to get a fair start in mainstream schools.

Conclusion and suggestions for future studies

The increasing number of pupils with ADHD studying in mainstream settings means that teachers will face related challenges daily. In turn, this needs to be addressed by policymakers and teacher education developers by ensuring that teachers are better prepared to manage the inclusion of pupils with ADHD. The need to develop positive attitudes toward their inclusion during the teacher education period evolves from previous research but is significantly strengthened by the

findings of this current study. Moreover, as educators learn to identify the positive opportunities afforded by the inclusion of pupils with ADHD, they actively model inclusion, which helps the peers of pupils with ADHD do the same; thus, they develop an inclusive learning environment. Specifically, as the main contribution of the current study indicates, the development of positive attitudes may be best achieved by creating meaningful encounters with pupils and adults with ADHD throughout the teacher education process. As shown herein, having a prior close relationship with a person with ADHD may be related to teachers' more positive attitudes toward the inclusion of pupils with ADHD.

Understanding the effects of ADHD on learning and daily activities can motivate teachers and educators to plan efficient learning of the kind that helps pupils develop strategies for lifelong learning. While proper preparation of inclusion leads to its success, this success also leads to positive attitudes toward inclusion. For example, when teachers prepare proper inclusion processes for pupils with ADHD, they are also prepared to cope with the frustrations those pupils often express throughout their learning, because they understand the reasons for the frustrations and can address them effectively.

Previous studies (Anderson et al., 2012; Vermeulen et al., 2012) have shown that academic knowledge about disabilities promotes efficient inclusion and positive attitudes toward the process. The current study reveals another perspective that educators should be aware of, as the findings demonstrate that having ADHD or having a close relationship with a friend or a family member with ADHD was associated with considerably less-negative attitudes toward the inclusion of pupils with ADHD. In contrast to the studies on the inclusion of people with SN focusing on the value of academic knowledge, this study emphasizes the positive effects of having previous relationships with people with ADHD, which are slightly stronger than the positive effects of having an academic knowledge in special education. Therefore, we recommend that all teacher education programs, should contain courses which specifically address ADHD and inclusion.

The goal of our study focused on learning whether teacher education programs have succeeded in producing teachers with positive attitudes toward including pupils with ADHD. At this point, we conclude that the answer is not entirely clear. There is no doubt that throughout the teacher education process, preservice teachers experience a change in their attitudes and become more positive regarding the inclusion of pupils with ADHD and other special needs in their classes (Peebles and Mendaglio, 2014). However, it also appears that previous experience and relationships with people with ADHD influence the development of such positive attitudes. Future research could address this lack of clarity by designing studies that directly compare the attitudes of graduates immediately after completing specialized and non-specialized teacher education

programs with the attitudes of their colleagues who, in addition, had prior relationships with people with ADHD.

Based on the results presented herein, we summarize this study from a practical perspective by offering the following suggestions, which may significantly improve the inclusion of pupils with ADHD in schools. As [Karhu et al. \(2018\)](#) emphasize, managing the inclusion of pupils with ADHD will also help educators develop positive attitudes toward inclusion in general.

- Throughout teacher education programs, it is important to plan opportunities for preservice teachers to meet with and learn from people with ADHD and from the parents of pupils with ADHD, to observe these families. This will promote the development of positive attitudes that will lead to successful inclusion of pupils with ADHD in mainstream classes.
- Developing positive attitudes toward the inclusion of pupils with ADHD requires a format that links the updated theoretical knowledge acquired in academic programs with practical experience to help preservice teachers understand when and how to apply this knowledge so as to internalize the comprehensive meaning of including pupils with ADHD.
- Teacher education programs should provide their students with opportunities to meet teachers who struggled but eventually succeeded in integrating pupils with ADHD in their mainstream classes.
- Conducting practical workshops can lead to recognition of the positive aspects of ADHD and how these can be used while planning inclusion processes in schools.
- Preservice teachers should be informed about the significance of developing various peer-learning activities and integrating them into their lesson plans. Activities that require pupils with and without ADHD to cooperate allow for the contribution of all participants according to their individual strengths, thus encouraging inclusion, as pupils see that their joint efforts lead to the successful completion of the assignment ([Hopkins et al., 2018](#)).

While pupils with ADHD probably face certain cognitive and emotional challenges in the classroom, at the same time, their presence also poses a challenge to their environment. In addition, the inclusion of adults with ADHD in the school's teaching staff sets the stage for creating positive attitudes toward the inclusion of pupils with ADHD. Educators should also recognize the ongoing challenges of teaching academic skills and imparting knowledge; teachers must constantly help these pupils stay focused. Awareness of these additional daily efforts probably influences teachers' opinions on inclusion processes in general. Therefore, providing them with opportunities to

develop positive attitudes and acquire practical strategies is a necessary step for the successful social and academic inclusion of pupils with ADHD.

It is important to mention one limitation of this study. All participants in this study were from a single country; therefore, we think that conducting the study in other cultures may contribute to the international understanding of the topic. In addition, we suggest that further inquiry be conducted applying qualitative methods, such as conducting individual interviews with preservice teachers, to gain a better understanding of their attitudes toward pupils with ADHD.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Achva Academic College's Ethics Committee. The patients/participants provided their written informed consent to participate in this study.

Author contributions

Both authors listed have made a substantial, direct, and intellectual contribution to the work, and approved it for publication.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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