RESEARCH ARTICLE

Knowledge of sensory processing disorder among special education teachers in primary school at Melaka Tengah

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Abstract:

This study is about sensory processing disorders and also to identify the differences of familiarity with the strategies and resources to support children with SPD between special education teachers in urban and rural areas. Using a cross-sectional study, 118 special education teachers participated in this study and answered the Demographic Profile and the Questionnaire for SENCOs. Most of the participants rated for 'unsure' and 'disagree' (79%) that indicated that they were lacking in understanding about SPD. There were no differences between the understanding of SPD and gender, teaching experience, and the location of the school. However, there was a difference between the understanding of SPD and the level of education and the presence of family with SPD (p=.036 HAT). Also, there was no association between the teaching experiences and the confidence in identifying behavior caused by sensory and the familiarity with the strategies and resources to support children between special education teachers in urban and rural areas. This study indicates that most of the special education teachers which involve in special education school lack in understanding of SPD.

Keywords: Sensory processing disorder, special education, teachers, primary school

1. INTRODUCTION

Sensory Processing Disorder (SPD) is a neurological condition that may change the way an individual receives sensory information and causes difficulties in processing the information from the five senses which are taste, touch, sight, hearing, and smell [1,2]. A total of 16% of school-aged children were affected with SPDs and the cognitive and behavioral deficits will be impacting the affected individual and their families [3]. Besides, there are significant and lifelong consequences of learning and social abilities for sensory processing differences [4].

A survey [5] was obtained in 2009 from 925 families where 71% of them were school-aged which were from 7 to 11 years old. As reported by the parents, the most disturbing sensation for their children was the tactile sensations such as from clothing, cutting a finger or toenails, hair brushing, and mud. It often shared the criteria and is more prevalent in children with Autism Spectrum Disorder and Attention-Deficit/Hyperactivity Disorder (ADHD) who meet the Diagnostic and Statistical Manual-Fifth Edition (DSM-5). However, even children with SPD have similar criteria and behavior impairment, they often fail to receive services [4].

This is because, SPD has been recognized in some of the diagnostic guides, but not others like the DSM-5 [6]. Children may have SPD without the challenges of attention, language, and also social like how the children with ADHD and ASD have [3]. Because the disorder has not been listed in the Diagnostic and Statistical manual that often used by the psychiatrists and psychologists, SPD has been overlooked [7]. The sensory dysfunction may affect the ability of the child to accomplish practical, daily activities, and age-appropriate learning tasks. It may result in a long-term impairment of intellectual and social abilities [3]

School personnel did not find it easy to sort and assess special educational needs [8]. The judgment of pupils having special education needs may vary from teacher to teacher and their attitudes can play a significant role in this process [9].

The challenges faced in the Malaysian special needs education sector are insufficient provision on teaching materials, problems such as the content of courses for teacher trainees which do not incorporate necessary conceptual understanding on disability and lack of training for the teachers and capacity of the resources of the teachers [10].

Many teachers have limited knowledge in this subject area which is Sensory Processing Disorder and requires support from Occupational Therapists [2]. A parent in a study by Scotch [11] stated that if the teachers have the knowledge regarding the SPD, they can address the issue effectively

and help the children to get more of what they learn in school. However, the information about knowledge of Sensory Processing Disorder among the special education teachers is limited and insufficient. Hence, there is a need for this study to be conducted.

2. MATERIAL AND METHODS

2.1 Study Design

The type of research design used in this study is a cross-sectional study. The design is suitable to be used as it is easy to be conducted, takes a short period, and cost-effective to be implemented. Thus, it is the most suitable study design to apply for this research.

2.2 Study Sample

The population of this study was the special education teachers of primary school at Melaka Tengah. According to Jabatan Pendidikan Negeri Melaka, the latest numbers of special education teachers at primary school in Melaka Tengah are 243. The study proposed three inclusion criteria which are the teachers must be a special education teacher. They must be teaching in the primary school in Melaka Tengah and they are also must be able to understand English. The study had only one exclusion criterion which is the teacher must not a general teacher to participate in this study.

2.3 Instruments

2.3.1 Demographic Information

The variables include teaching experience, level of education, gender, presence of family members with Sensory Processing Disorder, and area of the school.

2.3.2 Questionnaire for SENCos

This questionnaire was published in a Doctorate thesis by Plum Hutton [13] in school to rate the understanding and knowledge about sensory processing disorder. The participants could rate to what extent they agreed or disagree with the statement by using the 5 points Linkert Scale. The first five statements are the specific terminology and the central to understanding theories of sensory processing disorder. The last four statements are to investigate whether the teachers had appropriate knowledge and resources to support Sensory Processing Disorder. This questionnaire was piloted with three Special Education Need Coordinators (SENCos) and no issue was raised with it, hence no amendments made.

2.4 Study Stages

This research consists of four stages. The first stage is to seek ethical approval. Ethical approval was obtained from the Universiti Teknologi MARA (UiTM) Ethics Committee and Kementerian Pendidikan Malaysia before conducting the research. The second stage is screening and obtaining informed consent. Teachers were screened based on the inclusion and exclusion criteria. Teachers in the inclusion criteria were included in the study and were approached and consent from the teachers was obtained. The third stage was data collection. Teachers were given the questionnaire that includes the demographic questionnaires and questionnaires regarding the SPD. Teachers were explained on how to rate the questionnaire. Finally, the fourth stage is data analysis. The questionnaires were collected and were analyzed using SPSS.

2.5 Statistical Analysis

Data would be processed by using the Statistical Package for Social Sciences version 25 (SPSS-25). The data are categorical. Thus, categorical data analysis was used. Using the Chi-Square test, the expected count was identified using the crosstab to check the assumption. The expected counts were at the Chi-Square test output and it is to decide whether to use the Pearson Chi-Square or Fisher's Exact Test result. When the expected count of <5 is more than 20%, then the results were from Fisher's Exact Test. For interpretation, if the p-value is <0.05, thus, the null hypothesis will be rejected.

2.6 Ethical Consideration

This study was approved by the Ethical Committee of the Faculty of Health Sciences, UiTM Puncak Alam, and the Research Ethics Committee (REC) of UiTM Shah Alam (reference: REC/548/19). The approval also received from Kementerian Pelajaran Malaysia and Jabatan Pendidikan Negeri Melaka to involve the special education teachers in this study. The teachers were also assured of the confidentiality of their given data, and that all information was used solely for research purposes.

3. RESULT AND DISCUSSION

3.1. Demographic Data

The demographic data of the participants in this study are shown in Table 1. There were a total of n=188 participants involved in which the majority of them are female, 100 (84.70%) and the rest of them are male, 18 (15.30%). For the level of education, most of the participants had a Degree and above, 111 (94.10%) and 7 (5.90%) of them had a Diploma. Majority of the participants which are 90 (76.30%) of the have teaching experience more than 10 years while 28 (23.70%) of them have less than 10 years of teaching experience. Moreover, 109 (92.40%) of then do not have a family with Sensory Processing Disorder and 9 (7.60%) of them have a family with Sensory Processing Disorder. 59 (50.00%) were from urban school and another 59 (50.00%) participants were from the rural area of the school.

3.2. Understanding of Sensory Processing Disorder

Table 2 shows the result from the questionnaire for special education teachers regarding the knowledge of sensory processing disorder and it has 9 components. The first component is regarding the understanding of Sensory Processing Disorder, 30 (24.40%) of participants answered agree, 56 (47.50%) chose neither agree nor disagree and 32 (27.10%) of participants disagreed.

Table 1: Descriptive test. Demographic data

No	Variables	n (%)
1)	Gender:	
	- Male	18 (15.30)
	- Female	100 (84.70)
2)	Level of education:	
	- Diploma	7 (5.90)
	- Degree and above	111 (94.10)
3)	Teaching experience:	
	- Less than 10 years	28 (23.70)
	- More than 10 years	90 (76.30)
4)	Family with SPD:	
	- Yes	9 (7.60)
	- No	109 (92.40)
5)	Area of school:	
	- Urban	59 (50.00)
	- Rural	59 (50.00)

Table 2: Descriptive test. Understanding of Sensory Processing Disorder

No	Variables	n (%)
1)	Sensory Processing Disorder	
	- Agree	30 (25.40)
	- Neither	56 (47.50)
	- Disagree	32 (27.10)
2)	Sensory Modulation Disorder	
	- Agree	24 (20.30)
	- Neither	57 (48.30)
	- Disagree	37 (31.40)
3)	Vestibular Sense	
	- Agree	32 (27.10)
	- Neither	52 (44.10)
	- Disagree	34 (28.80)
4)	Proprioceptive Sense	
	- Agree	37 (31.40)
	- Neither	47 (39.80)
	- Disagree	34 (28.80)
5)	Tactile Defensiveness	
	- Agree	35 (29.70)
	- Neither	51 (43.20)
	- Disagree	32 (27.10)
6)	Confidence in identifying behavior caused by sensory	
	- Agree	32 (27.10)
	- Neither	55 (46.60)
	- Disagree	31 (26.30)
7)	Familiarity with strategies and resources to support children with SPD	
	- Agree	33 (28.00)
	- Neither	45 (38.10)
	- Disagree	40 (33.90)
8)	Know where to find strategies and resources to support children with SPD	
	- Agree	29 (24.60)
	- Neither	54 (45.80)
	- Disagree	35 (29.70)
9)	Teachers and Teaching Assistant in school know to identify and support children with SPD	
	- Agree	33 (28.00)
	- Neither	49 (41.50)
	- Disagree	36 (30.50)

Meanwhile, in the second component which is the understanding regarding Sensory Modulation Disorder, only 24 (20.30%) of participants chose to agree, 57 (48.30%) rate for neither agree nor disagree and 37 (31.40%) participant rate for disagreeing. For the third component, 32 (27.10%) of participants rate agree, 52 (44.10%) who rate for neither agree nor disagree, and 34 (28.80%) rate for disagree for the understanding of vestibular sense. Next, the understanding of proprioceptive sense, which is the fourth component, 37 (31.40%) of them chose to agree, 47 (39.80%) chose neither agree nor disagree and 34 (28.80%) rate for disagreeing. Moreover, for the fifth component which is the understanding of tactile defensiveness, 35 (29.70%) of participants rate for agreeing. While most of them rate for neither agree nor disagree 51 (43.20%) and 32 (27.10%) of the rate for disagreeing.

Next is the component of confidence in identifying behavior caused by sensory. 32 (27.10%) of participants rate for agreeing, 55 (46.60%) were not sure and rate for neither agree nor disagree and 31 (26.30%) rate for disagreeing. In the seventh component, 33 (28.00%) were agreed that they familiar with the strategies and resources to support children with SPD while 45 (38.10%) of the rate for neither agree nor disagree. Meanwhile, the rest of them, 40 (33.90%), disagreed that they familiar with the strategies and resources to support children with SPD.

For the eighth component, a total of 29 (24.60%) of participants agree that they know where to find strategies and resources to support children with SPD. Next, the majority of them which are 54 (45.80%) rate for neither agree nor disagree and 35 (29.70%) of the rate for disagreeing. Last but not least, the ninth component, 33 (28.00%) of them agree that their teachers and Teaching Assistants in school know how to identify and support SPD. Besides, 49 (41.50%) of them neither agreed nor disagree and 36 (30.50%) of them disagreed with the statement.

The result of this study showed that the majority of the special education teachers have poor knowledge of SPD as most of them rated for unsure which is neither agree nor disagree and disagree at most of the components in the questionnaire. Wild and Steeley [12] mentioned that there was researches that showed that teachers have a lack of understanding of SPD and the strategies to be implemented for sensory difficulties. The result is similar to a study by Hutton [13] where the result showed that most of the Special Education Need coordinators rated for not having a good understanding of SPD for themselves. Besides, a study by Sadoun [14] that was also focused on the knowledge of SPD obtained the same result where the teachers have a lack of knowledge regarding SPD.

To understand the children's response towards the events of everyday life, the professionals and also the caregivers may use the knowledge of sensory processing. It is useful for designing strategies that help children to have positive and fulfilling daily life experiences [15].

The lack of knowledge and awareness on the part of school professionals including teachers and administrators regarding SPD has contributed to a lot of misconceptions [2] and difficulty identifying the child's problem for their early intervention program [14]. Teachers that know about SPD may help the students to overcome their challenges especially them with sensory difficulties by simply changing the environment that suits them and providing them with activities that may help their sensory challenges [16].

3.3. Understanding of Sensory Processing Disorder and Demographic Data

As mentioned in Table 3, there are 33.3% which is more than 20% of the cell have expected count less than 5 which violates the assumption. Thus, the result of the Fisher-Freeman-Halton Test will be used. The hypothesis testing in Table 3 showed that there was no significant difference ($p > 0.05$) in the understanding of SPD and gender and we accept the null hypothesis. This result is similar to a study by Essa and El-Zeftawy [17] and Haimour and Obaidat [18] as their result also showed that gender will not affect the teachers' knowledge. Meanwhile, Taqi et. al. [19] mentioned in their study that instead of male teachers, the female teachers are the most effective regarding the organization and knowledge about the subject. Besides, Al-Hairy and Migdady [20] also found the same result. They stated that female participants have more knowledge than male participants. This is because of their characteristics where females are more concerned with the children as natural mothers.

Table 3: Chi-Square Test, Understanding of SPD and gender (male and female)

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	1.718 [a]	2	.424	.455		
Likelihood Ratio	1.749	2	.417	.430		
Fisher's Exact Test	1.902			.404		
Linear-by-Linear Association	.012[b]	1	.915	1.000	.527	.138
N of Valid Cases	118					

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 4.58.
b. b. The standardized statistic is .107.

Besides, the hypothesis testing also showed no significant difference ($p > 0.05$) in the understanding of SPD and teaching experience. Schwarber [21] and Rai et. al. [22] also had the same result as this study where there was no significant difference between teachers' knowledge and teaching experience. Meanwhile, Essa and El-Zeftawy [17] showed that teachers with 5-10 years of teaching experience have more knowledge than the other teachers. Haimour and Obaidat [18] also mentioned that there was a statistically significant difference between the teachers' teaching experience. Contradict to the study by Essa and El-Zeftawy [17], stated that teachers with less than 5 years of teaching experience had a higher level of knowledge. This is because they are still at the beginning of work and still retain the information they had during the undergraduate period.

Table 4: Chi-Square Test, Understanding of SPD and teaching experiences (less than 10 years and more than 10 years)

	Value	df	Asymptotic Significance (2sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	2.994 [a]	2	.224	.231		
Likelihood Ratio	2.902	2	.234	.241		
Fisher's Exact Test	2.846			.241		
Linear-by-Linear Association	2.699 [b]	1	.100	.104	.067	.031
N of Valid Cases	118					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.12.
b. The standardized statistic is -1.643.

As mentioned in Table 5, there is 50% which is more than 20% of the cell have expected count less than 5 which violates the assumption. Thus, the result of the Fisher-Freeman-Halton Test will be used. Next, based on the result of this study, it showed that there was a significant difference ($p < 0.05$) between understanding of SPD and level of education among the teachers, and the research hypothesis was accepted. Rai et. al. [22] also mentioned that there was a significant difference between knowledge and educational level. Haimour and Obaidat [18] also showed that there was a statistically significant difference between different education level groups. They also stated that teachers with advanced education levels usually received more advanced courses. However, contradicting a study by Sadoun [14], shows that there was no statistically significant difference between the teachers' educational level and background and knowledge regarding SPD.

Besides, there was also a significant difference ($p < 0.05$) between understanding of SPD and the presence of family with SPD and there are 50% which is more than 20% of the cell have expected count less than 5 which violates the assumption.

Table 5: Chi-Square Test, Understanding of SPD and level of education (diploma and degree and above)

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	7.839 [a]	2	.020	.025		
Likelihood Ratio	8.129	2	.017	.025		
Fisher's Exact Test	6.246			.030		
Linear-by-Linear Association	6.832 [b]	1	.009	.013	.007	.006
N of Valid Cases	118					

a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is 1.78.
b. The standardized statistic is -2.614

Thus, the result of the Fisher-Freeman-Halton Test will be used. Teachers that have experience with children with special needs able to reflect on the situation through their own experience [16]. Majoko [23] also mentions in his study that participants who have experience with children with special needs, practices, and perspectives may influence their perception. Teachers who had contact with them will have a higher level of knowledge that those who had no previous contact [18].

Table 6: Chi-Square Test, Understanding of SPD and presence of family with SPD

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	6.922 [a]	2	.031	.032		
Likelihood Ratio	8.785	2	.012	.020		
Fisher's Exact Test	6.072			.036		
Linear-by-Linear Association	.163[b]	1	.686	.813	.435	.174
N of Valid Cases	118					

a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is 2.29.
b. The standardized statistic is -.404.

The result of this study showed that there was no significant difference (p> 0.05) between the understanding of SPD and the areas of the school. The result is similar to a study by Whaley [24] where it showed that there was no significant difference between knowledge of teachers and the area of the school. Contradict to a study by Essa and El-Zeftawy [17], mentioned that there was a significant difference between rural and urban areas of school and teachers' knowledge.

Table 7: Chi-Square Test, Understanding of SPD and area of the school (urban and rural)

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	4.601 [a]	2	.100	.109		
Likelihood Ratio	4.670	2	.097	.109		
Fisher's Exact Test	4.568			.103		
Linear-by-Linear Association	2.304 [b]	1	.129	.164	.082	.032
N of Valid Cases	118					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 15.00.
b. The standardized statistic is -1.518.

3.4. Teaching Experiences And Confidence In Identifying Behavior Caused By Sensory

In this study, it showed that there was no significant association (p>0.05) between the confidence in identifying behavior caused by sensory and teaching experience. The result is similar to a study by Bruggink et. al. [25]. Their study's result showed that there is no significant correlation between teaching experience and the teachers' perception of dimensions of students' additional supports needs that include behavior. In contrast, a study by Majoko [23] mentioned that the identification of the children's characteristics with a variety of classification of special needs comes from various individual and systemic factors. According to a study by Brown et. al. [26], teachers' efficacy increases when they have more teaching experiences.

Most of the teachers have a misunderstanding of SPD and behavior. According to Sadoun [14], most of the teachers in her study were unsure how to differentiate if the child's tantrum is caused by sensory or not just bad behavior. They always grouped it as a problem or judge them by mistake. They might think that the sensory difficulties faced by students are behavior issues or behavior issues by the students are related to sensory while it might not be the cause.

One of the teachers in a study stated that untrained teachers will not understand SPD [2]. The teachers need to understand how the child enhance their behavior and what area they are seeking [27]. If they can understand the behavior that caused by sensory, they can provide the

students with sensory difficulties with the more sensory-friendly environment and may also increase the chance for them to manage the situation effectively [15].

Table 8: Chi-Square Test, Teaching experiences and confidence in identifying behavior caused by sensory

	Value	df	Asymptomatic Significance	Exact Sig. (2-side)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	1.795[a]	2	.408	.400		
Likelihood Ratio	1.736	2	.420	.433		
Fisher's Exact Test	1.750			.416		
Linear-by-Linear Association	1.562[b]	1	.211	.239	.135	.054
N of Valid Cases	118					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 7.36.
b. The standardized statistic is -1.250.

3.5. Familiarity With The Strategies And Resources To Support Children With SPD And The Area Of The School

This study showed that there is no significant difference between familiarity with the strategies and resources to support children with SPD and the areas of the school. A study by Tamayo et. al. [28], both urban and rural areas has low availability of materials to support students with disabilities. In contrast with the result in a study by Belapurkar and Phatak [29], it showed that urban schools have more infrastructural facilities, human resources, and more superior in giving support for the students.

Yan-Li and Sofian [30] mentioned that most of the teachers in their study stated that having external support such as the funding, society, and stakeholder is one of the challenges that they faced in leading special education. They also mentioned that the requirement of professional knowledge is important for special education teachers for them to understand managerial skill such as how to support the special needs students.

According to Leong et. al. [31], most of the service providers including teachers in Malaysia get the source of information and also the training of Sensory Integration Therapy from occupational therapists and books. After the survey, most of them respond that they use Sensory Integration therapy because they were recommended by the occupational therapist. Also, 71.4% of them got the advice from the other teachers, 71.4% of them got it from the books and 76.2% of them got it at the conference that they attended. Applying Sensory Integration in the classroom by the teachers is one of the strategies to help students with sensory difficulties.

Table 9: Chi-Square Test, Familiarity with the strategies and resources to support children with SPD and the area of the school (urban and rural)

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	2.574[a]	2	.276	.276		
Likelihood Ratio	2.590	2	.274	.276		
Fisher's Exact Test	2.555			.276		
Linear-by-Linear Association	.669[b]	1	.413	.483	.242	.067
N of Valid Cases	118					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 16.50.
b. The standardized statistic is -.818.

Besides understanding their behavior and red flag, Mizrahi [16] also mentioned that provide the students with a supportive environment may also help them in the classroom. According to the Ministry of Education [32] in their Malaysian Education Blueprint 2013 – 2025, they will increase the investment in physical and teaching resources for students with specific needs. Thus, the unfortunate students will receive additional support to have equal educational opportunities.

4. CONCLUSION

Generally, this study revealed that most of the special education teachers were unsure and disagree that they have a good understanding of SPD. It showed that they have a lack of understanding regarding SPD. The demographic data of special education teachers such as the level of education and the presence of family with SPD were some of the factors that influence their understanding of SPD. Meanwhile, factors such as gender, teaching experience, and the areas of school do not affect the understanding of SPD among the special education teachers. Besides, teaching experience is not a factor for the teachers to be confident in identifying the behavior caused by sensory. The areas of school, neither urban nor rural school area, both of them are not the indicator of their familiarity with the strategies and resources to support children with SPD.

This study may provide information to the occupational therapists regarding the current level of understanding among the special education teachers regarding SPD. Understanding regarding SPD is very crucial to help the students to achieve maximal performance in school. The occupational therapists may help to gain the teachers'

knowledge and perception about SPD and also train the teachers regarding special teaching methods for the students with SPD to meet the needs of them in the classroom. With the knowledge of SPD, early detection can be made to help the students with SPD.

Most importantly, one of the occupation domains in the Occupational Therapy Practice Framework (OTPF) 3rd Edition is the education. Thus, the information in this study could be important to occupational therapists to help children in school to receive appropriate education according to their needs

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