

Attitudes toward stimulant medication for treating ADHD among physical education student teachers

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Published online: May 31, 2023

(Accepted for publication May 15, 2023)

DOI:10.7752/jpes.2023.05162

Abstract

When addressing attention deficit hyperactivity disorder (ADHD), professional guidelines tend to refer to stimulant medications (such as methylphenidates and amphetamines) as the main form of treatment. Yet the public's perceptions of pharmacological treatment for ADHD are controversial, with negative attitudes having an impact on adherence to treatment in children and adolescents. Teachers, who play a key role in the diagnosis, referral, and treatment of children with ADHD, are highly influential in children's adherence to their prescribed medication. Physical education student teachers (PEST) are trained to serve as role models regarding healthy behaviors and are expected to lead healthy lifestyles themselves. It is therefore important to examine the lifestyles and attitudes of this population regarding the use of harmful substances, the use of prescribed and non-prescribed stimulant ADHD medications, while comparing them to those of general education student teachers (GEST), who are not necessarily trained to actively promote healthy lifestyle behaviors. The aim of this study, therefore, was to compare between health behaviors and attitudes of PEST and GEST participants. Quantitative questionnaires were completed by 652 pre-service teachers (438 PEST and 214 GEST). Our findings indicate that less PEST participants reported smoking tobacco compared to GEST ones (5.4% vs 9.1%), while more PEST participants reported using marijuana or alcohol than GEST ones (6.1% vs 3.3% and 7.6% vs 4.8%, respectively). No differences were seen in the use of prescribed stimulant medication for ADHD. However, more PEST reported using non-prescribed stimulant medication for treating ADHD (14.7% vs 2.7%), or not taking their prescribed medication (94.1% vs 78.4%). Furthermore, PEST participants were less inclined to encourage their future students with ADHD to comply with stimulant treatment. These results raise concerns regarding the health behaviors and attitudes of future physical education teachers, and the implications on their students who are diagnosed with ADHD.

Keywords: Methylphenidate; misuse; substances; cigarettes; alcohol

Introduction

Current professional guidelines consider methylphenidate and amphetamine medications as the main stimulant medication for treating attention deficit hyperactivity disorder (ADHD) (Heath, 2010). Such medication has been found to improve core symptoms of ADHD (i.e., hyperactivity, impulsivity, and inattention), as well as associated functional impairments in ADHD patients (Huss et al., 2017). However, the public's perceptions of pharmacological treatment for ADHD are controversial (Jensen, 2000; Rowland et al., 2002), with negative attitudes possibly impacting the adherence of adolescents to such treatment. Adolescents may also be influenced by the beliefs of others regarding the necessity of such medications (Emilsson et al., 2017). Indeed, studies show that the adherence of children and adolescents to pharmacological treatment for ADHD is not optimal and could and should be improved (Charach & Gajaria, 2008).

As ADHD is a chronic condition, successful treatment requires consistent and ongoing adherence to therapy (Wolraich et al., 2019). Lack of adherence to pharmacological treatment may increase the risk of a wide range of negative ADHD-associated functional outcomes (Boland et al., 2020). Factors associated with low adherence to pharmacological treatment also include a range of child and familial characteristics (Cheung et al., 2021). For example, children with no siblings, and children of mothers with an average household income (rather than a high one), are more likely to adhere to treatment; on the other hand, girls, and children who began treatment aged 12 years or older (rather than at a younger age), are less likely to persist with such treatment.

Teachers play a key role in the diagnosis, referral, implementation, and treatment of children with ADHD, and are highly influential in children's adherence to such treatment. However, despite more than 10% of their students being prescribed with such medications, teachers report having limited knowledge of psychotropic treatment. They also report having little communication with parents or professionals, regarding the use of such medications or their side effects (Lien et al., 2007). With a constant increase in the large number of school

children and adolescents who are treated for their ADHD with stimulant medication (Thomas et al., 2015), it is important for teachers to possess research-based knowledge, rather than mistaken perceptions or attitudes regarding stimulant medication for treating ADHD.

Specifically, physical education (PE) teachers are an important group that should be addressed in this context, as health promotion aspects are at the essence of their profession (Sallis et al., 2012). As teachers of tomorrow, physical education student teachers (PEST) are trained to serve as role models regarding healthy behaviors, and as such, are expected to promote a healthy lifestyle within their schools (Webster et al., 2015). During their academic studies, PEST are required to take part in physical activities (PA) as part of their curriculum, with many also participating in sporting activities as a built-in component of their personal and professional lives (Hills et al., 2015). However, PEST may also be more susceptible to negative body images, eating disorders, and exercise disorders, compared to their same-aged peers who are involved in careers that are unrelated to food, health education, or exercise (Yager & O'Dea, 2009). People who exercise excessively are prone to a range of undesirable behaviors, such as exercise disorders, steroid administration, body image concerns, and eating disorders (O'Brien & Hunter, 2006). In turn, these health risks may increase the likelihood of inappropriate and precarious behaviors among PEST, which they may convey to the students that they teach in the future (Yager & O'Dea, 2009). Studies have examined attitudes, knowledge, and behaviors of PEST regarding various aspects of their future work (e.g., Åstrom 2018, Ferry 2020). Yet to the best of our knowledge, this is the first research to examine their attitudes and behaviors in relation to the use of harmful substances and the administration of stimulant medications for treating ADHD.

ADHD is often correctly and appropriately treated with prescription stimulants. Yet this specific class of medication has the potential of being abused, particularly among college students who may self-medicate with these drugs, without diagnosis or prescriptions, as a means for maximizing their academic achievements (Bavarian et al., 2013; Benson et al., 2015; Looby et al., 2013). Studies also show that people who use non-prescribed stimulants during college often continue to do so even after graduating (Holt & McCarthy, 2020). While the effects of stimulants on academic performance in non-ADHD college students are unclear, serious adverse health effects have been identified (Faraone et al., 2020). Moreover, it is of great concern that college students who are involved in the misuse of stimulant medication, including using unprescribed stimulants or transferring prescribed medications to others, may underestimate associated risks, while overestimating related benefits (Kinman et al., 2017). Despite their importance and advantages, the problematic aspects of ADHD medication stimulants are twofold, as on the one hand, people who have not been diagnosed with ADHD may self-administer such treatment, while those who have been diagnosed may choose not to use them – rather than adhering to medical guidelines.

Discrepancies exist between medical recommendations for people with ADHD and certain public perceptions regarding the effectiveness or harmfulness of such treatment. In this study, we therefore examine these attitudes among PEST, and compare them to general education student teachers (GEST), who are not necessarily trained or inclined to actively promote healthy lifestyle behaviors. In this study, we hypothesize that as PEST participate in a large number of academic courses on human physiology, physical activity, and health consequences, they will show more positive health behaviors and attitudes compared to GEST students. Thus, the aim of this study was to compare health behaviors and attitudes regarding ADHD treatments between PEST and GEST participants, including adherence to stimulant medication for treating ADHD.

Material and Methods

Participants

A total of 652 respondents completed the questionnaire, including 438 PEST and 214 GEST participants. A Web-based questionnaire was distributed via E-mail and social media, to 4,000 education student teachers from four different colleges in Israel. By positively responding to the first question on the questionnaire, the participants conveyed their agreement to take part in the research.

Questionnaire

The questionnaire was designed by two ADHD experts and evaluated by two additional experts, as a means for assessing the use and misuse of prescription stimulants and other harmful substances (Table 1). The questionnaire, which also screened students' health habits, included 41 items regarding general information, use of stimulant medication for treating ADHD, and attitudes towards such medication. The study was approved by the Institutional Review Board of the authors' affiliated academic institution (#123).

The participants were asked to answer 22 questions for providing background information, including demographics, medical background, and academic education. The participants were also asked about their regular consumption of substances (including ADHD treatments), based on a given list (yet they could add additional substances to this list). Some substances are illegal in Israel (such as marijuana and psychoactive drugs) or are considered harmful (such as alcohol, tobacco, and cigarettes).

Next, participants who stated that they use at least one stimulant medication for treating ADHD were asked to respond to 18 additional items regarding stimulant use and misuse. For example, which stimulants do you use? Were you administered these stimulants through a doctor's prescription? Have there been occasions

when you chose not to take your prescribed medication? Have you been formally diagnosed with ADHD? Does your stimulant treatment affect the way you feel? Do you feel that the stimulant affects your physical performance during physical activity?

Finally, all participants were asked to express their attitudes towards stimulant therapy, via the following question: "In the future, if you are a teacher, will you recommend that your students use stimulant medication for treating their ADHD?"

Table 1
Questionnaire structure

	Answered by	Number of items	Content
General information	All participants	22	Demographic, medical, and academic education information
Use of cigarette, alcohol and illegal drugs	All participants	22	
Characteristics of ADHD Stimulant use	Stimulant users	18	Stimulant treatment for ADHD and misuse of stimulants
Opinion on stimulant for ADHD medication treatment	All participants	1	Will you recommend that your students use stimulants for the treatment of ADHD?

Statistical Analysis

Analyses were carried out using SPSS Statistics for Windows (2017) version 25.0 (IBM Corp, Armonk, NY, USA). As most variables were a-parametric, significant differences between PEST and GEST participants were determined through chi-square tests. Numerical characteristic variables were analyzed through t-tests.

Results

The PEST group included significantly more male students than the GEST group (43.4% and 11.7%, respectively). Furthermore, more students in the PEST group reported participating in PA, not having chronic diseases, and not regularly administering medication. No differences were found between the groups regarding their age or body mass index (BMI) (Table 2).

Table 2
Social and demographic subjects' characteristics

	PEST (n=438)	GEST students (n=214)
	Percentage (n)	Percentage (n)
Male **	43.38% (190)	11.68% (25)
Female**	56.62% (248)	88.32% (25)
Age (years)	28.89±5.99	29.47±6.75
BMI	22.87±3.01	23.35±4.50
PA participation **		
Amateur sport	73.52% (322)	56.54% (121)
Professional sport	24.89% (109)	3.74% (8)
Not participating in PA	1.60% (7)	39.72% (85)
Reported chronic diseases a **	13.24% (58)	23.84% (51)
Chronic medication use b **	14.84% (65)	30.37% (65)
Use stimulant ADHD medications	15.3% (68)	17.3% (37)

PEST – physical education student teachers; GEST – general education teacher students. * $p \leq .05$; ** $p \leq .001$, significant difference between GEST and PEST

^a such as Crohn disease, anemia, asthma, hypothyroidism, etc.

^b such as ADHD stimulants and other medications such as thyroid hormones, contraceptives, insulin, iron supplements, SSRIs, and cardiac medications.

As seen in Table 3, the prevalence of alcohol, cigarettes, and marijuana consumption differed significantly between the two groups, whereby more students from the PEST group reported that they do not use any harmful substances whatsoever (not including prescribed medication), and fewer reported smoking cigarettes or drinking alcohol. Interestingly, less PEST reported regular use of pain killers. Seven students reported using illegal stimulating drugs (not for ADHD): three from the PEST and four from the GEST group.

Table 3

Differences of Prevalence of Substance Use among PEST and GEST students. The only reported substances used were Marijuana. Alcohol Cigarettes and Pain medications

	Physical Education (N=438)	General Education (N=214)
	Percentage (n)	Percentage (n)
Not using substances ¹ *	43.0% (176)	31.1% (65)
Regular use of Marijuana	12.2% (50)	17.7% (37)
Regular use of Alcohol *	14.9% (61)	26.3% (55)
Regular use of Cigarettes *	10.7% (44)	27.7% (58)
Regular use of Pain killing drugs *	5.1% (21)	11.9% (25)

¹ not using alcohol, cigarettes, any legal or illegal drugs or medications, * $p \leq .05$

Analysis of the participants' behaviors regarding the use of stimulant medication for treating ADHD revealed that 15.3% of the PEST participants and 17.3% of the GEST respondents were using such medications at the time of the study. In both groups, immediate-release methylphenidate was the most frequently used (PEST: 11.0%; GEST: 8.9%); the second most frequently used stimulant was the extended-release methylphenidate. More PEST participants reported to be currently using non-prescribed ADHD stimulants than GEST ones (14.7% vs 2.7%, respectively).

When compared to the GEST group, the PEST group included more male participants, lower BMI, and higher reported PA; they also reported less chronic diseases, use of other medications, alcohol consumption, or cigarette smoking. The PEST group reported using prescribed medication for a shorter period, many only having started ADHD treatment over the previous year – compared to GEST participants; however, no differences were seen in the frequency of their use of ADHD treatments. More participants in the PEST group reported occasionally choosing to not use stimulants, partly as it interferes with their PA. Similar to the PEST group as a whole, the subgroup of stimulant users within the PEST group reported participating more often in PA, less chronic diseases (not including ADHD), less medications (other than stimulants for ADHD), and less alcohol consumption and cigarette smoking compared to the stimulant users within the GEST group (Table 4).

Table 4

Characteristics of subjects using prescribed ADHD stimulants presented as percentage (number)

	PEST (58)	GEST (36)
Male*	43.4% (24)	16.7% (6)
Women*	58.62% (34)	83.3% (30)
Age (years)	25.98±4.6	27.91 ±7.3
BMI*	22.95±2.7	24.70±4.5
Participation in PA**		
Amateur	81.8% (47)	61.1% (22)
Professional	19.0% (11)	2.8% (1)
Not participating in PA	0	36.1% (13)
Have chronic disease*	15.5% (9)	36.1% (13)
Regular use of medication (not ADHD stimulants)*	39.7% (23)	61.1% (22)
Use alcohol regularly**	16.4% (9)	42.4% (14)
Use cigarettes regularly**	10.9% (6)	51.5% (17)
Duration of using ADHD stimulants**		
Up to six months	37.9% (22)	11.4% (4)
1/2 - 1 year	20.7% (12)	11.4% (4)
2-3 years	22.4% (13)	28.6% (10)
3-4 years	5.1% (3)	25.7% (9)
5 years and more	13.8% (8)	22.9% (8)
Frequency of using ADHD stimulants		
Once a week or less	6.4% (6)	5.3% (5)
2-4 times a week	43.1% (25)	41.7% (15)
5 days a week or more	24.1% (14)	19.4% (7)
Occasionally	22.4% (13)	22.2% (8)
Situation not taking ADHD stimulants*	94.8% (55)	77.8% (28)
Prefer not taking ADHD stimulant because of PA	19.6% (10)	3.7% (1)

PEST – physical education student teachers; GEST – general education teacher students. * $p \leq .05$; ** $p \leq .001$, significant difference between GEST and PEST

The final question that the participants were asked was, "In the future, if you are a teacher, will you recommend that your students use stimulants for treating ADHD?" Significant differences were seen between the two groups (Table 5), whereby PEST respondents were more decisive *against* recommending the use of stimulants (e.g., "I will recommend that the pupil does not use such stimulants"; "I will only recommend using such medications as a last resort "; or "I will recommend that the pupil uses the medication as infrequently as possible"). GEST students were less decisive in their objection to their future pupils' use of stimulants, responding that their recommendations regarding ADHD treatment will depend on several variables, such as the child's symptoms and social status. Relatively few students in either group answered that they would refer the student to a professional, or that they would adhere to a professional's recommendation. In the subgroup of current stimulant users, about 27.6% of the PEST and 19.4% of the GEST respondents stated that they would not recommend the use of such medications among children.

Table 5
Attitudes of Education Students toward Use of ADHD Treatment of their Future Students.
Answers to the question: Will you recommend stimulants for your future students?

Significant differences were found between the answers of PEST compared to that of GEST students, $p \leq .001$

	PEST (n=438)	GEST students (n=214)
	Percentage (n)	Percentage (n)
It's not my duty to recommend	11.9% (52)	8.5% (18)
I will refer the child to a specialist	4.8% (21)	6.6% (14)
I will follow physician recommendation	4.8% (21)	8.9% (19)
It depends	13% (57)	25.3% (54)
Yes, I will recommend	8.7% (38)	11.3% (24)
I know nothing about it, so I will not recommend	0.7% (3)	0.5% (1)
I will recommend to use as little as possible	0.45% (2)	0% (0)
I will recommend as the last option	6.4% (28)	3.7% (8)
I will recommend not to use stimulants	42.2% (185)	26.3% (56)

Discussion

The aim of the research presented in this paper was to examine the health behaviors and attitudes of future teachers (PE and general education) regarding stimulant medication for treating ADHD among children. Our findings indicate that in line with their expected role as health promoters, PEST respondents tend to engage in PA, do not smoke, and do not consume alcohol, compared to GEST respondents. These findings are in line with previous studies, whereby PEST respondents tend to consume less alcohol and cigarettes than other college students (Bogati et al., 2020; Sharareh et al., 2020). Indeed, researchers state that differences in smoking and alcohol usage might be the result of the students' major academic field of studies (Chen & Chen, 2020) or living location (Firth et al., 2020). In addition, fewer PEST respondents reported having chronic diseases or using medications other than ADHD-related stimulants. These differences between the two groups may stem from their healthier lifestyles and behaviors, as well as their predisposed characteristics of young adults who chose to embark on a PE-related career.

An additional aspect of health promotion that was evaluated in this study relates to the behaviors and attitudes of future teachers regarding stimulant medication for treating ADHD. Although a similar prevalence of personal use of such medications was seen in both groups, more students from the PEST group stated that they sometimes refrain from using these stimulants that they have been prescribed, or on the other hand – that they take non-prescribed stimulants. The prevalence of stimulants used for ADHD treatment seen in the present study, for both groups of participants, is similar to that seen in college students in other fields of study (Advokat et al., 2011). However, in the present study, the prevalence of students diagnosed with ADHD who reported using non-prescribed stimulant medications is higher than that reported by the other students (Green & Rabiner, 2012), and is significantly higher among the PEST group than the GEST group.

The findings of this study indicate worrying behaviors in future PE teachers, in relation to stimulant medications for treating ADHD, conveying perhaps insufficient respect for professional medical opinions, or alternatively suggesting increased self-sufficiency, whereby the participants perceive themselves as being able to make their own related medical decisions. Lack of respect for professional opinions can also be seen in the respondents' answer to the question, "In the future, if you are a teacher, will you recommend that your students use stimulant medication for treating their ADHD?" Disturbingly, more than half the participants in the PEST

group answered that they would not recommend the use of such stimulants for their future students, and very few reported that they would follow a doctor's recommendation concerning the treatment of students with ADHD (compared to the GEST group). Despite teachers having limited knowledge on topics such as ADHD (Lien et al., 2007), the findings of this study suggest that many future teachers believe that they are capable of offering medical advice and even making medication-related decisions for their future students with ADHD.

Practical application

We believe that it is crucial to educate pre-service teacher students, mainly PEST, about ADHD and its treatment through stimulant medication. These future teachers should also be made aware of their possible impact on their future students, including the latter's adherence to prescribed medical treatment for treating ADHD.

Conclusions

Teachers play an important role in the treatment and management of children and adolescents with ADHD. As such, we evaluated the behavior and attitude of PEST respondents, young adults who are currently training to become PE teachers, and as such, are expected to actively promote health behaviors. The findings of this study indicate that PEST respondents tend to engage in PA, do not smoke, and do not consume alcohol, more than GEST respondents. Although the prevalence of using stimulants was similar among both groups, more respondents in the PEST group reported not following the physician's recommendations regarding the use of these stimulants. They were also more decisively against their future students' using stimulant medication, with more of them stating that they would not recommend stimulant treatment for them. This negative attitude among PEST respondents regarding stimulant treatment for others is highly concerning, as they are soon to be in a position where they can influence the adherence or children and adolescents to prescribed ADHD treatment.

Conflict of Interests

The authors declare no conflict of interest and no funding resources regarding this study.

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