Theoretical and Practical Knowledge of Central Auditory Processing Disorder among Primary School Teachers

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Abstract: Children's ability to process, store and retrieve auditory information is the foundation of their literacy, numeracy, and academic achievement. This progression is hampered by Central Auditory Processing Disorder (CAPD), which causes non-specific symptoms. A teacher's role is critical in multidisciplinary efforts to observe, recognize, refer, manage, and intervene on the child's learning and progression as part of CAPD. This study aims to investigate primary school teachers' awareness of CAPD's characteristics, causes, symptoms, management, and intervention strategies. A questionnaire was developed and distributed to randomly selected primary schools across the six educational districts in Kuwait. Results from 1003 teachers showed a reasonable degree of awareness of CAPD, which was mostly attributed to prior exposure and years of teaching experience. However, many of the teachers confused CAPD with other conditions such as deafness, learning disabilities, or behavioural disorders. Recommendations are made for bridging the gap between theoretical knowledge and professional practice in teachers' education and progression.

(**Keywords**: Central Auditory Processing Disorder, Primary School Teachers, Knowledge and Awareness, Kuwait)

Introduction

The sense of hearing involves a complicated cascade of events starting with the conversion of an auditory stimulus into a neural signal. The signal is then transmitted to the auditory cortex in the brain for processing, which results in the conscious perception of sound as well as the potential for cognitive elaboration. If left untreated, an impairment to this complex process, particularly from within the brain, can have devastating results on children's development. Nevertheless, advances in the identification and management of these central impairments, collectively known as "auditory processing disorders" are seldom utilised (Jerger & Musiek, 2000; BSA, 2011), and a battery for evaluating children at risk is yet to be developed (Wilson & Arnott, 2013; Amaral, et al. 2019).

المعرفة النظرية والعملية لاضطراب المعالجة السمعية المركزية لدى معلمي المدارس الابتدائية

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ملخص: تستند الأسس الأولية في معرفة القراءة والكتابة والحساب وتحقيق التقدم في التحصيل الدراسي على قدرات الأطفال في معالجة المعلومات السمعية وتخزينها واسترجاعها والتي قد تتعرقل بسبب اضطرابات في عملية المعالجة السمعية المركزية التي تبدو جلية في بعض المظاهر السلوكية. ويعد الدور الذي يقوم به المعلم، ضمن فريق متعدد التخصصات، حيويا في مجال مراقبة أداء الأطفال وإحالتهم وتطبيق استراتيجيات التدخل التربوي لصالحهم. وفي هذا الصدد هدفت هذه الدراسة إلى تقصي مدى وعي معلمي المدارس الابتدائية في دولة الكويت بهذا الاضطراب من حيث مظاهره وأسبابه واستراتيجيات التعامل معه، وذلك باستخدام استبانة طبقت عشوائيا على عينة مكونة من 1003 معلمات من جميع المناطق التعليمية. أظهرت النتائج درجة جيدة من الوعي بالاضطراب المكتسب غالبا من سنوات الخبرة في التدريس، وكذلك اشتباها في تمييز الاضطراب عن الحالات المشابهة له مثل الصمم وصعوبات التعلم وبعض الاضطرابات السلوكية. طرحت الدراسة ختاما توصياتها لسد الفجوة بين المعرفة النظرية والممارسة المهنية في تعليم المعلمين، ثم قدمت مقترحاتها للبحوث المستقبلية.

(الكلمات المفتاحية: اضطراب المعالجة السمعية المركزية، معلمو المرحلة الابتدائية، المعرفة والدراية، الكويت**)**

Also known as "Central Auditory Processing Disorder" (CAPD), this term encompasses a range of disorders defined by an impairment in auditory comprehension with normal perception. This usually exists in the presence of regular hearing tests, meaning that the individual affected with CAPD has problems interpreting speech and non-speech sounds despite normal hearing sensitivity (BSA, 2011; De-Wit et al., 2016). This can result in behaviours mimicking those found in individuals with hearing impairment (Lovett, 2011), and often sharing characteristics with other developmental disorders (Chermak & Musiek, 2014).

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The aetiology of CAPD can be regarded as developmental or acquired. The latter is a result of various insults to the auditory nervous system, from head injuries to chronic ear infections. The developmental aetiology in children is seen as idiopathic, although it is speculated that the central auditory nervous system may be subject to some form of delay in maturation, disorganisation or disease (Chermak & Musiek, 1997). Based on the collective content of several scholars (McCartney et al., 1994; Kaneko et al., 1996; Kaga et al., 1996; Baran & Musiek, 1999; Bamiou et al., 2001; Dutra et al., 2010; Rosen et al., 2010; Chermak & Musiek, 2011), CAPD may also be caused by genetic determinants, heavy metal exposure, or infectious diseases such as meningitis. Prematurity and low birth weight could likewise be contributors to a higher CAPD prevalence due to prenatal exposure to smoke, alcohol, anoxia or toxins. The estimated prevalence of CAPD among school-age children ranges from 2-7% (Koravand et al., 2017; Bamiou & Luxon, 2008; BSA, 2011; Wilson & Arnott, 2013), or as high as 10% when considering its comorbidity with other developmental disorders (Brewer, et. al. 2016). This is higher than the prevalence of hearing loss amongst the same cohort (Chermak & Musiek, 1998; NIDCD, 2016). The rates of CAPD have significantly increased over the years (Chermak et al., 2007), which may be due to the simultaneous increase in awareness amongst the concerned professionals, facilitating better identification and diagnosis of the disorder (Fouche-Copley, 2015).

CAPD is a multifaceted problem (Choudhury & Sanju, 2017). Children with CAPD share symptoms of other disorders, including autism spectrum disorder, attention-deficit hyperactivity disorder, pervasive developmental disorder, specific language impairment and learning-related problems (Dawes & Bishop, 2009; 2010; De-Wit et al., 2018). In relation to learning-related problems, children with CAPD are reportedly affected with reduced attention, ease of distractibility, and difficulties in understanding speech in noisy or suboptimal listening conditions. This is in addition to their general difficulties in communication, reading, spelling, phonological awareness and language comprehension (Jerger & Musiek, 2000; Bamiou et al., 2001; ASHA, 2005; Souza et al., 2016). Although their intelligence is thought to be at or above average levels (Keith, 1995), recent studies have detected a significant relationship between their cognitive abilities and poor performance on certain auditory processing tasks (Tomlin et al., 2015). Tomlin et al. (2015) asserted that since intelligence and other executive functions are associated with the auditory processing, the impact of children's cognitive ability must be considered, at least when interpreting their auditory performance tests. A review by De Wit et al. (2016) concluded that the evidence for a specific auditory condition in suspected children is inadequate, and thus their listening difficulties might be a result of cognitive and attention complications rather than bottom-up auditory processing. However, this prospect of reverse causality is yet to be adequately studied (Magimairaj & Nagaraj, 2018).

Prior to a diagnosis of CAPD with the aid of an audiologist, children are commonly misdiagnosed with another condition (Young, 2001). This is a source of great confusion and uncertainty for parents, educators and other practitioners. Hence, the diagnosis and interventions for CAPD require a multidisciplinary effort involving teachers, psychologists, physicians, audiologists and speech-language pathologists (Chermak et al., 1999), and must involve a wide-ranging assessment of the impairment of physical function experienced by those with CAPD (Choudhury & Sanju, 2017). Prompt identification and support at an early stage of children's schooling will minimise the risk of academic failure and maximise their development (Chermak et al., 2017; Choudhury & Sanju, 2017). There is currently no validated standardised measure for the diagnosis of CAPD (BSA, 2011; Fouche-Copley, 2015). Despite continuing efforts (Carvalho et al., 2019), there remains to be no international consensus on the best practices with regards to identification and intervention (Esplin & Wright, 2014). For the purpose of defining a criterion to diagnose the presence of CAPD in school-age children, a study was conducted in India by Yathiraj and Vanaja (2018) on 100 at-risk children and 280 controls. Children who ranged from 6 to 10 years were evaluated using different tests such as speech in noise, auditory memory and sequencing tests. In accordance with the number of poorly performed tests, the study recommended a cut-off criterion of one or two standard deviations below the mean scores of typically developing children to diagnose CAPD. Norrix and Faux (2019) however, commented that these criteria are not empirically derived, and further studies and

tests are needed to clearly define and diagnose CAPD in school-age children.

Another potential source of ambiguity is the current practice of intervention strategies also used for other disorders such as ADHD and autism, due to their shared characteristics with the condition (Chermak & Musiek, 2014), which may be a suboptimal approach. Thus, teacher's awareness of the condition as well as their participatory presence would have a vital effect in providing children with the support and strategies to achieve their potential.

The educational research into CAPD is notably scarce with few exceptions. For the purpose of building training programs, a study was conducted in the United Kingdom by Hind (2006) regarding the knowledge of different professionals about CAPD preassessment and referral routes. It involved general practitioners; audiologists; ear, nose and throat specialists; and speech-language therapists. Most of the professionals in the study indicated that they were not very well informed about the condition. Similar results were also obtained by Baldry and Hind later in 2008 as they surveyed general practitioners and otolaryngologists to gauge their awareness of CAPD. Over a third of the respondents (37%) rated themselves as 'not at all well informed'. Around 44% were 'not very well informed, while only 1% indicated that they were 'very well informed' (Baldry & Hind, 2008).

A later study by Ryan and Logue-Kennedy (2013) explored the levels of CAPD awareness amongst mainstream primary school teachers in the Republic of Ireland. Eighty-nine percent (89%) of respondents reported 'very poor' levels of awareness. These results were comparable with another study in Northern Ireland which also found that most of the participants (73%) comprising educational psychologists, audiologists and speech and language therapists considered themselves to be poorly or very poorly informed about CAPD (Logue-Kennedy et al., 2011). In a descriptive survey by Hlabangwane in 2002, the knowledge of CAPD was investigated among primary school teachers of 55 mainstream schools in Soweto, South Africa. The results from 301 participants showed that 88% of the teachers lacked both knowledge and basic training on CAPD, while some confused CAPD with auditory impairment. Nonetheless, a positive attitude was noted from the teachers reports towards CAPD training.

Another study conducted by Fletcher (2017) in North America hypothesised that reading research-based information about CAPD from a guidebook for educators would increase the teachers' confidence levels when dealing with affected children. The initial part of the study involved forty-three participants who reported that they knew little about the disorder. Twenty of the respondents proceeded with the study and read the handbook; they subsequently indicated higher levels of confidence in teaching children affected by CAPD. Finally, a recent study in Kuwait (Almusawi et al., 2021) investigated pre-service teachers' awareness of CAPD in relation to their college demographic variables. Participants were 287 students from the department of special education with various academic subspecialties, program completion and achievement levels. The study which utilised a questionnaire survey, indicated students' inability to distinguish CAPD from other comparable conditions such as deafness, behavioural disorders, and learning difficulties. In line with these results, it is suggested that an update to the curriculum with a dedicated course covering the most common and critical disorders and difficulties among school-age children, may be a useful strategy for all student-teachers in general and special education programs. Besides educators, several studies evaluated CAPD awareness among audiologists and speech pathologists (Hind, 2006; Baldry & Hind, 2008; Logue-Kennedy et al., 2011), reaching a similar conclusion of limited familiarity and professional readiness

Given the limited but consistent evidence on the lack of CAPD awareness and preparedness among those concerned (Hlabangwane, 2002; Ryan & Logue-Kennedy, 2013; Fletcher, 2017), a potential line of investigation to further delineate the extent of the problem includes general education teachers and their knowledge of causes, symptoms, and characteristics of CAPD, as well as their their ability to distinguish the disorder from other conditions and effectively refer or intervene when required (Almusawi et al., 2021).

Research Aim and Questions

This study aims to investigate the levels of theoretical and practical awareness surrounding Central Auditory Processing Disorder (CAPD) among mainstream primary school teachers in Kuwait. The questions utilised to achieve the aim of the study are as follows:

1. To which extent are the teachers prepared to opportunistically identify children with potential CAPD?
2. To which extent are the teachers aware and knowledgeable of the causes and effects of CAPD?
3. How well can the teachers distinguish between CAPD and other developmental delays and disorders such as autism, attention deficit and learning disabilities?
4. Are the teachers prepared to employ intervention strategies for children with CAPD?
5. Is there a difference in the awareness levels between teachers depending on their subject areas, years of experiences, qualification awarding body, or the educational districts they follow?

Importance of the Study

Given the potential impact of CAPD on children's achievement (Jerger & Musiek, 2000; Bamiou et al., 2001; ASHA, 2005; Souza et al., 2016), and the uniquely vital role of primary school teachers in tracking, referring and reporting suspected cases of CAPD (Hlabangwane, 2002; Ryan & Logue-Kennedy, 2013; Fletcher, 2017; Almusawi et al., 2021), this study aims to partly address the paucity of research into the theoretical and practical knowledge of primary school teachers about CAPD, an area which has not been investigated in Kuwait, nor in many Arab and global contexts. This study may facilitate subsequent steps to be taken in order to qualify teachers in apprehending and implementing the appropriate education and intervention strategies for one of the most common cases of special needs during an early critical stage of learning. This may in turn enable teachers in their obligation to responsibly upgrade and update any insufficiencies in skills (Almusawi et al., 2019), and promote the inclusive perspective of Kuwaiti Ministry of Education in accommodating diverse learners with different abilities and disabilities in mainstream classrooms (M.O.H, 2008).

The teacher's role is not limited to referring suspected children with CAPD and managing their learning difficulties or challenging behaviours. Since their role is the most significant in the early and primary stage of diagnostic and therapeutic processes to meet the unique needs of every child (Volpatto et al., 2019), it is essential for them to have sufficient knowledge about the condition and other similar disorders. Conducting such a study may assist stakeholders and policy makers in reviewing the teacher preparation and training programs to discern how general and special educational services can be improved.

Scope and Delimitation

1. Objective delimitations: Primary school teachers' awareness of Central Auditory Processing Disorder in terms of characteristics, causes, symptoms, management, and intervention strategies.
2. Spatial delimitations: Primary schools in the State of Kuwait which are distributed across the six educational districts; Alasimah, Alfarwaniah, Aljahra, Alahmadi, Hawalli and Mubarak Alkabeer.
3. Temporal delimitations: Second semester of the academic year 2018-2019.
4. Human delimitations: Primary school teachers in the State of Kuwait.

Terminology

1. Central Auditory Processing Disorder; is a disorder characterised by difficulties in manipulating and utilising sound signals at the level of the central nervous system, which disadvantage the child from fully understanding and responding to speech and instructions, potentially leading to academic and social failure (Lasky & Katz, 1983; Bellis, 2002).

2. Theoretical and Practical Knowledge; are compared as two connected educational hierarchies (Jo Corlett et al., 2003). Theoretical knowledge encompasses all levels of consciousness and awareness, and it is what many educational institutions are designed to inform through text, thought, and speech (Lave, 1996). Practical knowledge is knowledge that wills individuals to act in certain patterns. Such concept is grounded on the epistemic, empirical, and normative conditions that influence a person's motivation and actions in human conduct (Lumer, 2010).

Methodology

In order to achieve the aim of the study, a descriptive analytical approach was followed, and a self-reporting questionnaire tool was administrated to elicit responses and collect data. In constructing the questionnaire, published and unpublished measures, scales and surveys in the

field were reviewed (Hlabangwane, 2002; Baldry & Hind, 2008; Logue-Kennedy et al., 2011; Ryan & Logue-Kennedy; 2013; Fletcher, 2017; O'Hara & Mealings, 2018). Items were adopted or developed according to the study objectives and adjusted to the Kuwaiti context. The first seven questions of the questionnaire addressed the demographics of the teachers, including their highest qualifications, major subject areas, qualification awarding body, graduation year, years of teaching experiences, and their educational districts. The subsequent questions were based on a three-point Likert scale (Yes, No, Don't know) and included 70 statements divided into 7 sections. Because the scale averages across many items which are knowledge-based with clearly defined levels and minimal ambiguity, the three-point scale is considered sufficiently appropriate (Lehmann & Hulbert, 1972). These probed teachers' awareness about CAPD characteristics, causes, symptoms shared with other disorders, specialists involved in diagnosis, management and intervention strategies as well as their contact and exposure to children with the condition according to their beliefs. Although the three-point rating scale is convenient for comparability across the data set, an open-ended question was also added in order to pinpoint the most common issues otherwise noted by teachers.

In order to ensure accuracy as recommended by scholars (Guillemin et al., 1993; Tyupa, 2011), the adopted statements were translated into Arabic and back into English, then reviewed by bilingual experts in the field. To promote further clarity of all items, the initial questionnaire was piloted on a sample of ten qualified primary school teachers who were requested to provide their comments on a prepared form. Feedback received from experts and teachers on the clarity of words and phrases, or duplication and ambiguity in meanings, was considered in preparing the final form.

The recruitment process started at the office of the Educational Research and Development Administration, where the purpose and plan of research were introduced. Following approval, permission letters were sent by the office to all six educational districts in Kuwait (Alasimah, Alfarwaniah, Aljahra, Alahmadi, Hawalli and Mubarak Alkabeer) and subsequently to all primary schools in each district. The questionnaires which introduced information about the study objectives and confidentiality in its first page, were available electronically and in paper-based forms. The researchers handed in the questionnaires in both forms to seven randomly selected schools in each district and a period of one month was given for participation with periodic reminders. The target population consisted of all primary school teachers in Kuwait who comprised 7304 teachers in 2018/2019 according to the annual bulletin of education statistics (Central Statistical Bureau, 2019). The recruited sample who returned valid questionnaires by the end of the specified period was 1003 out of 1008 responses.

The instruments' reliability was verified using Cronbach's alpha, which was calculated as 0.796, indicating a good reliability (Hinton et al., 2004). Table (1) provides a general estimate of the total value as well as the subsection values.

Table (1)

Cronbach's Alpha reliability of the questionnaire's total and subset values

Subset	No. of items	Chronbach's alpha
Contact with CAPD	4	0.628
Classroom symptoms and characteristics	17	0.742
Distinguishing between CAPD and other disorders	5	0.760
Related factors of CAPD	6	0.607
Unrelated factors of CAPD	9	0.630
Specialists involved	14	0.847
Intervention strategies for CAPD	15	0.923
Total	70	0.796

To assess the internal consistency of the questionnaire, the average correlation among the items within the questionnaire subscales was calculated. Table (2) describes estimates of Pearson's correlation coefficients between each item and its main construct.

Table (2)

The questionnaire's internal consistency based on Pearson's correlation coefficients between items and constructs

Contact		Characteristics		Distinction Symptoms		Related Factors		Unrelated Factors		Specialists		Intervention	
Item	Correlation	Item	Correlation	Item	Correlation	Item	Correlation	Item	Correlation	Item	Correlation	Item	Correlation
Q1	.751**	Q3	.330**	Q23	.582**	Q32	.625**	Q28	.567**	Q43	.390**	Q56	.543**
Q2	.766**	Q5	.475**	Q24	.619**	Q33	.558**	Q29	.539**	Q44	.130**	Q57	.501**
Q75	.535**	Q6	.515**	Q25	.635**	Q36	.517**	Q30	.394**	Q45	.201**	Q58	.565**
Q77	.677**	Q8	.354**	Q26	.646**	Q39	.615**	Q31	.547**	Q46	.484**	Q59	.665**
-	-	Q9	.510**	Q27	.609**	Q40	.694**	Q34	.577**	Q47	.518**	Q60	.733**
-	-	Q10	.477**	-	-	Q42	.485**	Q35	.561**	Q48	.542**	Q61	.545**
-	-	Q11	.392**	-	-	-	-	Q37	.449**	Q49	.395**	Q62	.681**
-	-	Q12	.470**	-	-	-	-	Q38	.383**	Q50	.655**	Q63	.615**
-	-	Q13	.482**	-	-	-	-	Q41	.495**	Q51	.542**	Q64	.399**
-	-	Q14	.441**	-	-	-	-	-	-	Q52	.594**	Q65	.391**
-	-	Q15	.530**	-	-	-	-	-	-	Q53	.371**	Q66	.630**
-	-	Q16	.516**	-	-	-	-	-	-	Q54	.543**	Q67	.636**
-	-	Q18	.487**	-	-	-	-	-	-	Q55	.322**	Q68	.597**
-	-	Q19	.487**	-	-	-	-	-	-	Q71	.261**	Q69	.665**
-	-	Q20	.568**	-	-	-	-	-	-	-	-	Q70	.629**
-	-	Q21	.203**	-	-	-	-	-	-	-	-	-	-
-	-	Q22	.336**	-	-	-	-	-	-	-	-	-	-

Several statistical analyses were applied to the collected data. Scoring was based on recoding the correct answers as 2 points, wrong answers as 0 points, and 'Don't Know' answers as neutral points equalling 1 point. The award of 1 point improves the analyses and the correlations between the study's constructs, as opposed to excluding them or recoding them with the mean value (Denman et al., 2018). The statements phrased negatively were also reverse coded.

Results

The demographic profile of 1003 respondent primary school teachers is presented in Table (3). It is noted that the majority of teachers (56.1%) were graduates of the College of Basic Education which is the largest provider of teacher preparation in Kuwait. The respondents were mostly Bachelor's degree holders (94.9%) and most of them are recent graduates (since 2016) with less than 5 years of teaching experience (43%) in different disciplines. The majority were under Alahmadi educational district (33%) which has the highest number of primary schools, and the smallest proportion were from Hawalli district (5.9%) which has the least number of primary schools in Kuwait, based on the latest annual bulletin of education statistics of 2018/19 (csb.gov.kw, 2020).

Table (3)

Teacher's demographics in frequencies and percentages (n=1003)

Demographic Categories		Frequency	Percentage(%)
Level of Education	Diploma	13	1.3
	Bachelors	952	94.9
	Masters	34	3.4
	PhD	4	0.4
Graduation Year	Before 1990	16	1.6
	1990 - 1995	31	3.1
	1996 - 2000	80	8.0
	2001 - 2005	151	15.1
	2006 - 2010	166	16.6
	2011 - 2015	236	23.5
	Since 2016	323	32.2
Educational Institute	Kuwait University	304	30.3
	College of Basic Education	563	56.1
	Open University	18	1.8
	Other	118	11.8
Major	Arabic	141	14.1
	Islamic Studies	265	26.4
	English	115	11.5
	Science	137	13.7
	Mathematics	120	12.0
	Special Education	36	3.6
	Arts	54	5.4
	PE	26	2.6
	Music	5	0.5
	Other	104	10.4
Years of Experience	Less than 5 years	435	43.4
	5 - 10 years	240	23.9
	11 - 15 years	175	17.4
	16 - 20 years	119	11.9
	More than 20 years	34	3.4
Educational District	Alasimah	130	13.0
	Alahmadi	331	33.0
	Hawalli	59	5.9
	Alfarwaniah	123	12.3
	Mubarak Alkabeer	111	11.1
	Aljahra	249	24.8

Prior to addressing the first research question, teachers were asked if they had previous exposure to children with CAPD according to their beliefs. Only 28.6% of the participating teachers stated that they were aware of the condition before the survey, whilst 71.4% of them declared that they were not aware of the existence of this condition. Only 11.3 % of the teachers agreed that they had independently researched the condition, compared with 88.7% who had not. Yet between 35-40% of the participants mentioned that they knew and have taught children with CAPD previously in their classroom, whereas 60-65% stated that they did not.

An analysis of 17 statements assessed the first question on the extent to which primary school teachers are prepared to opportunistically identify children with potential CAPD. Table (4) below summarises the findings. There was a considerable variation in the levels of teachers' awareness of CAPD ranging from about 30% to 80%. The most recognised characteristic of CAPD was related to children's delayed responses to questions and instructions with 78% answering correctly.

Alternatively, the most contentious characteristic was children's ability to identify the directions of voices, in which 36% of the answers were incorrectly chosen as 'yes', 33% as 'don't know', and only 31% were correctly answered as 'no'. Overall, the percentage of correct answers was 51%. Incorrect answers comprised 21% and the remaining 28% were neutral.

Table (4)

Teacher's awareness of CAPD symptoms and characteristics in classrooms

Question	Answers					
	Yes		No		I don't know	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Children with central auditory processing disorders CAPD:						
Do not find it difficult to focus and concentrate.	270	26.9	**528**	**52.6**	205	20.4
Are slow to respond to questions and instructions	**782**	**78**	79	7.9	142	14.2
Their responses to questions and instructions are inappropriate	**522**	**52**	206	20.5	275	27.4
Are able to localise the direction of sounds	360	35.9	**312**	**31.1**	331	33
Have reading difficulties.	**511**	**50.9**	235	23.4	257	25.6
Have writing/spelling difficulties	**408**	**40.1**	334	33.3	267	26.6
Have problems remembering things. (Have memory problems)	**315**	**31.4**	338	33.7	350	34.9
Can watch and listen closely at the same time.	230	22.9	**455**	**45.4**	318	31.7
Can distinguish between similar sounds and words	243	24.2	**429**	**42.8**	331	33
Become bored quickly when listening (yawn)	**398**	**39.7**	216	21.5	389	38.8
Need repetition when spoken to	**763**	**76.1**	77	7.7	163	16.3
Misunderstand what is said to them	**468**	**46.7**	218	21.7	317	31.6
Can use long sentences	197	19.6	**452**	**45.1**	354	35.3
Have a difficulty understanding and following fast speech.	**665**	**66.3**	137	13.7	201	20
Get distracted and lose focus easily	**643**	**64.1**	141	14.1	219	21.8
Understand slow and clear speech	**685**	**68.3**	118	11.8	200	19.9
Focus on instructions properly when spoken indirectly to them (from behind them).	257	25.6	**356**	**35.5**	390	38.9

An analysis of 15 factors that are either related or unrelated to CAPD was conducted to inform the second question, on the extent to which primary school teachers are aware and knowledgeable of the causes and effects of CAPD. These are respectively shown in the Tables (5 and 6). Table (5) shows the percentages of correct responses to the factors related to CAPD varied dramatically between approximately 20% and 80%. For instance, only 21.5% of the teachers were aware of the relationship between low birth weight and CAPD, while 39.5% were unaware. Nevertheless, a significant percentage of the respondents (80%) were mindful that chronic ear diseases are a factor in CAPD. In general, the average percentages of correct an incorrect response were 59% and 18% respectively. Regarding unrelated factors to CAPD such as left-handedness or low socio-economic status, the correct scores were considerably lower than those of the related factors, ranging from 11.5% to 54% with an average of only 36%. The same average was calculated for incorrect

responses, whereas 28% of the responses were neutral as demonstrated in Table (6). Remarkably, 70% of the teachers thought that hearing loss is a causative factor of CAPD, which may directly affect their identification of the disorder.

Table (5)

Teacher's awareness about the related factors of CAPD

Question	Answers					
	Yes		No		I don't know	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Do you think that the following factors cause CAPD?						
Mental problems/disturbances.	**604**	**60.2**	182	18.1	217	21.6
Chronic ear conditions.	**800**	**79.8**	71	7.1	132	13.2
Heredity.	**715**	**71.3**	106	10.6	182	18.1
Problem with the parts of the brain that receive sound/speech from the ear.	**742**	**74**	72	7.2	189	18.8
Slow development.	**488**	**48.7**	237	23.6	278	27.7
Low birth weight.	**216**	**21.5**	396	39.5	391	39

Table (6)

Teacher's awareness about the unrelated factors of CAPD

Question	Answers					
	Yes		No		I don't know	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Do you think that the following factors cause CAPD?						
Watching a lot of television.	564	56.2	**246**	**24.5**	193	19.2
Excessive use of smart devices.	696	69.4	**159**	**15.9**	148	14.8
Born to deaf parents.	523	52.1	**227**	**22.6**	253	25.2
Verbal, emotional or sexual abuse.	393	39.2	**288**	**28.7**	322	32.1
Low socio-economic status.	233	23.2	**543**	**54.1**	227	22.6
Bed wetting/ incontinence.)	150	15	**522**	**52**	331	33
Left-handedness.	106	10.6	**498**	**49.7**	399	39.8
Hearing loss.	699	69.7	**115**	**11.5**	189	18.8
Poor and delayed language development.	609	60.7	**192**	**19.1**	202	20.1

Responses to 5 statements were analysed to assess the extent to which primary school teachers can distinguish between CAPD and other developmental delays, disorders and learning disabilities in order to answer the third research question. The percentage of correct answers ranged from around 33% to 72% as shown in Table (7). The disorder that teachers most commonly associated with CAPD (72.5) is learning difficulties. In contrast, only 33.2% of teachers believed that CAPD is associated with autism; a total of 66.8% responded to this statement incorrectly with 'No' or 'I don't know'. The average percentage of the teachers' total awareness in distinguishing between CAPD and other disorders was about 55.2% which is relatively high.

Table (7)

Teacher's awareness of the relationship between CAPD and other developmental delays and disorders

Question	Answers					
	Yes		No		I don't know	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Do you think that the following disorders are related to CAPD?						
Attention deficit and hyperactivity.	**634**	**63.2**	208	20.7	161	16.1
Learning difficulties	**727**	**72.5**	156	15.6	120	12
Autism	**333**	**33.2**	344	34.3	326	32.5
Pervasive developmental disorder	**387**	**38.6**	301	30	315	31.4
Poor and delayed language development.	**703**	**70.1**	133	13.3	167	16.7

It is also vital for teachers to be aware of the specialists involved in the diagnosis and treatment of CAPD. Table (8) includes a list of different professionals whom the teachers were queried regarding their effective involvement in CAPD. The highest percentage of 93% was attained in appreciating that a doctor should be involved with CAPD cases, whereas only 35% correctly believed that a dietitian is involved. Interestingly, 23% and 29% of the respondents thought that a 'clergyman' and a 'homeopathic practitioner' respectively are also effectively involved in handling CAPD cases. Similar percentages were also calculated in the neutral category for the same options, which indicates the impact of culture on the current practices for children with special needs. Moreover, most of the respondents (70.1%) indicated that no one can effectively help the children with CAPD. Collectively, these results indicate an alarming lack of knowledge amongst many teachers regarding the necessary involvement of specialised professionals and the possibility of educational intervention. Indeed, table 9 shows the extent to which teachers agreed to certain intervention strategies in order to answer the fourth research question, in which 69 (6.9%) teachers indicated that ignoring the child is an option, while 47 (4.7%) indicated punishment as an effective strategy. However, this does not apply to the majority of teachers, 58% to 90% of whom selected the correct options for the different intervention strategies as summarised in Table (9).

Table (8)

Teachers' awareness of the specialists effectively involved with CAPD intervention

Question	Answers					
	Yes		No		I don't know	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Can the following persons help children with CAPD?						
The general practitioner	**936**	**93.3**	23	2.3	44	4.4
The clergyman	234	23.3	**525**	**52.3**	244	24.3
The homeopathic practitioner	287	28.6	**479**	**47.8**	237	23.6
The teacher	**775**	**77.3**	125	12.5	103	10.3
The audiologist	**917**	**91.4**	37	3.7	49	4.9
The special education teacher	**886**	**88.3**	47	4.7	70	7
The physiotherapist	**517**	**51.5**	287	28.6	199	19.8
The parents	**873**	**87**	65	6.5	65	6.5
Friends	**670**	**66.8**	191	19	142	14.2
The psychologist	**777**	**77.5**	111	11.1	115	11.5
The dietitian	**352**	**35.1**	404	40.3	247	24.6
The child him/herself	**747**	**74.5**	130	13	126	12.6
No one	71	7.1	**633**	**63.1**	299	29.8

Question	Answers					
	Yes		No		I don't know	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
	Same method		Different method		Not sure	
Should children with auditory processing disorders be treated the same or differently from other children in the class?	118	11.8	**779**	**77.7**	106	10.6

Table (9)

Teachers' opinions about intervention strategies for children with CAPD.

Question	Answers					
	Yes		No		I don't know	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Which of the following methods can the teacher use to help children with auditory processing disorders?						
Ignoring the child.	69	6.9	**881**	**87.8**	53	5.3
Punishing the child.	47	4.7	**906**	**90.3**	50	5
Monitoring the child's use of hearing aids	**875**	**87.2**	63	6.3	65	6.5
Seating the child in the front row.	**887**	**88.4**	54	5.4	62	6.2
Using visual methods with the child such as images and drawings.	**904**	**90.1**	48	4.8	51	5.1
Reducing noise in the classroom with carpets and curtains.	**771**	**76.9**	98	9.8	134	13.4
Looking directly at the child while speaking	**887**	**88.4**	58	5.8	58	5.8
Repetition of questions and orders	**878**	**87.5**	67	6.7	58	5.8
Using sign language.	**609**	**60.7**	250	24.9	144	14.4
Speaking loudly when talking to the child.	**586**	**58.4**	291	29	126	12.6
Writing notes and instructions for the child	**843**	**84**	72	7.2	88	8.8
Periodically checking to ensure the child's understanding	**898**	**89.5**	42	4.2	63	6.3
Speaking slowly and clearly when talking to the child.	**902**	**89.9**	38	3.8	63	6.3
Rephrasing questions and orders in a simplified way.	**894**	**89.1**	45	4.5	64	6.4
Presenting information to the child in a tangible and perceptible manner, and avoiding abstract information.	**906**	**90.3**	35	3.5	62	6.2

A further question probed teachers' knowledge on whether children with CAPD should be treated similarly or differently to other children in the class. A total of 118 teachers (12%) thought that children with CAPD should not be treated any differently from their peers in the classroom, while 77.7% indicated the opposite. Moreover, 88.3% agreed with the role of special education teachers in CAPD as presented in table 8. In order to facilitate the comparison between teachers' performance based on their exposure to CAPD cases in classrooms, standardised variables were calculated for each dimension as well as the total scores of the participants in the study. An independent samples t-test was used to compare the scores of reportedly exposed and non-exposed teachers in the different dimensions of the study. The results in Table (10) show that teachers'

performance in all dimensions, except for specialists involved, is significantly affected by their experience and exposure to children with the condition. Prior exposure improved awareness levels in all significant domains except in factors unrelated to CAPD, where awareness is decreased in exposed teachers.

Table (10)

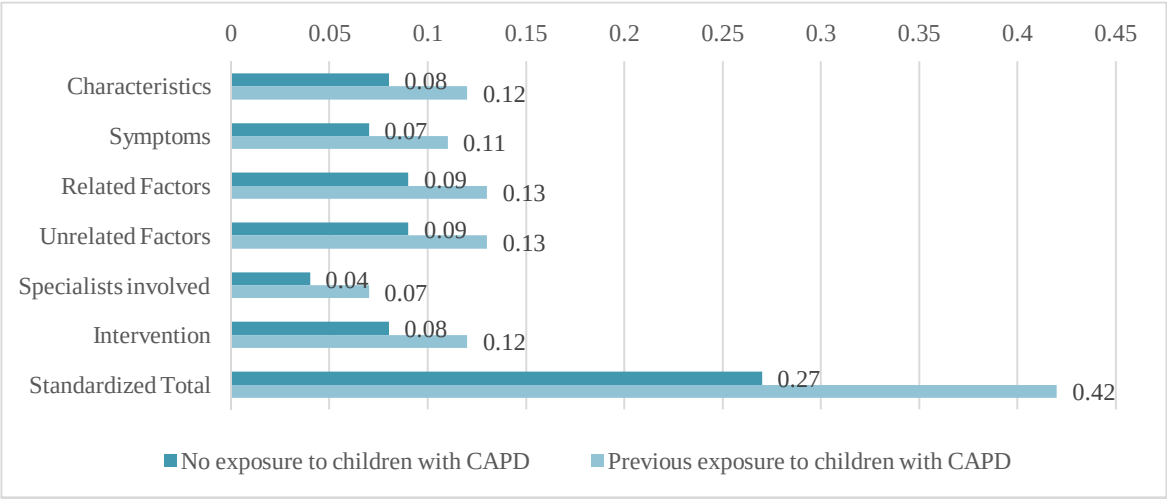
Mean comparisons of standardised results of teachers' awareness based on CAPD exposure in their classrooms

	No exposure to children with CAPD		Previous exposure to children with CAPD		Difference between groups	
	Mean	SD	Mean	SD	P value	Results
Characteristics	-0.08	0.94	0.12	1.08	0.004	Significant
Symptoms	-0.07	0.97	0.11	1.03	0.004	Significant
Related Factors	-0.09	1.00	0.13	0.99	0.001	Significant
Unrelated Factors	0.09	0.97	-0.13	1.03	0.001	Significant
Specialists involved	-0.04	1.01	0.07	0.98	0.092	Not Significant
Intervention	-0.08	1.07	0.12	0.87	0.001	Significant
Standardized Total	-0.27	3.11	0.42	2.99	0.001	Significant

Moreover, 28% of those who have known children with CAPD (M=.72, SD=.45) thought that they are less intelligent than their peers in the classroom, whereas 22.3% of those with no exposure (M=.78, SD=.42) believed that they have lower intelligence levels. The remainder of each group responded that intelligence levels that are at or above average in CAPD. T-test analyses showed exposure to CAPD had a significant effect on the two groups' answers in this section, $t(801) = 2.016$, $p=.044$. Figure (1) below better illustrates the differences between teachers' awareness in the different aspects of the disorder based on the status of previous exposure.

Figure (1)

Illustrated Differences Between the Means of Awareness among Teachers based on their CAPD Exposure



Further analysis was conducted to detect the difference in awareness levels between primary school teachers depending on their subject areas, years of experiences, qualification awarding body, or educational districts they follow. The mean and standard deviation values of the correct response percentages in the previous measures were calculated and summarised in Table (11) based on the different demographic characteristics. Significant differences were identified using a One-way Anova.

Table (11)

Differences in teachers awareness levels and percentages based on the different categories

Demographic categories		Mean Awareness Level	Standard Deviation	Percentage of Awareness
Level of Education	Diploma	34.8	14.4	52.7
	Bachelors	40.2	10.6	61.0
	Masters	42.3	9.2	64.1
	PhD	44.8	5.6	67.9
Graduation Year	Before 1990	41.5	7.0	63.5
	1990 - 1995	42.1	9.6	62.9
	1996 - 2000	41.8	10.5	62.6
	2001 - 2005	41.3	9.9	62.1
	2006 - 2010	41.0	9.2	61.8
	2011 - 2015	39.6	11.1	60.0
	Since 2016	39.5	11.2	59.8
Educational Institute	Kuwait University	41.3	9.6	62.6
	College of Basic Education	39.7	11.0	60.1
	Open University	39.5	6.5	59.8
	Other	41.1	10.6	62.2
Major	Arabic	42.5	7.2	64.4
	Islamic Studies	38.8	11.9	58.8
	English	40.6	9.6	61.6
	Science	41.3	11.4	62.6
	Mathematics	38.7	11.0	58.6
	Special Education	42.2	9.7	63.9
	Arts	41.0	10.8	62.1
	PE	38.9	11.1	59.0
	Music	31.8	18.7	48.2
	Other	40.0	9.5	60.7
Years of Experience	Less than 5 years	39.0	11.4	59.1
	5 - 10 years	40.5	9.8	61.4
	11 - 15 years	41.3	9.1	62.6
	16 - 20 years	41.8	11.4	63.3
	More than 20 years	41.8	8.1	63.4
Educational District	Alasimah	40.2	8.9	60.9
	Alahmadi	39.8	10.4	60.4
	Hawalli	39.5	12.0	59.9
	Alfarwaniyah	39.7	11.8	60.1
	Mubarak Alkabeer	42.4	9.0	64.2
	Aljahra	40.1	11.4	60.8

The percentage awareness levels regarding CAPD amongst the primary school teachers increased with higher educational attainment. Teachers at the diploma level scored 15.2% less than those with a PhD, whose average percentage of awareness was 67.9%. The ANOVA indeed reveals a significant effect of the qualification level on the total awareness scores of teachers, $F(4,998) = 2.778$, $p = .026$. A post-hoc Scheffe test showed that a significant difference was noted between the total awareness scores between diploma level teachers and the Masters holders. The insignificance between PhD level teachers and the other groups is likely due to the small number of participants in this category.

There is a similarly positive relationship between the number of years since qualification and awareness levels, increasing from 59.8% for graduates since 2016 to 63.5% in those who

graduated before 1990, which could be attributed to a gain in experience. Indeed, the ANOVA showed a significant difference in the teachers' awareness level depending on their years of experience, F(4,998) = 6.840, p =.000. Those with less than 5 years of experience had significantly lower awareness levels compared to participants with 10 to 15 years at the.05 level, and also with 16 to 20 years of experience at the.001 level according to post-hoc Scheffe tests. Similarly, teachers with 5 to 10 years of experience have significantly lower awareness scores than those with 16 to 20 years of experience at the.05 level.

The difference between the qualification awarding bodies was less than 3% which shows no overall significant advantages of one institute over the other in terms of CAPD awareness and information taught. This result was confirmed by the insignificant *F* value obtained through ANOVA.

In measuring the difference between the various majors of primary school teachers, Arabic language and Special Education teachers are the most aware of the condition with an average of 64.4% and 63.9% respectively. The range of awareness percentages for all the other majors was between 58% and 62%, except for Music teachers who scored 48%. Significant results were also obtained when the means of each group were compared through ANOVA, F (9,993)= 2.297, p =.015. Lastly, teachers in the Mubarak Alkabeer were to some degree more aware than their counterparts in other districts with a percentage of 64.2%. Whilst the lowest average awareness percentage was in the Hawalli district at 59.9%. However, the ANOVA yielded no significant differences between the results in these districts.

Discussion

Generally, the findings here differ from the studies by Hind (2006) as well as Baldry and Hind (2008) who reported almost negligible knowledge levels of CAPD among professionals such as audiologists and speech-language therapists. Poor or very poor awareness about the condition was likewise reported among in-service teachers in studies conducted by Hlabangwane (2002) in South Africa, Logue-Kennedy et al., (2011) in Northern Ireland, Ryan and Logue-Kennedy (2013) in the Republic of Ireland, and Fletcher (2017) in North America, as well as pre-service teachers (Almusawi et al., 2021). In contrast, primary school teachers in this study performed moderately, and this difference is possibly due to several contributing factors. Firstly, a higher level of awareness in this study was observed in teachers with more years of experience, indicating that teaching hours in classrooms may have contributed to their general knowledge about the condition.

The analyses into the impact of exposure to children with CAPD on teachers' awareness of characteristics, symptoms, possible causes and intervention all showed a significantly positive effect. An exemption was the teachers' knowledge about the specialists involved in CAPD treatment, which is perhaps not typically gained through the classroom teaching experience. The paradoxically higher awareness level concerning the unrelated factors in the non-exposed teachers may be reflective of a more reserved approach in drawing causative relationships due to a self-recognised lack of prior exposure. Furthermore, the significant differences observed in teachers of different majors further support a correlation between time spent teaching and level of awareness; Arabic language teachers, who are exposed to children for almost 90 minutes daily through two successive lessons, achieved greater awareness in comparison to music teachers who are exposed to children only once a week. Simply, the longer the contact time with children, the greater the opportunity to become aware of their different conditions.

It is also within expectation that special education teachers had the second highest level of awareness about CAPD. This result might be related to two factors. Firstly, their college pathway considers the diverse special needs population, and CAPD is assumingly amongst the learning objectives. Secondly, their choice of the college minor is often Arabic language, hence the added benefit of experiencing practical skills as main Arabic teachers through longer daily exposures to children. The former assumption, however, needs to be investigated since no difference was observed in the level of awareness between the graduators from different teacher preparation institutions in Kuwait, and especially from those offering special education programmes. The emphasis must therefore be on the importance of theoretical knowledge on teachers' skills in addition to the practical knowledge gained by classroom exposure. Establishing the theoretical knowledge is the cornerstone in teachers' preparation, because it minimises ambiguity in

addressing the special needs cases. It also maximises the benefit of teachers' time and effort and shortens the pathways to intervention, which might appear broad and unclear if awareness is gradually gained by experiences, and not constructed scientifically in distinguishing CAPD from other conditions. The results also support this notion as diploma holders were less aware about CAPD when compared to those with a Master's degree. PhD holders also had a greater awareness though not statistically significant, likely due to the low number of participants in this category. Their awareness percentage, however, is relatively low given the expectation of a broader theoretical knowledge base rather than specialised competencies in their field (Melin & Janson, 2006).

Teachers' practice-based experience was also evident when probing the extent to which the participants could distinguish between CAPD and other developmental delays, disorders and learning disabilities. The large range of correct response percentages (33% to 72%) suggests considerable uncertainty between CAPD and the other developmental delays and disorders amongst the primary school teachers. This is likely to be at least partly a consequence of the majority (71%) who stated that they were not aware of the condition before the survey, and between 60-65% who have not had exposure to children with CAPD leading to an inability identify or distinguish between CAPD and the other disorders such as ADHD, learning difficulties and poor language development. The mutual symptoms of CAPD and these other disorders which are also common in classrooms may give teachers some advantage in better dealing with the condition. Another potential contributor to the higher levels of awareness is the increased prevalence rate of CAPD from between 2-7% (Chermak & Musiek, 2007; Bamiou et al., 2001) to 9-11% (Skarzynski et al., 2015; Brewer, et. al. 2016) over the last two decades. This is perhaps due to a better understanding of the disorder, and may promote greater awareness among parents, teachers and other professionals. The availability and ease of accessibility to information through online services and communities may have made teachers somewhat more aware about the disorder prior to their participation as 11% of them declared. The ease of connecting with experts through social media may have further contributed to a positive attitude towards raised awareness about different conditions and disciplines. The study by Fletcher (2017) highlighted teachers' willingness to expand their knowledge, which was significantly improved after reading a booklet about the condition. Their positive approach towards learning about CAPD is an indicator of the potential benefit of bringing teachers' attention to diverse groups of special needs. This can either happen through training courses and workshops for in-service teachers, or through pre-service university courses and programmes as demanded by student-teachers (Almusawi, et al., 2021). Incorporating CAPD and other disorders into teaching syllabi of different disciplines, as well as following up with training courses after teachers' graduation is likely to be highly beneficial. The latter approach is a plausible explanation for the higher level of awareness in Mubarak Alkabeer compared to other districts. Each district administrations independently offers training courses and workshops for their affiliated teachers, many of which provide a competitive advantage for teachers and enable their expertise in the fields of general and special education. Further, several comments written by the participating teachers in the open-ended space made it clear that teachers desire improving their theoretical and practical knowledge and would like their professional development to be continuously and regularly updated.

Better awareness and practices by teachers will serve to limit the amount of academic failure at the critical primary school level. For example, understanding the weaknesses of children with CAPD in communication, language acquisition and reading comprehension will assist in taking appropriate steps through their initial referral to diagnostic assessment and intervention practices (Choudhury & Sanju, 2017). Subsequent remediation activities and implementation of classroom behaviour management will facilitate their teaching and learning tasks. Attracting children's attention when speaking, ensuring soundless learning environments, enhancing lessons with visual or written cues, breaking instructions into achievable steps, repeating, summarising, and simplifying the given instructions are some examples among many other strategies. Further to the focus on auditory training and functioning, paying attention to cognitive and language skills such as working memory and phonological processing skills is also recommended (for a review: De Wit et al., 2016). Explicit and direct instruction in the beginning

stages of reading practice is believed to be indispensable for the intended inclusive practices in the state of Kuwait (Almusawi, 2014; Almusawi et al., 2019), and is universally needed for those with specific learning difficulties or disabilities (Berninger & Wolf, 2009), as well as those with hearing impairment (Almusawi, 2014; 2019; 2022; Colin et al., 2007). Adopting these national standards will gradually compensate for the reportedly poor performance of Kuwaiti students on the international stage (UNESCO, 2015), which currently persists despite concerted efforts and large budgets allocated to Kuwaiti institutions (Ahmad & Greenhalgh-Spencer, 2017). It will also fulfill the demand for a consistent program of teacher professional growth with intensive development of educational institutions and learning standards (Singer et al., 2014).

Although the required management of CAPD is a holistic multidisciplinary practice that involves audiologists, psychologists, speech-language therapists, hearing therapists and possibly other professionals according to the specific requirements of the case (Keith et al. 2019), it can only further benefit by including teachers. Teachers must be aware of the condition in order to inform and refer the suspected cases and must be trained in order to manage and intervene. The intervention team should also involve parents and families since providing them with auditory training and communication strategies that target children's listening difficulties revealed a significant remediation impact (Cameron et al., 2015; Loo et al., 2016). If available in school, children with the condition should also attend audiologist and speech-language pathologist services (McCarty, 2019). Behavioural and electrophysiological research shows that auditory training is helpful in improving the performance of children with CAPD (Filippini et al., 2019). Once again, a focus on cognitive and language skills, appears even more promising than auditory functioning skills (De-Wit et al., 2016) in such condition.

Conclusions and Recommendations

This study uncovered the teachers' theoretical and practical knowledge levels about the characteristics, symptoms, causes and intervention strategies of CAPD in primary schools, and concludes that the teachers' awareness of CAPD is easily confused with other conditions such as autism and ADHD. This however remedied to an extent by certain variables such as their years of teaching experiences and prior exposure to children with special needs. Their attained education levels and their subject areas also played a significant role in their knowledge level, as opposed to the qualification awarding body, or educational districts followed. Based on the findings of the study, the following recommendations may be made:

1. Advising stakeholders and policymakers to establish or rebuild course content and offer material at community centers, schools, colleges and awarding bodies to meet the demands of a more competent and qualified body of current and future teachers.
2. Providing in-service teachers with instant academic courses containing updated theoretical knowledge and practical opportunities about how to recognise, refer, manage, and effectively intervene with general, specific and common conditions and disorders.
3. Providing schools with guidance facilities through a team of social and psychological specialists, as well as audiologists and speech-language pathologists, either as residents or as provisional visiting teams.
4. Establishing centers that include doctors and specialists to provide counseling and rehabilitation services in educational, social and psychological fields for people with disorders, their teachers and their families.
5. Targeting parental figures in each household by offering parenting training courses and methods designed to guide through different issues or concerns about their child's development and behaviour across different age ranges.

Finally, this study serves to facilitate further research in the field. Within the same goals of the current study, investigations of teachers and administrator's awareness in other local or international institutions and bodies are of future interest. Studies exploring the awareness levels firstly and intervention approaches secondly amongst pre-service teachers in comparison to their in-service peers may also be valuable. This will ideally prompt educators to assess the quality and effectiveness of the pedagogical practices they implement, and to intervene and support the curricula they propose.

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