KNOWLEDGE AND ATTITUDE TOWARDS ATTENTION-DEFICIT HYPERACTIVITY DISORDER AND ITS ASSOCIATED FACTORS AMONG PRIMARY SCHOOL TEACHERS IN KUALA MUDA/YAN, KEDAH

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ABSTRAK

Latar Belakang: Gangguan hiperaktif kurang daya tumpuan (ADHD) adalah gangguan neuropsikiatrik yang biasa berlaku di kalangan kanak-kanak. Kanak-Kanak yang terjejas mungkin mengalami masalah dari segi pembelajaran dan sosial dalam jangka masa panjang sekiranya tidak dikenalpasti dan diabaikan tanpa penjagaan yang sewajarnya. Guru sekolah memainkan peranan penting dalam pengesanan awal dan membuat rujukan yang bersesuaian kerana mereka selalu berinteraksi dengan kanak-kanak ini. Tujuan kajian ini adalah untuk menentukan tahap pengetahuan, sikap, dan faktor yang mempengaruhi pengetahuan guru sekolah rendah berkaitan ADHD.

Kaedah: Ini adalah kajian keratan rentas yang dilakukan di tiga belas sekolah rendah kerajaan di Kedah, Malaysia, yang melibatkan 329 guru. Data yang dikumpulkan melalui soal selidik adalah termasuk maklumat demografi, pengetahuan dan sikap guru mengenai ADHD dan dianalisa dengan statistik deskriptif dan analitikal. Regresi logistik dwivariasi dan pelbagai dilakukan untuk mengenal pasti faktor yang berkaitan dengan pengetahuan ADHD. Pemboleh ubah yang mempunyai nilai $p < 0.05$ pada 95% CI dianggap signifikan secara statistik.

Keputusan: Seramai 329 responden (99% kadar maklum balas) telah mendaftar dalam kajian ini. Antaranya, 70.8% mempunyai pengetahuan yang baik mengenai ADHD. Walau bagaimanapun, secara relatif mereka masih kurang pengetahuan mengenai penyebab dan perkembangan penyakit dan rawatan berkaitan ADHD. Mempunyai maklumat sebelumnya mengenai ADHD (OR 3.89, 95% CI: 2.26, 6.70) dan berminat untuk mengetahui berkenaan ADHD (OR 1.82, 95% CI: 1.04, 3.18) dikaitkan dengan

pengetahuan yang baik. Secara menyeluruh, guru didapati mempunyai sikap positif terhadap kanak-kanak yang mempunyai tingkah laku jenis ADHD walaupun mereka merasakan akan megalami kesukaran dalam mengajar kanak-kanak ini.

Kesimpulan: Terdapat sebilangan besar guru yang mempunyai pengetahuan yang baik mengenai ADHD. Ini berkaitan dengan mempunyai maklumat sebelumnya mengenai ADHD dan minat mereka terhadap ADHD. Secara amnya, guru menunjukkan sikap positif terhadap kanak-kanak yang mempunyai ADHD.

Kata kunci: ADHD, pengetahuan, sikap, guru sekolah rendah.

ABSTRACT

Introduction: Attention-deficit hyperactivity disorder (ADHD) is a common neuropsychiatric disorder among children. The affected child may suffer both academically and socially in the long run if being undiagnosed and neglected without proper care. School teachers play important role in early detection and appropriate referral as they have regular interaction with the child. The purpose of this study is to determine the knowledge, attitude, and factors affecting the knowledge of primary school teachers about ADHD.

Methods: This was a cross-sectional study conducted in thirteen government primary schools in Kedah, Malaysia, involving 329 teachers. Data were collected by a self-administrated questionnaire that include demographic information, knowledge and attitude of teachers regarding ADHD and were analysed by descriptive and analytical statistics. Bivariable and multivariate logistic regressions were performed to identify factors associated with the knowledge of ADHD. Variables having a p-value < 0.05 at 95% CI were considered statistically significant.

Results: A total of 329 respondents (99% response rate) were enrolled in the study. Among them, 70.8% have good knowledge of ADHD. However, they were relatively lacking in terms of the causes, course and treatment of ADHD. Having prior information about ADHD (OR 3.89, 95% CI: 2.26, 6.70) and being keen to know about ADHD (OR 1.82, 95% CI: 1.04, 3.18) were associated with good knowledge. This study also found that teachers have positive attitudes towards children with ADHD.

Conclusion: There was a high proportion of teachers having good knowledge on ADHD. It was significantly associated with having prior information regarding ADHD and their interest towards ADHD. Generally, teachers showed positive attitude towards children with ADHD.

Keywords: ADHD, knowledge, attitude, primary school teacher

CHAPTER 1: INTRODUCTION

1.1 Introduction

Attention-deficit hyperactivity disorder (ADHD) is a neurodevelopmental disorder characterized by the primary symptoms of inattention, hyperactivity and impulsivity. It is necessary to observe the child in at least two situations before the age of twelve years old in order to diagnose ADHD (APA, 2013; Dort, Strelow, Schwinger, & Christiansen, 2020). Further, this condition can persist into adulthood and negatively impact a person's behavioral, social, academic, emotional, and cognitive development (Menikdiwela & Vojtova, 2017). Often, they are being referred to the medical practitioners as having difficulty in terms of learning as well as relationship with their peers and also as someone who has problems with social misconduct (MOH, 2020). As the number of negative consequences linked to ADHD in adulthood increases, such as substance use disorder, suicide, joblessness, failures of relationships and involvement in motor vehicle accident, the need for early detection and treatment is evident (Chung et al., 2019).

ADHD continues to be a recognize disorder among childhood and adolescent with a growing prevalence over time worldwide. The prevalence varies worldwide from 5.6% to 13.3% (Cénat et al., 2021). While in Malaysia, the estimated prevalence of ADHD ranges from 1.6% to 4.6%, with boys are affected more than girls (MOH, 2020). Most often ADHD children presents in the early school years, and is quite prevalent across the education system, with an average of one child per classroom having the disorder (Jimoh, 2014). Many studies identify teachers as the most frequent initial referral source by recommending to parents that their child receive assessment for ADHD and these referrals have often been used as a predictor

of a child's symptoms (Jimoh, 2014; Veenman, Luman, & Oosterlaan, 2017). These happen due to the fact that ADHD behaviors contradicts with the classroom environments whereby the children need to follow the rules, sit quietly, be attentive and complete the given tasks (Greenway & Edwards, 2020). Therefore, primary school teachers are often the one who will notice these difficulties in the students as they are in regular contact with them aside from their parents. Evaluation of any child and adolescent for ADHD does not only involve clinical interviews with parents/caregivers and the patient, but also feedback from teachers, either through a behavior rating scale or reports from schools (MOH, 2020).

Several studies from different countries have shown that overall knowledge regarding ADHD among teachers are still inadequate and need further intervention (Al-Omari, Al-Motlaq, & Al-Modallal, 2015; Alfageer et al., 2018; Bhattarai & Sharma, 2019; Khademi et al., 2016; Menikdiwela & Vojtova, 2017; Muanprasart, Traivaree, Arunyanart, & Teeranate, 2014; Rodrigo, Perera, Eranga, Williams, & Kuruppuarachchi, 2011; Youssef, Hutchinson, & Youssef, 2015) . Studies also indicate that most teachers have a poor understanding of general information and treatment for ADHD but they have a fair understanding of the symptoms and diagnosis of the issue (Al-Moghamsi & Aljohani, 2018; Bhattarai & Sharma, 2019; Padilla, Cuartas, Henao, Arroyo, & Flórez, 2018). Similarly, a local study by Choo in 2013 involving 92 preschool teachers found that they lack sufficient knowledge about ADHD, in addition to the use of ADHD stimulant medications (Choo, 2013). Several factors were shown to be significantly related to teachers' ADHD knowledge such as having attended training or courses on ADHD (Alfageer et al., 2018; Youssef et al., 2015), specific teaching experience with ADHD child (Al-Moghamsi & Aljohani, 2018; Alfageer et al., 2018; Youssef et al., 2015)

and also education level of the teachers (Al-Amarei & Mohamed, 2020; Dessie, Techane, Tesfaye, & Gebeyehu, 2021; Youssef et al., 2015). Researchers have also reported mixed findings in recent years about attitude towards ADHD among teachers. There was a positive attitude towards several aspects of ADHD such as dealing with the behavioral problems of the ADHD students (Amiri, Noorazar, Fakhari, Darounkolaee, & Gharehgoz, 2017a), recognizing the ADHD students and the validity of the educational issue (Youssef et al., 2015) and agreed that they need medical care (Alfageer et al., 2018) and psychological support (Al-Omari et al., 2015; Khademi et al., 2016). However, some other studies reported that teachers showed negative attitude towards the symptoms of ADHD whereby teaching student with ADHD-type behaviors causing them to feel stressed (Al-Omari et al., 2015; Amiri et al., 2017a; Rodrigo et al., 2011).

1.2 ADHD in Malaysia

Data from the National Health and Morbidity Survey (NHMS 2019) found that almost half a million children in Malaysia have mental health problems whereby 2.3% were hyperactive and more than half having conduct and peers related problems (MOH, 2019). ADHD incidence was the highest among newly diagnosed children with mental disorders attending the Child and Adolescent Mental Health (CAMH) outpatient clinic of Hospital Sultan Abdul Halim (HSAH), Sungai Petani in Kuala Muda/Yan district. Majority was from the primary school age group with a mean age of 9.98 years (Harun, Panirselvam, & Yusuff, 2017).

ADHD is classified under the learning disabilities group in the Malaysian education system for student with special education needs (SEN). There were a total of 79,921 students with learning disabilities in Malaysia and 6,846 of them were students with ADHD (MOE, 2021). Malaysia endorsed the Salamanca Statement (UNESCO, 1994) which advocates inclusive education and provisions for children with learning difficulties, to include students with special needs in mainstream education. The Special Education Division of the Ministry of Education (MOE) coordinates all special education programs that were implemented in Malaysian schools; a programme for pupils with visual impairments or hearing impairments in special schools, an integrated programme for students with visual impairments or hearing impairments or learning disabilities in general schools, and an inclusive education programme for students with special needs who are able to attend normal classes with their peers (Lee & Low, 2014).

In accordance with the plan, MOE provides a Bachelor of Education degree program in special education for preservice teachers since 1993 (Lee & Low, 2014). This is separate from mainstream teachers' preparation program which does not encourage inclusivity. In recent years, the Ministry has developed a few strategies to ensure that students with special needs receive high-quality education that is relevant to their needs. Making special education needs a part of preservice courses will enable all future teachers to be equipped with basic skills and aware of the needs of students with SEN. In addition, teachers interested in special education needs teaching and curriculum development will be offered in-service training programs as well (MOE, 2013).

In light of the increasing prevalence of ADHD in our local context and the consequent decline in health-related quality of life scores make recognizing and managing ADHD imperative in order to help these children and their parents to improve their educational and psychological difficulties (MOH, 2020). All of these illustrate the importance of a teacher's role in ADHD, not only early identification and referring the suspected child with ADHD but also guiding them in the classroom. Even though certain action towards improving the teacher's knowledge in area of special education had been implemented at national level, there is still lack of proper study that evaluate the outcome of the intervention. Our study will focus on primary school teachers' knowledge and attitude towards ADHD, in contrast to study by Choo, 2013 who examined preschool teachers' knowledge and opinions regarding stimulant medication (Choo, 2013). This study was designed to assess whether the intervention was successful or whether a more specific intervention will be needed in the near future. As such, this is the first local study looking into identifying the knowledge gaps, assessing the attitude towards ADHD as well as factors that might affect primary school teachers' knowledge about it. The district of Kuala Muda/Yan in the state of Kedah was chosen since it has a high number of children with ADHD (Harun et al., 2017).

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CHAPTER 2: OBJECTIVES OF THE STUDY

Research Questions

1. What is the proportion of good knowledge of ADHD among primary school teachers under Pejabat Pendidikan Daerah (PPD) Kuala Muda/Yan?.
2. What is the attitude towards ADHD among primary school teachers under PPD Kuala Muda/Yan?
3. What are the associated factors for good knowledge on ADHD among primary school teachers under PPD Kuala Muda/Yan?.

2.1 General objectives

1. To determine the proportion of good knowledge on ADHD and its associated factors among primary school teachers under PPD Kuala Muda/Yan, Kedah.

2.2 Specific objectives

1. To determine the proportion of good knowledge on ADHD among primary school teachers under PPD Kuala Muda/Yan, Kedah
2. To describe the attitude towards ADHD among primary school teachers under PPD Kuala Muda/Yan, Kedah
3. To identify the associated factors for good knowledge on ADHD among primary school teachers under PPD Kuala Muda/Yan, Kedah

CHAPTER 3: MANUSCRIPT

3.1 TITLE PAGE

Title:

Knowledge on attention-deficit hyperactivity disorder and its associated factors among primary school teachers in Kuala Muda/Yan, Kedah, Northwest of Peninsular Malaysia

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Conflicts Of Interest

The authors declare no conflicts of interest.

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3.2 ABSTRACT

Introduction: Attention-deficit hyperactivity disorder (ADHD) is a common neuropsychiatric disorder among children. The affected child may suffer both academically and socially in the long run if being undiagnosed and neglected without proper care. School teachers play important role in early detection and appropriate referral as they have regular interaction with the child. The purpose of this study is to determine the knowledge and factors that affecting the knowledge of primary school teachers about ADHD.

Methods: This was a cross-sectional study conducted in thirteen government primary schools in Kedah, Malaysia, involving 329 teachers. Data were collected by a self-administrated questionnaire including demographic information and knowledge of teachers regarding ADHD and were analysed by descriptive and analytical statistics. Bivariable and multivariate logistic regressions were performed to identify factors associated with the knowledge of ADHD. Variables having a p-value < 0.05 at 95% CI were considered statistically significant.

Results: Of 329 respondents (99% response rate), 70.8% of them have good knowledge about ADHD. However, they were relatively lacking in terms of the causes, course and treatment of ADHD. Having prior information about ADHD (OR 3.89, 95% CI: 2.26, 6.70) and being keen to know about ADHD (OR 1.82, 95% CI: 1.04, 3.18) were associated with good knowledge.

Conclusion: There was a high proportion of teachers having good knowledge on ADHD. It was significantly associated with having prior information regarding ADHD and their interest towards ADHD.

Keywords: ADHD, knowledge, primary school teachers.

3.3 INTRODUCTION

Attention-deficit hyperactivity disorder (ADHD) is one of the most commonly diagnosed neuropsychiatric disorders, that begin in childhood and continue into adulthood (Dessie et al., 2021; Hosseinnia, Mazaheri, & Heidari, 2020). Globally, the prevalence of ADHD is projected to be around 2%-7%. Though the prevalence can be different worldwide and has been increasing over time, it is still fairly under-recognized and often less diagnosed in most countries, particularly in girls and older children (Sayal, Prasad, Daley, Ford, & Coghill, 2018). The estimated prevalence of ADHD in Malaysia ranges from 1.6% to 4.6%, with preponderance towards boys (MOH, 2020).

ADHD is characterized by a persistent pattern of impulsivity hyperactivity and inattention. Children usually will have problems with learning disabilities and behavioral disorders, which can hinder their development (Alshehri, Shehata, Almosa, & Awadalla, 2020; Toye, Wilson, & Wardle, 2019). This condition can persist into adulthood, increasing the risk of conduct disorder and antisocial personality disorder as well as difficulties with employment and relationships as a consequence (Alshehri et al., 2020; Sayal et al., 2018). Data from the National Health and Morbidity Survey (NHMS 2019) found that almost half a million children in Malaysia have mental health problems whereby 2.3% were hyperactive and more than half having conduct and peers related problems (MOH, 2019). A local study by Suhana 2012 found that 67% of the 100 juvenile detainees had ADHD and among them, 66.2% had substance use disorder (Suhana, 2012). These showed quite a high prevalence of our adolescents with ADHD experience social problems.

It is estimated that at least one child with ADHD is present in every classroom (Anderson, Watt, Noble, & Shanley, 2012). The classroom is a particularly challenging and difficult environment for children with ADHD, because they are required to behave in ways that are in conflict with the symptoms of the disorder (Anderson et al., 2012; Toye et al., 2019). As such, primary school teachers are generally often the first to notice these and play an important role in the assessment of the children's behaviors (Alshehri et al., 2020). Early detection and referral for evaluation by the teachers can help provide an opportunity to improve their long-term outcomes. Therefore, there has been an increasing emphasis on teachers' knowledge towards ADHD in these recent years.

Numerous studies showed that teachers' knowledge of ADHD was unsatisfactory especially in the area of general information (Bhattarai & Sharma, 2019; Muanprasart et al., 2014). They were more knowledgeable regarding symptoms and diagnosis of ADHD (Al-Amarei & Mohamed, 2020; Al-Moghamsi & Aljohani, 2018; Bhattarai & Sharma, 2019; Muanprasart et al., 2014; Woyessa, Tharmalingadevar, Upashe, & Diriba, 2019). A local study by Choo 2013 involving 92 preschool teachers, also found that they have insufficient knowledge and were rather disinclined to participate in the evaluation of students with ADHD (Choo, 2013)**.** There were several predictors of teachers' knowledge towards ADHD such as age, education level, teaching experience, source of information (Al-Amarei & Mohamed, 2020; Dessie et al., 2021) and received training on ADHD (Yarde-Leavett, 2018).

A registry of new clients attending the Child and Adolescent Mental Health (CAMH) outpatient clinic of Hospital Sultan Abdul Halim (HSAH), Sungai Petani in Kuala Muda/Yan district showed that ADHD incidence was the highest among newly diagnosed children with mental disorders. Majority was from the primary school age group with a mean age of 9.98 years (Harun et al., 2017). Thus, primary school teachers play a major role in early identification of students with ADHD. Therefore, teachers need to have good knowledge of ADHD. They will be able to recognize who will need further assessment, give correct information to the parents and also initiate early referral of the child for evaluation. This will also help them in handling student with ADHD. However, in Malaysia, there were still very limited studies in this area. This study aims to assess the primary school teacher's knowledge and possible factors that affect the knowledge towards ADHD in Kuala Muda/Yan district in Kedah, northwest of Peninsular Malaysia.

3.4 METHODS

This study was a cross-sectional study conducted from August 2020 until September 2020 in thirteen government primary schools located in Kuala Muda/Yan district in Kedah, northwest of Peninsular Malaysia. Participants were recruited from cluster sampling among teachers from government primary schools in the district. Thirteen schools were randomly selected from a list of 133 government primary schools excluding the special education schools. The number of selected schools was determined based on the average number of 25 teachers in each school. All the primary school teachers from the selected schools with at least 6 months of teaching experience were invited to participate in the study. Special education teachers were excluded from the study, since incorporating those teachers who have experienced with special education might cause bias in the finding.

Sample size

A calculation for the sample size of all the objectives of this study was performed. The biggest sample size for this study was elicited from the calculation of the sample size to determine the proportion of good knowledge on ADHD among primary school teachers. It was calculated using the single proportion formula based on the proportion of good knowledge for ADHD among primary school teachers of 56.4% (Thanasekaran, Upashe, & Chala, 2016) and using the precision rate of 0.08. After considering 10% non-respond rate and design effect of 2, the calculated sample size was 330.

Research instruments

The data was collected through a structured self-administered questionnaire which was adapted from few previous studies (Al-Omari et al., 2015; Rodrigo et al., 2011; Sciutto, Terjesen, & Frank, 2000). The questionnaire was modified and translated to Malay language. Back-to-back translation was done by the research team and double checked with English-Malay language expert. It consists of two sections; the first section with socio-demographic characteristics that include types of school, age, gender, race, marital status, level of education, years of teaching experience, having had information about ADHD and sources of information, attended seminars or talks on ADHD, having child or relatives with ADHD and interested to know regarding ADHD. The second section assessed the knowledge of ADHD adapted from the Knowledge of attention deficit disorders scale (KADDS) (Sciutto et al., 2000) and other literature (Al-Omari et al., 2015; Rodrigo et al., 2011) to get the most information. It has 20 items covering the general information (9 items), symptoms and diagnosis (7 items), and knowledge about treatment (4 items). The responses were indicated as 'true', 'false', and 'don't know' and scored "1" for correct answers and "0" for wrong and don't know answers. The total knowledge score ranged from 0-20 and was converted to percentage score. Good knowledge is taken as score of 50% and above based on the previous studies (Muanprasart et al., 2014; Srignanasoundari, Vijayalakshmi, & Kokilavani, 2016). The questionnaire was reviewed by a group of experts involving two psychiatrists with one expertise in child psychiatry and three family physicians for appropriateness and content validity. Face validity was carried out by interviewing five primary school teachers to estimate the time required to complete the questionnaire and identify any difficulty or ambiguities. A pilot study was performed at a primary school in another district outside the study area, involving 40 teachers to assess the reliability and construct validity of this modified questionnaire. The

Cronbach's alpha was 0.80 for knowledge items, indicating that this modified questionnaire was acceptable for assessing these variables.

Data collection

Selected schools were visited by researcher at pre-arranged time. Criteria of eligibility was informed to the headmasters before the visit. On the day of data collection, eligible teachers were gathered in the school hall and briefed on the details of the study. Participation was totally voluntary and any dissent on their part will not have any bearing on their job status. Written consents were obtained from the participants who agreed to participate. Then the self-administered questionnaire was distributed to the consented participants to be filled individually. It was stressed to them that they should not discuss when filling up the form. The questionnaire was collected at the same setting once completed. The questionnaire took about 10-15 minutes to be completed. Researcher was available throughout the task to reduce bias while answering the survey.

Statistical analysis

Data analysis was carried out using SPSS software (SPSS Inc, version 26). For descriptive analysis, categorical data were presented as frequency and percentage while numerical data were presented as mean and standard deviation (SD). Simple Logistic Regression (SLR) tests were applied in the univariate analysis. All variables with $p<0.25$ and other considered importance variables were included in the multivariate analysis. Forward and backward selection methods were utilized. The goodness of fit model was analyzed using Hosmer and Lemeshow, the classification table, and the receiver operator characteristic curve. The associations were expressed as odds ratio and its 95% confidence interval with significant p value taken at $p<0.05$.

3.5 RESULTS

Socio-demographic characteristics

A total of 329 subjects were enrolled in this study with a 99% response rate. The mean (SD) age of the participants was 44.28 (± 7.73) years, with a mean (SD) level of teaching experience of 18.96 (±7.88) years. Majority (79.9%) of the respondents were female and a vast majority (92.7%) of them never underwent educational seminars or talks regarding ADHD. The sociodemographic characteristic of participants is shown in Table 1.

Knowledge of teachers on ADHD

Of the total respondents, more than two-thirds (70.8%) of them had good knowledge of ADHD (Table 2). In terms of the knowledge subscale, more than half of them had good knowledge on all the three categories of general information, symptoms and diagnosis, and treatment of ADHD. More were knowledgeable on symptoms and diagnosis of ADHD. The results are shown in Figure 1.

Factors associated with knowledge of primary school teachers towards ADHD

All variables were included in the univariate analysis. The results for the simple logistic regression analysis are summarized in Table 3. As such, gender, marital status, information on ADHD, attended seminars/talks, self-interest and other important variables such as age, education level, teaching experience, type of school and family history were selected for multivariate analysis.

Multivariate analysis shows that only two variables have significant influence on good knowledge of ADHD. A person who has heard or know about ADHD has 3.89 odds of having good knowledge on ADHD (95% CI: 2.26, 6.70) when self-interest was controlled. A person having self-interest about ADHD has 1.82 odds of having good knowledge on ADHD (95% CI: 1.04, 3.18) when information on ADHD was controlled. The results are shown in the Table 4.

3.6 DISCUSSION

Early referral and intervention are crucial in the management of ADHD children. Being the one who have frequent interaction with the children aside from their parents, the knowledge of this condition among the primary school teachers is very important and can have a big impact on the outcome. This current study assessed such knowledge and found that the proportion of primary school teachers with good knowledge was 70.8%. This proportion is consistent with studies conducted in Australia (Mulholland, 2018) and India (Srignanasoundari et al., 2016) even higher than the studies done in other countries such as Africa (Dessie et al., 2021), Iraq (Al-Amarei & Mohamed, 2020), Nepal (Bhattarai & Sharma, 2019), Egypt (Aly, Mohammed, & Ahmed, 2015) and Saudi Arabia (Alfageer et al., 2018). Regionally, this proportion is also higher than shown by studies in our neighbouring countries, Indonesia (Murtani et al., 2020) and Thailand (Muanprasart et al., 2014) with proportion of 41.1% and 19.4% respectively. Study in Thailand (Muanprasart et al., 2014) was done to population with demography similar to our study, where majority of the participants were female, having high education level with comparable mean age and teaching experience. It is important to note that their study participants were 201, recruited via purposive sampling and using the widely accepted KADDS (Sciutto et al., 2000) as the study tool. KADDS has 36 items and some of the items especially the general items were too technical and not suitable for general population not familiar with health care (Sciutto et al., 2000). That may be the explanation why the previous studies using KADDS yield lower knowledge score (Al-Moghamsi & Aljohani, 2018; Dessie et al., 2021; Muanprasart et al., 2014). This hypothesis was also a consideration when we decided to modify the questionnaire to suit the general population. In addition, some proposed that this discrepancy of knowledge could be due to the

differences in other socio and cultural backgrounds as reported by a study in Tamilnadu, where knowledge levels are significantly correlated with religion (Srignanasoundari et al., 2016).

From this current study, it was shown that the teachers were better in recognizing the signs/symptoms and diagnosis of the disease compared to their general knowledge and treatment (72.7% vs. 55.8% and 69.4%). This result was consistent with those in other studies that evaluated knowledge of the ADHD subscale (Bhattarai & Sharma, 2019; Hosseinnia et al., 2020; Muanprasart et al., 2014; Mulholland, 2018; Padilla et al., 2018; Yarde-Leavett, 2018). The observed findings might be due to the teachers experience in handling and observing the students' behaviors. This in line with the previous studies that showed knowledge is directly associated with the teaching experience (Al-Amarei & Mohamed, 2020; Bhattarai & Sharma, 2019; Murtani et al., 2020) . Most teachers have poor knowledge regarding the general information and treatment of ADHD. More than half of the respondents believe that ADHD is a result of ineffective parenting skills and almost three-quarters didn't know that ADHD can be lifelong which was also observed in the study by Munshi 2014 (Munshi, 2014). Majority of our respondents agreed that punishment as an effective method in reducing the symptoms of ADHD. As seen in many Asian countries, cultural norms dictate one should behave in the presence of a teacher or elder. Poor behavior is taken as non-acceptable and often frowned upon. As mentioned above, many of them believed that child with ADHD symptoms stemmed from poor parenting. The assumption alone will lead them to disregard the child as disruptive, thus overlooking the need for assessment. Poor knowledge regarding the availability of drug therapy may also lead them to simply accept the child rather than provide assistance. This misperception and inadequacy in knowledge are predicted since nearly half of them

(47.4%), primarily get information about ADHD from social media, and only 7.3% received training from seminars. Other studies also reported the internet and social media as their population major sources of information (Al-Amarei & Mohamed, 2020; Padilla et al., 2018). In the age of technology, obtaining information online is undoubtedly the fastest and easiest route. However, the downside of it is, the accuracy and reliability of the sources can be questionable and the information gained can also be partial according to their subject of interest only. Education and accurate, comprehensive information are the only reliable sources to improve knowledge about any disease. Evidences showed that having attended courses and received training positively affects the teachers' knowledge about ADHD (Aly et al., 2015; Yarde-Leavett, 2018; Youssef et al., 2015) Hence, future educational interventions involving experts in this area should be done and should focus on other aspects of ADHD, not only symptoms and diagnosis.

In the current study, participants who previously heard or knew about ADHD were significantly more likely to have higher levels of knowledge about ADHD. The majority of them were familiar with ADHD as shown from the findings which contributed to the likelihood of having good knowledge. Perhaps it may be a result of the increased awareness regarding ADHD in our population through the implementation of inclusive education programs in our schools and educational promotion via social media. Despite this, there are still gaps in their understanding of ADHD as mentioned earlier. Perold *et al* 2010 previous study confirmed our finding that prior exposure to ADHD through reading is positively related to overall knowledge (Perold, Louw, & Kleynhans, 2010). A study of 130 teachers in Makkah also reported overall knowledge of the teachers about ADHD was significantly higher among teachers who had sufficient undergraduate information and those who read about ADHD (Munshi, 2014).

This present study also found that teachers' self interest in knowing about ADHD was also significantly associated with their ADHD knowledge. More than three-quarters (76.3%) of the participants were interested in learning more about ADHD. In this regard, the targeted groups should be informed accurately about ADHD through a variety of channels as well as workshops, as they may read inaccurate information on their own. In contrast to our study, several other studies have reported different outcomes. Studies conducted in Ethiopia (Dessie et al., 2021), Iraq (Al-Amarei & Mohamed, 2020), Nepal (Bhattarai & Sharma, 2019) and the Caribbean (Youssef et al., 2015) region revealed that a teacher's level of education was significantly associated with knowledge of ADHD. There was a good understanding of ADHD among teachers with a bachelor's degree and more. It is possible that persons' highest educational levels are likely to increase their capacity to gain knowledge about various topics, including ADHD (Singh, 2013). While studies in Thailand (Muanprasart et al., 2014), Saudi Arabia (Alfageer et al., 2018) and Madina (Alfageer et al., 2018) have found a positive relationship between teachers' knowledge of ADHD and previous experience with ADHD children. For instance, they might have received formal training in ADHD or gained knowledge through their own reading in order to handle the child appropriately and also through observation of the child's behaviors. Nevertheless, few other studies have found no association with these demographic characteristics consistent with our findings (Mulholland, 2018; Srignanasoundari et al., 2016).