MALAYSIAN ONLINE JOURNAL OF COUNSELING

THE RELATIONSHIP BETWEEN SENSORY PROCESSING PATTERNS AND DEPRESSION IN ADULTS

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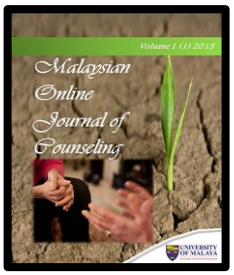

Vol. 3, Issue 1, July 2016

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ABSTRACT

Considering the high prevalence of depressive symptoms in adults, this study aimed at exploring the relationship between depression and sensory processing patterns in healthy adults. For this purpose, a number of 354 university students aged 20-45 years completed the PROMIS® Depression Item bank and Adolescent/Adult Sensory Profile®. The findings showed that there was a positive significant relationship between three of the sensory processing patterns and depression, including sensation avoiding, sensory sensitivity, and low registration and a negative significant relationship between depression and sensation seeking. As a conclusion, sensory processing patterns might be related to individuals' depression. Having insight into their sensory patterns can help them to reduce their depressive symptoms. This study may have implications for mental health professionals.

Keywords: sensory processing; depression; psychology; intervention; mental health

INTRODUCTION

Depression is among the most common psychological difficulties in adults (WHO 2012). Beside clinical depression, people experience depressive symptoms such as sadness, poor functioning, helplessness, loneliness, and so forth, to some degree in daily life (Muñoz and Ying 2002). Having knowledge about the factors that can affect mental health offers major advantages for individuals and professionals. This research aimed at studying one of the individual differences, which is the way people receive, process and respond to sensory stimuli in their daily life. Therefore, the purpose of this study was to explore the relationship between sensory processing patterns and depression.

LITERATURE REVIEW

Sensory processing is defined as the method through which the nervous system receives, organizes, and understands sensory stimuli from inside and outside the body to make a person able to decide how to react to the environment (Humphry 2002). According to Dunn's sensory model (1997), people are different in their neurological thresholds and in their response to sensory inputs. They may have low or high thresholds and passive or active responses. Each of these components is in the continuum (neurological threshold and self-regulation response) and by interactions between them, four different sensory processing patterns emerge: sensation seeking (high threshold and active response), sensation avoiding (low threshold and active response), sensory sensitivity (low threshold and passive response), and low registration (high threshold and passive response) (Dunn 2001). Based on each sensory pattern the interventions are designed to help individuals fulfill sensory needs (Brown and Dunn 2002).

Although most people have balanced sensory processing abilities, 15% of the total population has more intense sensory processing patterns (Miller et al 2007). Extreme sensory processing styles are related to psychological difficulties (Ben-Avi et al 2012, Schaaf et al 2015, Tomchek, Little and Dunn 2015).

Studies showed the relationship between sensory processing and personality traits and negative affect (Kimball et al 2012, Engel-Yeger and Dunn 2011), and sensory sensitivity and depressive symptoms (Liss et al 2008), but there is a deficiency in the knowledge about the relationship between different sensory processing patterns based on Dunn's model of sensory processing and depression level in the university students who are at the higher risk of depression.

Studies in different nations investigated that university students are experiencing depression (Perveen 2015, Hunt and Eisenberg 2010), and it is more prevalent in international students (Poyrazli 2015, Han et al 2013, Shamsuddin et al 2013). International students face difficulties such as homesickness, culture shock, language barrier, financial difficulties, racial discrimination, and social environment (Sümer et al 2008).

Depression has been studied in international students from different perspectives, but one of the unstudied areas is how students are adapting to the environment from the perspective of sensation. Therefore, the purpose of this study was to explore depression from the sensory processing perspective to expand the knowledge in the mental health area.

METHOD

Participants

Three hundred fifty four international students who met inclusion criteria as studying full-time in a master or Ph.D. program in a selected public university in Malaysia participated in the study. Exclusion criteria were having no history of diagnosed mental disorder or illness and using no medication on a daily basis.

Instruments

Adolescent/Adult Sensory Profile®(AASP) (Brown and Dunn 2002) provides a tool for recording an individual's responses to sensory events in daily life, thereby combining a sensory processing framework perspective with daily life performance. AASP includes 60 items in the self-questionnaire according to the sensory processing categories. The items on the AASP represent one of the four quadrants (sensation seeking, sensation avoiding, sensory sensitivity, and low registration), which are based on Dunn's (1997) model of sensory processing. Sensory processing categories (taste/smell, movement, visual, touch, activity level, and auditory), the neurological threshold continuum (low and high), and the behavioral response/self-regulation continuum (passive and active) are revealed from the profile. In each item, participants indicate how often they respond to a sensory input by using a five-point Likert scale (from 1= almost never to 5 = almost always). The report of studies showed that this questionnaire has good internal consistency with coefficient alpha values from 0.63 to 0.82 in different studies (Pearson Education 2008, Brown and Dunn 2002, Brown et al 2001). The permission for using the AASP was obtained by purchasing the original copies of the instrument from the copyright holder/publisher.

PROMIS® Depression Item Bank is an instrument to assess self-reported negative mood (sadness, guilt), views of self (self-criticism, worthlessness), and social cognition (loneliness, interpersonal alienation), as well as decreased positive affect and engagement (loss of interest, meaning, and purpose) (Pilkonis et al 2011). The Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association 2013) has adopted PROMIS® Depression as a recommended specific assessment (Kuhl et al 2011). In this study, the PROMIS® Depression item bank was used, which consists of 28 items with a 7-day period and a 5-point scale that ranges from 1 (Never) to 5 (Always). According to previous studies (Pilkonis et al 2011) PROMIS® Item banks has good psychometric properties to use. A Demographic Questionnaire included questions concerning age, gender, marital status, nationality, medical history, psychiatric history, and using psychiatric medicine.

Procedure

We obtained ethical approval from the targeted university to conduct the research. In a multistage random sampling, we approach the students who met the inclusion criteria. The participants completed the questionnaires after signing the consent form.

Data analysis

The Pearson Correlation test was employed to explore the relationship between sensory processing patterns and depression.

RESULTS

Based on the demographic questionnaire, the participants' ages ranged from 20 to 45 years old with the average age of 29.68 years old (SD = 5.42). From them, the number and valid percent of 244 (68.9%) were male, and 110 (31.1%) was female. In terms of their marital status 230 (65%) was single, 117 (33.1%) was married, four (1.1%) was divorced, and three (.8%) was in other marital status that includes separated (1 student) and engaged (2 students). The participants were from 24 different nationalities with a high level of English language proficiency in accordance with the university requirements.

As a descriptive statistics of variables, the four categories of sensory processing range from 17 to 62. The Mean value of Sensation Seeking is 45.33 (*SD* = 7.42), the Mean value of Sensation Avoiding is 39.45(*SD* = 6.89), the Mean value of Sensory Sensitivity is 37.74 (*SD* = 8.17), the Mean value of Low Registration is 31.88 (*SD* = 6.52). The level of depression in participants ranges from 38 to 68, with a Mean value of 52.71 (*SD* = 6.05). According to PROMIS Depression instrument, Mean for the normal population including different races, ages, and genders in the US was 50 (SD =10) (Pilkonis et al 2011).

The assumptions underlying Pearson correlation test was explored and met the requirements. As the table 1 shows, there was a significant relationship between sensory processing patterns and depression level.

Table 1. Pearson Correlation between Sensory Processing Patterns and Depression (N=354)

	Depression	
	Pearson Correlation	**Sig. (2-tailed)**
Sensation Seeking	-.125*	.019
Sensation Avoiding	.310**	.000
Sensory Sensitivity	.244**	.000
Low Registration	.138**	.009

Note: * $p < .05$ ** $p < .01$

DISCUSSION

Findings indicated that three sensory processing patterns -- sensation avoiding, sensory sensitivity, and low registration -- had a positive correlation with depression. There was a negative correlation, however, between sensation seeking and depression. These results are in line with the findings of studies by Kimball et al (2012), Engel-Yeger and Dunn (2011), and Liss et al (2008) where all found that sensory processing sensitivity had a positive relationship with depression and negative affect.

Individuals who have sensitivity to sensory stimuli in their environment are more likely to experience negative psychological symptoms such as depression (Aron and Aron 1997, Brindle et al 2015). Besides that, as Liss et al (2008) mentioned, the two potential elements of sensory processing sensitivity, which are ease of excitation, and low sensory threshold are positively related to depression specially in the context of a difficult home environment. Moreover, people with high sensory sensitivity are more likely to experience negative psychological symptoms compared to individuals with normative sensory processing. In addition, the result is in line with the findings of previous studies that stated high sensory processing sensitivity is associated with more frequent symptoms of ill health (Benham 2006), and reduced quality of life (Pfeiffer et al 2014).

Considering this point that sensory sensitivity and sensation avoiding are two of the sensory processing patterns, which are in the low neurological threshold sensory quadrants, this study is also consistent with

previous studies that found a relationship between low sensory threshold and depression and other psychological difficulties. According to Ahadi and Basharpoor (2010) and Liss et al (2008), low sensory threshold is related to mental health.

Interestingly, beside the participants with higher scores in low neurological threshold quadrants (sensory sensitivity and sensation avoiding), participants with high scores in low registration quadrant, which belong to high neurological threshold quadrant, also showed a high level of depression. According to previous studies depressive disorders may be associated with higher expressions of low registration and lower expressions of sensation seeking (Rotenberg and Cholostoy 2004). Similarly, in this research, sensation seeking and depression had a negative significant relationship.

As Raine et al (2002) mentioned, sensory seeking pattern may not be a maladaptive pattern of sensory processing, and stimulation seeking can be considered as a possibly adaptive trait. Moreover, sensory seeking may be adaptive because seekers put on control over their environments. Jerome and Liss (2005) also stated that sensory seeking pattern relates to secure attachment, which is considered as one of the mental health related variables. In previous literature, high levels of sensation seeking as a psychological trait had a relationship with the mania scale of the Minnesota Multiphasic Personality Inventory (Carton et al 1995). According to the American Psychiatric Association (2013) in DSM–5, Mania and depression are in two different criteria, which are in contrast with each other.

From another point of view, according to Beck's cognitive model of psychopathology, biased information processing from internal or external sources can cause dysfunctional beliefs in a person (Beck 1979). According to this model, a specific situation, or stressor, such as an event relating to losses or failure may activate the depressive schema in the person (Beck and Clark 1988). People with low registration pattern may miss some of the environmental stimuli because of their high neurological threshold and their passive behavioral response. Therefore, they may experience losses and failure after lately noticing what had happened around them or after other people make them aware of the happenings in their environments. Besides that people with sensory processing patterns that have low neurological threshold (sensory sensitivity and sensation avoiding), may find themselves more overwhelmed in most of the situations because of receiving many stimuli from their environment. This may cause them to have a biased negative self-referent thinking, personal deficiency, and self-blame which are the other underlying reasons of depression based on the Beck (1979) cognitive model.

Using the questionnaires in English language was one of the limitations in this study. Although the study was conducted on international students and based on university requirements that they have high proficiency in English language, but conducting research on the mother- language of participants is much more reliable as they can answer the items with complete understanding. Besides that, the validity of instruments should be explored on this population.

The results of this study might have implications for different groups of mental health professionals such as psychologists, counselors, and occupational therapists. This study links sensory processing to adults and especially students' daily life and provides the knowledge about how the individuals' sensory processing patterns might relate to their depression level.

It is recommended that future studies investigate other psychological difficulties and sensory processing patterns. Moreover, exploring the sensory processing patterns in the individuals with clinical depression is recommended. Conducting a mix-method research, which is combining the AASP and interviews, will be beneficial. Conducting experimental researches to explore the effectiveness of sensory processing interventions on depression is recommended.

CONCLUSION

This study was another attempt to know more about individuals' mental health factors. Based on the results, sensory processing patterns might be significantly related to the depression level in adults. Therefore, mental health professionals should consider the individuals' sensory processing patterns when they are exploring the possible factors related to their mental health, especially their depressive symptoms. Other studies are recommended to explore this construct more deeply.

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