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Cognizance and perception of physiotherapy intervention in attention-deficit/hyperactivity disorder amongst clinical physiotherapy students in tertiary institution, Nigeria

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Abstract

Background This study examines the cognizance and perception of physiotherapy intervention in ADHD amongst clinical physiotherapy students in a tertiary institution and, also, determines the relationship of the study variables on the socio-demographic characteristics.

Methods This study is a cross-sectional survey and employed a convenient sampling technique to recruit 137 respondents. A cognizance and perception questionnaire was used as the survey instrument to obtain data. Descriptive statistics of frequency, mean, and standard deviation were used to analyse the socio-demographic characteristics. Spearman rank correlation was used to analyse the relationship amongst the variables of cognizance of attention-deficit/hyperactivity disorder (COG-ADHD), perception of attention-deficit/hyperactivity disorder (PERCEP-ADHD), cognizance of physiotherapy intervention (COG-PT_ITV), and perception of physiotherapy intervention (PERCEP-PT_ITV). The Mann-Whitney *U* test was used to test the influence of socio-demographic characteristics of age and the level of study on the cognizance and perception of ADHD. Variables having a p-value < 0.05 were considered statistically significant.

Result The majority of the respondents (63.5%) had high cognizance of physiotherapy intervention for ADHD, while the majority of the respondents (60.6%) had a fair perception of physiotherapy intervention for ADHD. A significant proportion of respondents (26.3%) had no source of information on ADHD before the study. Cognizance of ADHD significantly correlated with perception of ADHD, ADHD, perception of physiotherapy intervention in ADHD, and cognizance of physiotherapy intervention in ADHD. There were significant positive correlations between gender and cognizance of physiotherapy intervention in ADHD and between the level of study and perception of ADHD.

Conclusion Respondent's perception of physiotherapy intervention in ADHD was relatively low; in contrast, their cognizance was relatively satisfactory. Strengthening their cognizance and perception is paramount.

Keywords Cognisance, Perception, Attention deficit, Hyperactivity disorder, Physiotherapy, Clinical, Students

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Background

Attention-deficit/hyperactivity disorder (ADHD) is a mental health condition that can cause some levels of hyperactivity and impulsive behaviours [1]. It is the most common childhood neurodevelopmental disorder [2]. ADHD is generally characterized by the inability to sustain attention, modulate activity level, and moderate impulsive actions; thus, the result is maladaptive behaviours that are inconsistent with age and developmental level [3]. Many individuals with ADHD may have additional difficulties in their motor skills, including problems with their coordination, and may often appear physically clumsy [4].

Although the diagnosis is made in childhood, ADHD can progress into adolescence and adulthood [5] and may negatively affect functional outcomes [6, 7]. In adults, this disorder may cause trouble getting organized, remembering appointments, or even having trouble keeping a job; hence, activities of daily living (ADL) are compromised because the child finds it difficult to focus attention on one task at a time [8].

A child with the health challenge under discussion might daydream a lot, forget or lose things a lot, squirm or fidget, talk too much, make careless mistakes or take unnecessary risks, have a hard time resisting temptation, have trouble taking turns, and have difficulty getting along with others [9]. It has been reported that symptoms experienced by the involved persons get lesser as one ages and that coping strategies can be learned by those whose symptoms refuse to abate [10]. The symptoms of ADHD can be categorized into two types of behavioural problems: inattentiveness, and hyperactivity and impulsiveness [11]. These symptoms can be mild, moderate, or severe and occur more often in males than in females [10]. Previous literature reported that bone fractures are common among children with ADHD, because of the increased vulnerability to accidental injuries [12].

It is normal for children to have trouble focusing and behaving at one time or another; however, children with ADHD do not just grow out of these behaviours [9]. To be diagnosed with ADHD, a person must show symptoms for more than 6 months and in more than one setting [13]. Deciding if a child has ADHD is a process with several steps as there is no single test to diagnose ADHD, and many other problems, like anxiety, depression, sleep problems, and certain types of learning disabilities, can have similar symptoms [9]. Developmental problems, like language delays, can also be mistaken for ADHD; therefore, children at the preschool age or younger suspected of having ADHD are more likely to need an evaluation from a specialist (i.e. psychologist, psychiatrist, speech pathologist, developmental paediatrician) [13]. Diagnosing ADHD usually includes a checklist for rating ADHD symptoms and taking a history of the child from parents, teachers, and sometimes, the child [9].

Despite much research, little is known regarding the aetiology of this disorder [14]. Factors that may be involved in the development of ADHD include genetics, the environment, or problems with the central nervous system at key moments in development [10]. This disorder is characterized by motor, perceptual, cognitive, and behavioural disorders, expressing global difficulties in child development [15]. Alongside displaying hyperactivity and poor concentration skills, they have difficulty with writing, tying shoelaces, eating properly using fork and knife, and playing games and sports, which is generally known as dyspraxia or developmental coordination disorder (DCD) [16].

A multidisciplinary approach is recommended for the treatment of ADHD with emphasis on subtypes and the comorbidities that are associated [15, 17]. Diagnosis of ADHD in a child brings a huge concern to the parents that they become worried about which treatment is right for their child, whereas ADHD can be managed with the right treatment [18]. There are many treatment options, and what works best can depend on the individual child and family; hence, to find the best options, it is recommended that parents work closely with others involved in their child's life: healthcare providers, therapists, teachers, coaches, and other family members [18].

The aim of physiotherapy for individuals with attention-deficit/hyperactivity disorder is to maximize their functional ability and develop motor skills to minimize the risk of pain and postural problems [4]. Through physical therapy, many interventional techniques are applied such as massage therapy and chest physiotherapy to reduce anxiety, stress, and muscle tension caused by ADHD and thus promote relaxation and improve the quality of life [15, 19]. Also, previous findings have shown that physical exercise in children and adults (with or without ADHD) promotes intellectual function, cognitive ability, and academic achievement; this could suggest that regular exercise training may alter brain functions that underlie cognition and behaviour, as well as the underlying physiology present in ADHD [20–23].

Improvements in neurobehavioural functions have been demonstrated, including reduced impulsivity and hyperactivity, improved attention, and enhanced performance on executive functioning tasks [19]. Physiotherapy management using multiple approaches, namely motor perception, sensory integration therapy, kinesiotherapy, neurobehavioural performance, and a motor intervention programme, also showed significant improvements in balance, fine motor skills, body image, and temporal organization in children with ADHD [24].

There is a dearth of published studies on the role of physiotherapy in the area of psychiatry. Thereby, it emerged the concern to assess the importance of physical therapy techniques in children with ADHD. Antecedent studies on the cognizance and perception of ADHD also revealed that the majority of participants had partial knowledge about the disorder. However, there have been limited studies that specifically dealt with the cognizance and perception of physiotherapy students towards physiotherapy intervention in ADHD. This study explored the levels of cognizance and perception of physiotherapy intervention in ADHD amongst clinical physiotherapy students in the College of Health Sciences, Nnewi Campus, Anambra State. We believe that the outcome of this study will help to bridge the knowledge gap in this area of study among the population of study.

Methods

Thecctional study that aimed to determine the cognizance and perception of physiotherapy intervention in ADHD amongst clinical physiotherapy students at Nnamdi Azikiwe University, Nnewi Campus.

Research design

This was a cross-sectional survey.

Setting of the study

The participants comprised fourth- and fifth-year physiotherapy students of the Department of Physiotherapy, Faculty of Health Sciences and Technology, College of Health Sciences, Nnamdi Azikiwe University, Nnewi, Anambra State. They comprised male and female students who have entered the clinical phase of their training.

Sample size determination

The sample size was calculated using the Taro Yamane formula: $n = N/1 + N(e)^2$. It was used to get 136 as the minimum sampled size. A convenience sampling technique was used to recruit participants (clinical physiotherapy students) from the Department of Medical Rehabilitation College of Health Sciences, Nnamdi Azikiwe University, Nnewi Campus, Anambra State.

Eligibility criteria

Those who participated in the study included fourth- and fifth-year clinical students of the Department of Medical Rehabilitation (Physiotherapy), Faculty of Health Sciences and Technology, College of Health Sciences, Nnamdi Azikiwe University, Nnewi, Anambra State. Those students who were not at the clinical stage of the study were not allowed to participate.

Study instrument

CAP-ADHD questionnaire

The questionnaire for this study is a 43-item self-administered questionnaire (Appendix 1) that was self-developed. It was a 5-point Likert scale. It incorporates dichotomous and multiple choice questions on demographics, general and specific cognizance of ADHD and its physiotherapy intervention, and the perception of ADHD and its physiotherapy intervention.

Questionnaire validation

Before application, the study instrument was checked and certified for content validity by a panel of five renowned and experienced academics. The content validity index (CVI) score of 100% was assigned after the review by the five research experts Both Item content validity (I-CVI) which assesses the relevance and clarity of each item in relation to the construct being measured and is calculated as the number of experts who rated an item as being relevant or clear divided by the total number of experts, and Scale Content Validity Index (S-CVI) which measures the content validity for the entire scale or instrument and is calculated by summing the I-CVI values for all items and then dividing by the total number of items were employed. The validation by the five experts followed a group discussion with them with a view to extracting their opinions on the degree of clarity and comprehension of each item contained in the CAP-ADHD Questionnaire. The purpose was to determine if the components of the measure were relevant to the variable being measured in this study. After the interactions with the expert panellists and checking on the questionnaire items, there was a consensus opinion that the items in the amended questionnaire measure what they are supposed to measure. The study instrument was also pilot-tested with fifteen randomly selected students of the Faculty of Health Science and Technology, Nnamdi Azikiwe University, Nnewi Campus. The purpose of the pilot testing was to check with the respondents from another population that each questionnaire item was understandable, and the questions which were found not to be clearly understood were revised or removed. The combination of expert opinion and pilot testing made the researchers confident to apply the questionnaire in this study.

The research instrument is divided into five sections (A, B, C, D, and E): section A—demographic data (3 items); section B—general and specific cognizance of ADHD (10 items); section C—perception of ADHD (10 items); section D—cognizance of physiotherapy intervention in ADHD (10 items); and section E—perception of physiotherapy intervention in ADHD (10 items).

Scoring

The level of cognizance of ADHD and its physiotherapy intervention (sections B and D) was determined by the number of statements/questions answered correctly out of the total number of questions. Every "incorrect" or "undecided" to any correct statement was given a score of 0 while every "correct" to an incorrect statement was given a score of 0 as well. Every "correct" to a correct statement was assigned a value of 1 while every "incorrect" to any incorrect statement was also assigned a score of 1. The score of each participant was converted to a percentage, and the level of cognizance of ADHD and its physiotherapy intervention were scored as follows: poor/low cognizance, 0–30%; fair/moderate cognizance, 31–60%; and good/high cognizance, 61–100%

The level of perception of ADHD and its physiotherapy intervention (sections C and E) was scored on a 5-point Likert scale. Correct statements commenced from 1 indicating "strongly disagree" to 5 for "strongly agree" for the items. Incorrect statements commenced from 5 indicating "strongly disagree" to 1 for "strongly agree" for the items. Scores were classified as follows: poor/low perception, 10–30; fair/moderate perception, 31–40; and good/high perception, 41–50.

Procedure for data collection

Ethical approval was obtained from the Institutional Ethics Committee of the Faculty of Health Sciences and Technology, Nnamdi Azikiwe University, before the commencement of this study. Before the administration of the questionnaire, the respondents were fully informed about the purpose of the study, informed consent was obtained, and the confidentiality of the respondents was strictly maintained. The participants were asked to answer the questions in the instrument as explicitly as possible and were allowed to complete the questionnaire. Completed copies of the questionnaire were retrieved on the same day. The entire data for this study were collected for 3 weeks after which it was recorded and sorted before analysis.

Analysis of data

The data obtained from this study were summarized and analysed using frequency count, percentages, mean, standard deviation, Spearman's rank correlation test at 0.05 level of significance, and Mann-Whitney *U* test at 0.05 level of significance. The Shapiro-Wilk test was used to test for the normality of data.

Results

Socio-demographic characteristics of the study participants

A total of 137 undergraduate physiotherapy students (44.5% males and 55.5% females) with a mean age of 23.394 ± 1.763 participated in this study. All participants were in their clinical phase of the study in the College of Health Sciences, Nnewi Campus, Anambra State. Fifty-nine (43.1%) were in the 400 level while 78 (56.9%) were in the 500 level. A significant proportion of participants (26.3%) had no source of information on ADHD before the study. Supplementary participants reported their sources of information as hearsay (5.1%), doctor/brochure (14.6%), social media (19.0%), books/newspaper (12.4%), family/friends (5.8%), and websites (16.8%) (Table 1).

Summaries of participants' scores on the CAP-ADHD questionnaire

The participants' mean score for cognizance of ADHD (70.657 ± 23.079) was suggestive of moderate to high cognizance of attention-deficit/hyperactivity disorder. Out of 137 respondents involved in this study, 11 (8.0%) had poor cognizance of ADHD, 31 (31%) had fair cognizance of ADHD, and 95 (69.3%) had good cognizance of ADHD (Table 2).

The participants' mean score for the perception of attention-deficit/hyperactivity disorder (35.263 ± 4.396) was suggestive of a low perception of attention-deficit/hyperactivity disorder. Out of 137 respondents, 22 (16.1%) had a poor perception of ADHD, 98 (71.5%) had a fair perception of ADHD, and 17 (12.4%) had a good perception of ADHD (Table 2).

The participants' mean score for cognizance of physiotherapy intervention of ADHD (68.759 ± 21.674) was suggestive of moderate to high cognizance of physiotherapy intervention of ADHD. Out of 137 respondents involved in this study, 7 (5.1%) had poor cognizance of ADHD, 43 (31.4%) had fair cognizance of ADHD, and 87 (63.5%) had good cognizance of ADHD (Table 2).

Table 1 Socio-demographic characteristics of the study participants

Variable	Frequency (%)	Mean ± SD
Age		23.394 ± 1.763
Gender		
Male	61 (44.5)	-
Female	76 (55.5)	
Level		
400 level	59 (43.1)	-
500 level	78 (56.9)	
Source of info.		
No info		36 (26.3)
Hearsay		7 (5.1)
Doctors/brochure		20 (14.6)
Social media		26 (19.0)
Books/newspaper		17 (12.4)
Family/friends		8 (5.8)
Websites		23 (16.8)

Table 2 Summaries of participants' scores on the CAP-ADHD Questionnaire

Variable	Frequency (%)	Mean ± SD
COG-ADHD		**70.657 ± 23.079**
COG-ADHD-CTGRY		-
Poor Cog. ADHD	**11 (8.0)**	
Fair Cog. ADHD	**31 (31)**	
Good Cog. ADHD	**95 (69.3)**	
PERCEP.ADHD		**35.263 ± 4.396**
PERCEP.ADHD-CTGRY		-
Poor Percep. ADHD	**22 (16.1)**	
Fair Percep. ADHD	**98 (71.5)**	
Good Percep. ADHD	**17 (12.4)**	
COG-PT-ITV	**68.759 ± 21.674**	
COG_PT-ITV-CTGRY		-
Poor COG-PT-ITV	**7 (5.1)**	
Fair COG-PT-ITV	**43 (31.4)**	
Good COG-PT-ITV	**87 (63.5)**	
PERCEP-PT-ITV		**39.112 ± 4.665**
PERCEP-PT-ITV-CTGRY		-
Poor Percep-PT-ITV	**8 (5.8)**	
Fair Percep-PT-ITV	**83 (60.6)**	
Good Percep-PT-ITV	**46 (33.6)**	

The participants' mean score for the perception of physiotherapy intervention in ADHD (39.112 ± 4.665) was suggestive of a low perception of physiotherapy intervention in ADHD. Out of 137 respondents involved in this study, 8 (5.8%) had a poor perception of ADHD, 83 (60.6%) had a fair perception of ADHD, and 46 (33.6%) had a good perception of ADHD (Table 2).

Spearman rank correlation showing the relationship among COG-ADHD, PERCEP-ADHD, COG-PT_ITV, PERCEP-PT_ITV, and Age ($n = 137$)

There were significant positive correlations between cognizance of ADHD and perception of ADHD (rho = 0.326, $p < 0.001$). Cognizance of physiotherapy intervention in ADHD was also significantly correlated with perception of physiotherapy intervention in ADHD (rho = 0.452, $p < 0.001$). There was a significant positive correlation between cognizance of ADHD and cognizance of physiotherapy intervention in ADHD (rho = 0.264, $p = 0.002$). There were also varying positive correlations between the perception of ADHD and the perception of physiotherapy intervention in ADHD (rho = 0.374, $p < 0.001$) but a significant negative correlation between age ($n = 137$) and all the variables (Table 3).

Influence of gender and level of study on COG-ADHD, PERCEP-ADHD, COG-PT_ITV, and PERCEP-PT_ITV

A Mann–Whitney *U* test was used to correlate the variables against the gender of the participants. There were significant correlations between gender and cognizance of physiotherapy intervention in ADHD ($p = 0.025$) with the males having higher mean rank scores. This showed that males had higher levels of cognizance of physiotherapy intervention in ADHD than females. There were no significant relationships between gender and all other variables among the participants (Table 4).

Influence of level of study on COG-ADHD, PERCEP-ADHD, COG-PT_ITV, and PERCEP-PT_ITV

The level of study of the participants was also correlated using the Mann-Whitney *U* test.

There were significant correlations between the level of study and perception of ADHD ($p = 0.011$) with the 500 level having higher mean rank scores. This showed that 500-level students had a higher perception of ADHD than 400-level students. There were no significant relationships between the level of study and all other variables among the participants (Table 5).

Discussion

This study was designed to examine the cognizance and perception of physiotherapy intervention in ADHD amongst clinical physiotherapy students in the College

Table 3 Spearman rank correlation showing the relationship between COG-ADHD, PERCEP-ADHD, COG-PT_ITV, PERCEP-PT_ITV, and age ($n = 137$)

Variable	COG-ADHD	PERCEP-ADHD	COG-PT_ITV	PERCEP-PT_ITV	Age
COG-ADHD	–	**$r = 0.326, p < 0.001$***	**$r = 0.264, p = 0.002$***	**$r = 0.225, p = 0.008$***	**$r = -0.099, p = 0.249$**
PERCEP-ADHD	–	–	**$r = 0.230, p = 0.007$***	**$r = 0.374, p < 0.001$***	**$r = 0.037, p = 0.670$**
COG-PT_ITV	–	–	–	**$r = 0.452, p < 0.001$***	**$r = 0.050\ p = 0.561$**
PERCEP-PT_ITV	–	–	–	–	**$r = 0.068, p = 0.427$**
Age	–	–	–	–	–

COG-ADHD cognizance of ADHD, *PERCEP-ADHD* perception of ADHD, *COG-PT_ITV* cognizance of physiotherapy intervention in ADHD, *PERCEP-PT_ITV* perception of physiotherapy intervention in ADHD

* Spearman rank correlation coefficient (*r*) is significant at $p < 0.05$

* Significant at $p < 0.005$

Table 4 Mann–Whitney *U* test showing the influence of the gender of participants on COG-ADHD, PERCEP-ADHD, COG-PT_ITV, and PERCEP-PT_ITV ($n = 137$)

Variable	Mean rank	*U*-value	*p*-value
COG-ADHD	Male = 71.89 Female = 66.68	2141.50	0.438
PERCEP-ADHD	Male = 68.70 Female = 69.24	2299.50	0.936
COG-PT_ITV	Male = 77.38 Female = 62.28	1807.00	0.025*
PERCEP-PT_ITV	Male = 76.40 Female = 63.06	1866.5	0.050

* Significant at $p < 0.05$

Table 5 Mann-Whitney *U* test showing the influence of the level of study on participant's COG-ADHD, PERCEP-ADHD, COG-PT_ITV, and PERCEP-PT_ITV ($n = 137$)

Variable	Mean rank	*U*-value	*p*-value
COG-ADHD	400 level = 63.32 500 level = 73.29	1966.00	0.140
PERCEP-ADHD	400 level = 59.14 500 level = 76.46	1719.00	0.011*
COG-PT_ITV	400 level = 62.19 500 level = 74.15	1899.500	0.077
PERCEP-PT_ITV	400 level = 71.77 500 level = 66.90	2137.500	0.476

* Significant at $p < 0.05$

of Health Sciences, Nnewi Campus, Anambra State. The respondents were made up of clinical physiotherapy students in the aforementioned institution, comprising 61 males and 76 females. One hundred and thirty-seven questionnaires (87 online Google Forms and 50 printed forms) were distributed using a convenience sampling technique. The sample as a whole was relatively young (M = 23.394, SD = 1.763). Respondents reported their source of information as hearsay (5.1%), doctor/brochure (14.6%), social media (19.0%), books/newspapers (12.4%), family/friends (5.8%), and websites (16.8%). A greater proportion (26.3%) of respondents dismissed having heard of ADHD before the data collection process and reported zero sources of information about ADHD. However, such persons were also allowed to complete the questionnaire and were enlightened briskly on the nature of ADHD after successful completion of the questionnaire, thus fulfilling one of the goals of this study: enlightenment of participants on the aforesaid disorder. Antecedent studies on the cognizance and perception of ADHD also revealed that the majority of participants had partial knowledge about the disorder [25].

Cognizance of ADHD and physiotherapy intervention in ADHD

The result obtained from this study showed higher scores on cognizance of ADHD and higher scores on cognizance of physiotherapy intervention in ADHD. About 69.3% and 63.5% had high cognizance of ADHD and high cognizance of physiotherapy intervention in ADHD, respectively. This may not be unconnected to the fact that precedent surveys have reported higher levels of cognizance of ADHD amongst medical students and paediatricians than the general public [26]. This might also be a result of the fast rise in technological use, as a greater number of respondents reported social media as the main source of information. The main sources of information about ADHD have been reported to be the internet (67%), friends (47%), TV (34%), and reading books (23%) [27]. According to the law of accelerating returns, the pace of technological progress, especially information technology, speeds up exponentially over time because there is a common force driving it forward. Being exponential, as it turns out, is all about evolution [28]. Another study also reported higher levels of cognizance of ADHD amongst persons in close contact with friends or relatives with ADHD [29].

Perception of ADHD and physiotherapy intervention in ADHD

The result obtained from this study showed lesser scores on the perception of ADHD and lesser scores on the perception of physiotherapy intervention in ADHD (i.e. negative attitudes). About 71.5% and 60.6% had a fair perception of ADHD and a fair perception of physiotherapy intervention in ADHD, respectively. Only 12.4% and 33.6% of respondents had a good perception of ADHD and a good perception of physiotherapy intervention for ADHD, respectively. This may not be unrelated to the fact that the respondents (400 level and 500 level students) who are in their clinical phase of study have dealt with minimal cases of ADHD, seeing as most persons with ADHD symptoms are either ignorant or sceptical about reporting to health facilities for proper medical check-up and evaluation. Although ADHD is one of the most common developmental disorders, it is also one of the most misunderstood. Myths about ADHD can harm people living with the condition [30]. A previous study reported poor to very poor levels of perception of ADHD [26].

Significant correlations between variables

Based on the analysis via Spearman's rank correlation test, cognizance of ADHD significantly correlates with perception of ADHD. Thus, a higher level of cognizance would yield a higher level of perception of ADHD and

vice versa. This study also showed significant correlations between cognizance of physiotherapy intervention in ADHD and perception of physiotherapy intervention in ADHD; hence, a lower or higher level of cognizance of physiotherapy intervention in ADHD will be associated with a lower or higher perception of physiotherapy intervention in ADHD. Similar correlations were also found for the perception of ADHD and perception of physiotherapy intervention in ADHD, cognizance of ADHD, and cognizance of physiotherapy intervention in ADHD. This may not be unconnected to the fact that people understand and perceive things based on how well-versed they are about the said topic. Gaining knowledge mediates changes in perception [31].

Based on the analysis via the Mann-Whitney *U* test, there were significant positive correlations between gender and cognizance of physiotherapy intervention in ADHD ($p=0.025$) with the males having higher mean rank scores (77.38) than females (62.28). Thus, according to this study, males have higher levels of cognizance of physiotherapy intervention for ADHD. Proper research is yet to be made as to why males would have higher cognizance of physiotherapy intervention in ADHD than females; however, results from this study might provide a baseline for which such research studies should be implemented. There were also significant positive correlations between the level of study and perception of ADHD ($p=0.011$) with the 500 level having higher mean rank sores. Thus, according to this study, 500-level students have a higher perception of ADHD than 400-level students. This may not be unrelated to the fact that 500-level study students are at a higher level of study and have had more clinical exposure than their counterparts in the 400 level. Moreover, associations have been found between lower educational levels and lower perceived probability [32].

Conclusion

The following conclusions were drawn from the findings of the study; There were relatively low levels of perception of ADHD and perception of physiotherapy intervention in ADHD amongst clinical physiotherapy students in the College of Health Sciences, Nnewi Campus, Anambra State. There were relatively satisfactory levels of cognizance of ADHD and cognizance of physiotherapy intervention in ADHD amongst clinical physiotherapy students in the College of Health Sciences, Nnewi Campus, Anambra State. There were significant positive correlations between the following: cognizance of ADHD and cognizance of physiotherapy intervention in ADHD, perception of ADHD and perception of physiotherapy intervention in ADHD, cognizance of ADHD and perception of ADHD, cognizance of physiotherapy intervention in ADHD and perception of physiotherapy intervention in ADHD, level of study and perception of ADHD, and gender and cognizance of physiotherapy intervention in ADHD.

Limitations of the study

This present study had some limitations which should be taken into account. Firstly, during the study, most of the participants were unwilling to participate while some others required persuasion. Some participants hinted at not seeing the need for evaluation of their cognizance and perception of ADHD and its physiotherapy intervention, based on beliefs that ADHD is not a real illness warranting treatment and physiotherapists are not directly involved in the management of neuropsychiatric disorders, specifically ADHD, although numerous studies have proven the importance of the implementation of physical therapy in mental health, as well as interdisciplinary work [33, 34]. Some refusals were based on the fact that they had never heard of ADHD before this study, and would be unable to answer any ADHD-related question whatsoever. While some of the participants were unwilling to spare a few minutes to answer the questionnaires because they simply did not want to be bothered.

Significance of findings

The outcome of the study has been able to determine the cognizance and perception of clinical physiotherapy students in a tertiary institution in Nigeria. Though there was a dearth of literature in this area of interest, especially in the Nigerian population the outcome of the current study has been able to fill the gap existing in the literature and has also exposed the need to improve the cognizance and the perception of the clinical students during their clinical phase as it will facilitate their application of physical therapy interventions in the management of ADHD when they start practicing. There is a need for the implementation of courses, research seminars, and conferences on the role of physiotherapy in the management of ADHD. These should be organized for physiotherapists, both student physiotherapists and practising physiotherapists by institutions and/or organizations in Nigeria, with the cost of the seminars and conferences reduced to the barest minimum and subsidized by the governments so that all individuals including physiotherapists in rural areas can comfortably attend. This will enable them to build and improve their knowledge and perception base of ADHD and its physiotherapy intervention and also expose them to current trends in physiotherapy.

Abbreviations

CAP-ADHD	Cognisance and perception questionnaire
COG-ADHD	Cognizance of attention-deficit/hyperactivity disorder

PERCEP-ADHD	Perception of attention-deficit/hyperactivity disorder
COG-PT_ITV	Cognizance of physiotherapy intervention in attention-deficit/hyperactivity disorder
PERCEP-PT_ITV	Perception of physiotherapy intervention in attention-deficit/hyperactivity disorder
DCD	Developmental coordination disorder

Supplementary Information

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Additional file 1.

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UPO, JCN, COA, and UMC wrote the main manuscript text. AVM, ESI, CNO, and JOU prepared Tables 1, 2, and 3. All authors reviewed the manuscript.

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Availability of data and materials
The data is with the corresponding author and will be made available at a reasonable request.

Declarations

Ethics approval and consent to participate
The current study was performed by the relevant guidelines and regulations as contained in the Helsinki Declaration. Ethics approvals to carry out the research were obtained from the Ethics Committee of the Faculty of Health Sciences and Technology, Nnamdi Azikiwe University (/NAU/FHST/2022/MRH18). Informed consent was obtained from each participant before participation.

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

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References

1. Angel, T. Everything you need to know about ADHD. Healthline. 2021. Available at: https://www.healthline.com/health/adhd. Accessed 1 Nov. 2021.
2. Froehlich TE, Lanphear BP, Epstein JN, Barbaresi WJ, Katusic SK, Kahn RS. Prevalence, recognition, and treatment of attention-deficit/hyperactivity disorder in a national sample of US children. Arch Pediatr Adolesc Med. 2007;161(9):857.
3. Rappley MD. Attention deficit–hyperactivity disorder. N Engl J Med. 2005;352(2):165–73. Accessed 1 Nov. 2021. Available at: https://www.nejm.org/doi/full/10.1056/NEJMcp032387.
4. ASD Clinic. Physiotherapy for attention deficit hyperactivity disorder | Attention deficit hyperactivity disorder | Conditions | ASD clinic.co.uk | Social, behavioural & communication therapy. 2013. www.asdclinic.co.uk. Available at: https://www.asdclinic.co.uk/conditions/adhd/physiotherapy-for-attention-deficit-hyperactivity-disorder.php. Accessed 28 Oct. 2021.
5. American Psychiatric Association. Diagnostic and statistical manual of mental disorders: DSM-5 (5th edition). Reference Reviews. 2013;28(3).
6. Shaw M, Hodgkins P, Caci H, Young S, Kahle J, Woods AG, Arnold LE. A systematic review and analysis of long-term outcomes in attention deficit hyperactivity disorder: effects of treatment and non-treatment. BMC Med. 2012;10(1):99.
7. Biederman J, Faraone SV. Attention-deficit hyperactivity disorder. The Lancet. 2005;366(9481):237–48.
8. National Institute of Health. NIMH» Could I have attention-deficit/hyperactivity disorder (ADHD)? 2020. Nih.gov. Available at: https://www.nimh.nih.gov/health/publications/could-i-have-adhd/index.shtml#pub1. Accessed 28 Oct. 2021.
9. Centers for Disease Control and Prevention. What is ADHD? Centers for Disease Control and Prevention. 2018. Available at: https://www.cdc.gov/ncbddd/adhd/facts.html. Accessed 29 Oct. 2021.
10. Mayo Clinic. Attention-deficit/hyperactivity disorder (ADHD) in children - symptoms and causes. Mayo Clinic. 2019. Available at: https://www.mayoclinic.org/diseases-conditions/adhd/symptoms-causes/syc-20350889. Accessed 28 Oct. 2021.
11. NHS. Symptoms - attention deficit hyperactivity disorder (ADHD). 2018. NHS. Available at: https://www.nhs.uk/conditions/attention-deficit-hyperactivity-disorder-adhd/symptoms/.
12 Chou IC, Lin CC, Sung FC, Kao CH. Attention-deficit-hyperactivity disorder increases risk of bone fracture: a population-based cohort study. Dev Med Child Neurol. 2014;56(11):1111–6.
13. National Institute of Mental Health. NIMH» Attention-deficit/hyperactivity disorder in children and teens: what you need to know. 2017. www.nimh.nih.gov. Available at: https://www.nimh.nih.gov/health/publications/attention-deficit-hyperactivity-disorder-in-children-and-teens-what-you-need-to-know. Accessed 28 Oct. 2021.
14. Langley K, Rice F, van den Bree MBM, Thapar A. Maternal smoking during pregnancy as an environmental risk factor for attention deficit hyperactivity disorder behaviour A review. Minerva Pediatr. 2005;57(6):359–71. Available at: https://pubmed.ncbi.nlm.nih.gov/16402008/.
15. de Souza Lima Daltro MC, Frutuoso P, da Silva JF, de Moura Menezes Dantas A, de Miranda Luna Marques AC, de Oliveira Costa Nobre J, Diniz Machado Neto C, de Caldas Guedes Garcia VV, Leal Almeida Costa M, Medeiros Brito P, Soares de Belchior AC, Fernandes de Oliveira RM, Campos de Assis S, Morais de Medeiros L, Marques Nunes E. Effectiveness of physiotherapy techniques in children with attention deficit disorder/hyperactivity. Int Arch Med. 2016;9(107).
16. Fliers EA, Franke B, Buitelaar JK. Motor problems in children with ADHD receive too little attention in clinical practice. Ned Tijdschr Geneeskd. 2011;155(50):A3559. Accessed 28 Oct. 2021. Available at: https://pubmed.ncbi.nlm.nih.gov/22186361/.
17. Loe IM, Feldman HM. Academic and educational outcomes of children with ADHD. J Pediatr Psychol. 2007;32(6):643–54.
18. Barbaresi WJ, Colligan RC, Weaver AL, Voigt RG, Killian JM, Katusic SK. Mortality, ADHD, and psychosocial adversity in adults with childhood ADHD: a prospective study. Pediatrics. 2013;131(4):637–44.
19 Cerrillo-Urbina AJ, García-Hermoso A, Sánchez-López M, Pardo-Guijarro MJ, Santos Gómez JL, Martínez-Vizcaíno V. The effects of physical exercise in children with attention deficit hyperactivity disorder: a systematic review and meta-analysis of randomized control trials. Child Care Health Dev. 2015;41(6):779–88. Accessed 28 Oct. 2021. Available at: https://onlinelibrary.wiley.com/doi/abs/10.1111/cch.12255.
20. Tomporowski PD, Davis CL, Miller PH, Naglieri JA. Exercise and children's intelligence, cognition, and academic achievement. Educ Psychol Rev. 2007;20(2):111–31. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2748863/.
21. Pontifex MB, Saliba BJ, Raine LB, Picchietti DL, Hillman CH. Exercise improves behavioral, neurocognitive, and scholastic performance in children with attention-deficit/hyperactivity disorder. J Pediatr. 2013;162(3):543–51. Available at: https://www.jpeds.com/article/S0022-3476(12)00994-8/fulltext.

22. Wigal SB, Nemet D, Swanson JM, Regino R, Trampush J, Ziegler MG, Cooper DM. Catecholamine response to exercise in children with attention deficit hyperactivity disorder. Pediatr Res. 2003;53(5):756–61. Accessed 20 Mar. 2020. Available at: https://www.nature.com/articles/pr2003297.
23. Dishman RK, Berthoud H-R, Booth FW, Cotman CW, Edgerton VR, Fleshner MR, Gandevia SC, Gomez-Pinilla F, Greenwood BN, Hillman CH, Kramer AF, Levin BE, Moran TH, Russo-Neustadt AA, Salamone JD, Van Hoomissen JD, Wade CE, York DA, Zigmond MJ. Neurobiology of exercise*. Obesity. 2006;14(3):345–56.
24 de Oliveira IS, da Silva Oliveira D, de Azevedo Guendler J, Rocha BM, Sarinho SW. Effectiveness of motor intervention on children with developmental coordination disorder (DCD): a systematic review. J Phys Educ Sport Manag. 2017;8(3):32–40.
25. Lasisi, D., Ani, C., Lasebikan, V., Sheikh, L., Omigbodun, O. Effect of attention-deficit–hyperactivity-disorder training program on the knowledge and attitudes of primary school teachers in Kaduna, North West Nigeria. Child and Adolescent Psychiatry and Mental Health. 2017, 11(1). Available at: https://capmh.biomedcentral.com/articles/https://doi.org/10.1186/s13034-017-0153-8. Accessed 15 Feb. 2022.
26. Julivia Murtani, B., Wibowo, J.A., Liu, C.A., Rusady Goey, M., Harsono, K., Mardani, A.A.P., Wiguna, T. Knowledge/understanding, perception and attitude towards attention-deficit/hyperactivity disorder (ADHD) among community members and healthcare professionals in Indonesia. Asian Journal of Psychiatry. 2020, 48:101912. Available at: https://pubmed.ncbi.nlm.nih.gov/31923809/. Accessed 12 Nov. 2021.
27 Alshehri AM, Shehata SF, Almosa KM, Awadalla NJ. 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. 2020;17(15):5605. Accessed 12 Nov. 2021. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7432601/.
28. Berman, A.E. Technology feels like it's accelerating—because it actually is. Singularity Hub. 2016. Available at: https://singularityhub.com/2016/03/22/technology-feels-like-its-accelerating-because-it-actually-is/. Accessed 14 Feb. 2022.
29. See L-C, Li H-M, Chao K-Y, Chung C-C, Li P-R, Lin S-R. Knowledge of attention-deficit hyperactivity disorder among the general public, parents, and primary school teachers. Medicine. 2021;100(12):e25245. Accessed 12 Nov. 2021. Available at: https://journals.lww.com/md-journal/Fulltext/2021/03260/Knowledge_of_attention_deficit_hyperactivity.95.aspx.
30. Villines, Z. Why is ADHD awareness important? Medicalnewstoday.com. Available at: https://www.medicalnewstoday.com/articles/adhd-awareness. 2021. Accessed 17 Feb. 2022.
31. Emberson, L.L. Gaining knowledge mediates changes in perception (without differences in attention): a case for perceptual learning. Behavioral and Brain Sciences. 2016. 39. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7294586/. Accessed 14 Feb. 2022.
32. Rattay P, Michalski N, Domanska OM, Kaltwasser A, De Bock F, Wieler LH, Jordan S. Differences in risk perception, knowledge and protective behaviour regarding COVID-19 by education level among women and men in Germany. Results from the COVID-19 Snapshot Monitoring (COSMO) study. PLoS One. 2021;16(5):e0251694. Accessed 15 Feb. 2022. Available at:https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0251694.
33. Carla, M., Frankiliane, J., Adriano Moura de Menezes Dantas., Elicarlos Marques Nunes. Effectiveness of physiotherapy techniques in children with attention deficit disorder/hyperactivity. 2016. ResearchGate. Accessed 13 Nov. 2021. Available at: https://www.researchgate.net/publication/304994735_Effectiveness_Of_Physiotherapy_Techniques_In_Children_With_Attention_Deficit_Disorder_Hyperactivity.
34. Zang Y. Impact of physical exercise on children with attention deficit hyperactivity disorders. Medicine. 2019;98(46):e17980. Accessed 13 Nov. 2021. Available at:https://journals.lww.com/md-journal/fulltext/2019/11150/impact_of_physical_exercise_on_children_with.66.aspx.

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