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A PRELIMINARY STUDY OF BIOLOGICAL ATTRIBUTED RISK FACTOR FOR ANXIETY AMONG ANXIOUS CHILDREN

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Abstract: *Anxiety disorders are chronic, disabling conditions that are distributed across the globe. Woefully, the consistent increase of prevalence rate had affected people across nations range from children to adults. Biological attributed risk factors had associated strongly with the early onset of anxiety during the childhood stage. This current research intended to study the biological risk factors of brain electrical activity, hereditary and gender effect on trait anxiety among anxious children. A total of 36 children, aged ranged from 8 to 13 years old with high trait anxiety level were recruited by using a purposive sampling method. Self- administered STAIC-T and STAIT were used to measure the trait anxiety level of children and parents respectively. Besides, neuroimaging of Quantitative Electroencephalogram (qEEG) brain mapping was administered to study the brain electrical activity and associated brain locations. Pearson's Correlation was carried out in order to study the relationship between biological risk factors with trait anxiety level. Results showed that there is a significant relationship between parents' trait anxiety score and children's trait anxiety score. Preliminary findings indicated that the brain locations of Fp1, F4, F8, T3, and T4 showed a significant relationship*

with trait anxiety. In conclusion, hereditary and associated brain locations played a role in affecting the trait anxiety level of children and results in the biological vulnerability of anxiety since birth.

Keywords: *Trait Anxiety, Children, qEEG Brain Mapping, Hereditary, Gender*

Introduction

In this era of globalization, anxiety had become "pandemic" and "epidemic" whereby it has affected people from various backgrounds globally. According to the American Psychological Association (2017), anxiety is "an emotion characterized by feelings of tension, worried thoughts and physical changes", namely increased blood pressure, sweating, trembling, or dizziness. Furthermore, according to Oxford Dictionary of Psychology, anxiety is defined as a state of uneasiness, accompanied by dysphoria and somatic signs and symptoms of tension, focused on apprehension of possible failure, misfortune, or danger.

Prevalence of it has consistently increased in global population over the time (Baxter et al., 2014). Worldwide, approximately 272.2 million people are found suffering from anxiety disorders in 2010. In Malaysia, 29% of Malaysian was diagnosed with an anxiety disorder by the year of 2017 (Malaysian Psychiatric Association, 2017). The prevalence rate for anxiety disorder had steadily increased considerably and became the most prevalent form of psychopathology disorder globally (Kessler, Berglund, Demler, Jin, Merikangas, & Walters, 2005; Kessler, Chiu, Demler, & Walters, 2005).

Increasing of prevalence rate had not only affected the nation itself in terms of economic but also affected adults and children. Early intervention seems to be promised to elevate the effectiveness of preventative precaution. Dealing with the most preliminary level of anxious feelings, trait anxiety became an issue of concern rather than symptoms treatment. Trait anxiety, the anxious personality that formed since birth in children increase their biological vulnerability to anxiety when they are faced with psychological and social threat. In order to address this, risk factors for anxiety should be ruled out. Therefore, in the present study, we aim to study the relationship between trait anxiety levels of children with three biological attributions of brain electrical activity, hereditary and gender.

Literature Review

Concept Of Anxiety Among Children

Woefully, early onset of anxiety has been associated with its perilous development, suggesting that childhood is a core risk phase for anxiety (Katja, Susanne & Daniel, 2009; Lippman, Moore & McIntosh, 2011; World Health Organization, 2005). By last year, 15.7% of Malaysian children were suffering from anxiety symptoms. Since birth, children experienced some signs of worry and aspects of worry vary throughout developmental stages (Foxman, 2004). In fact, children who experience high level of anxious feeling tends to have lower general well-being, increase abdominal pain and extra intestinal symptoms (Reigada et al., 2015). As a result, prolong anxious feeling will increase the tendency of stuttering, asthma and inflammatory bowel disease (Iverach, Jonesb, McLellana, Lynehama, Menziesc, Onslowc, & Rapee, 2016; Dudeney, Sharpe, Jaffe, Jones, & Hunt, 2017). Without proper early intervention, children are at extreme risk for anxiety disorder and it might affect their progressive developmental stage. Past research showed that early onset of anxiety in childhood stage had affected their life and

development in the later on stage as it usually comorbid with other mental or physical illness that worsen the condition (Essau, Lewinsohn, Lim, Ho, & Rohde, 2018).

Risk Factor for Anxiety

Previously, more focus had been drawn on identifying the risk factors for anxiety as it aided in preventative precaution before the onset of anxious symptoms that can help in reducing the prevalence rate. Bio-psycho-social model of anxiety explained the etiology of anxiety in terms of biological, psychological and social risk factors for anxiety (Engel, 1997). As for children, biological attribution is the aspect that will affect them the most once birth whereby psychological and social aspects come later in their life (Averill, 2015). In order to understand about biological attributed risk factors, trait anxiety, the anxious personality that is deep rooted in a person since birth will be the significant indicator (Miu, Heilman, & Miclea, 2009).

Specifically, biological attributed risk factor for anxiety played an important role in increasing the vulnerability of children to suffer from anxious symptoms. Biological attributed risk factors can be defined as brain-caused mental disorder or genetic-caused mental disorder that are innate in children (Kvaale, Gottdiener, & Haslam, 2013). Passed research showed that biological attributed risk factors of brain electrical activity, hereditary and gender affected the innate anxiety level of children. In fact, the dominance of different brain electrical activity or brain waves that detected through Quantitative Electroencephalogram (qEEG) resulted in different human behaviours. Many neurological and medical disorders are accompanied by abnormal patterns of cortical activity so as for anxiety disorder (Hammond, 2002). Alteration of dorsolateral prefrontal cortex and temporal lobe activity played a role in processing different types of worry and anxious feeling (Smith, Zambrano-Vazquez & Allen, 2016; Martin, Ressler, Binder, & Nemeroff, 2009). As for inheritance, anxiety disorders run in families, strong evidence showed that there are strong associations between parent anxiety and child anxiety (Lawrence, Murayama, & Creswell, 2018; Micco et al., 2009). For this, parents inherited a collection of genes in several areas of chromosomes that responsible for stress and fear and resulted in genetic vulnerability to stress and fear in children ((Barlow, 1991; Kendler, 2005). Besides, females have higher chances to exhibit anxiety symptoms and more likely to experience anxious feelings or suffer from phobias if compared to boys. (Guzelhan, Conkbayir, Ugurlucan, Yildiz, Alpagut & Bozbuga, 2018; Blau, Dimino, Demaria, Beverly & Chessler, 2016; Hantsoo and Epperson, 2017).

Identifying risk factors of anxiety can help in preventing the onset of anxiety at child level. Besides, it can help in identifying the vulnerable group so that more specific intervention can be administered to the target group. So, this current research intended to study biological attribution of risk factors in trait anxiety among anxious children. Specifically, this preliminary study aimed to study the relationship of three biological attributed risk factors of brain electrical activity, hereditary and gender and trait anxiety among anxious children.

Methods

This is a cross-sectional study using purposive sampling, with retrospective recall of anxiety in the past 12 months as the primary measure. Survey method was used in order to study trait anxiety level and gender of respondents for the first phase. It also acted as a screening phase of purposeful sampling to recruit children with high trait anxiety. At the second phase, survey method was administered among parents of recruited children in order to study the hereditary. In addition, in order to study and predict the associated brain location for trait anxiety, brain imaging technique was used which is the qEEG brain mapping method.

Participants

In this preliminary study, a total of 48 children were participated in the first phase of screening. Among 48 children, 35 children were recruited as research participants as they scored 35 and above for State-Trait Anxiety Inventory for Children-Trait (STAIC-T) and fulfilled inclusion criteria through purposeful sampling. For the second phase, these 35 children were participated in qEEG brain mapping and at the same time, their parents, 35 pairs of parents were recruited too.

Measures

In this research, a total of 4 instruments were used in order to achieve the proposed objectives. The instruments used are State Trait Anxiety Instrument for Children-Trait Scale (STAIC-T), Demographic Questionnaire State Trait Anxiety Instrument-Trait Scale (STAI-T) and Quantitative Electroencephalogram (qEEG) Brain Mapping.

State Trait Anxiety Instrument for Children-Trait Scale (STAIC-T)

STAIC-T was used to assess the trait anxiety level of children and also as a screening tool during recruitment phase. STAIC was developed by Spielberger by 1973. In this research, only trait scale had been adopted study the proneness of the child to anxious behavior rooted in the personality. STAIC-T consisted of 20 items that measured trait anxiety in children between the ages of 8 to 13 years old. Three points Likert scale which range from 1(Hardly ever); 2(Sometimes); 3, Often. It is a valid and reliable instrument that had been implemented to different country and also Malaysia. Spielberger et al. (1983) reported alpha coefficients of .90 to .93 for internal consistency and .73 to .86 for test-retest reliability. The scale has demonstrated convergent validity by having statistically significant correlations with other anxiety scales. Alpha coefficients in the present study were adequate, with values of .86 to .89 for trait and state anxiety scales respectively. Within the subscale, STAIC-T showed good internal consistency and test-retest reliability in children population. (Turgeon & Chartrand, 2003; Spielberger, Gorsuch, & Lushene, 1970; Hashim, Wan Hasyila, Ang, Azlan Helmy, & Husyairi, 2018). This instrument was presented in bilingual of English and Mandarin so that Chinese participants can have better understanding regarding each item. Besides, STAIC-T is easy to read and can be administered verbally to younger children.

Demographic Questionnaire

Respondent's demographic information was obtained using self-administered structured questionnaires. It consisted of gender, age, family background, type of school and socioeconomic status (SES). Specifically, gender is one of the biological attributed risk factors for trait anxiety among children.

State Trait Anxiety Instrument-Trait Scale (STAI-T)

STAI-T were used to assess the trait anxiety level of parents in order to study the hereditary of anxiety from parents to children. It was developed by Spielberger by 1970. Same with STAICT, only trait scale was adopted in this research to measure the anxious behavior and personality rooted in parents. 20 items were administered to parents with 4-points Likert scale of 1 = Not At All, 2 = Somewhat, 3 = Moderately So, and 4 = Very Much So Both state and trait scales in the STAI Form Y has high reliability of 0.92 and 0.90 respectively (Spielberger et al., 1983). A re-test of the STAI among engineering students in Malaysia is conducted by Vitasari, Abdul Wahab, Herawan, Othman, and Sinnadurai (2011). The test re-test reliability of the STAI is found to be high, with $\alpha = .85$, with a validity of KMO = .824. As for the subscale, the state anxiety subscale shows KMO = .818 with $\alpha = .797$, and the trait anxiety subscale scores a KMO of .783 and $\alpha = .781$, suggesting that the reliability and validity of the STAI are suitable and

acceptable. Besides, STAI-T is suitable for individuals who have at least a sixth-grade reading level, suggesting that it is appropriate to be utilized in the current study which targets on adults.

Quantitative Electroencephalogram (qEEG) Brain Mapping

The forth instrument used is neuroimaging of qEEG brain mapping that measure the biological brain of brain electrical activity in term of brain location based on International 10-20 system. A cap with 22 electrodes was worn on the participants' scalp in order to detect their brainwaves. A total of 15 tasks were carried out included eyes closed, eyes open, watching video, digit spam task, imagination task, reading task and pattern recognition task. After that, a computer generalized report of brain electrical activity and brain map of participants (Figure 1) were generated in order to identify the light up brain parts at Hi-beta waves (18-34Hz). qEEG is safe, painless and non-invasive (Minho, Byung & Sungho, 2015; Hackett, 2018). Besides, it had been widely used for children population whereby previous studies had integrated and applied qEEG to study children with ADHD and autistic symptoms (Chabot, Coben, Hirshberg, & Cantor, 2015). qEEG is a reliable tool with greater than 0.9 reliability score and showed high test-retest reliability over time (Thatcher, 2010).

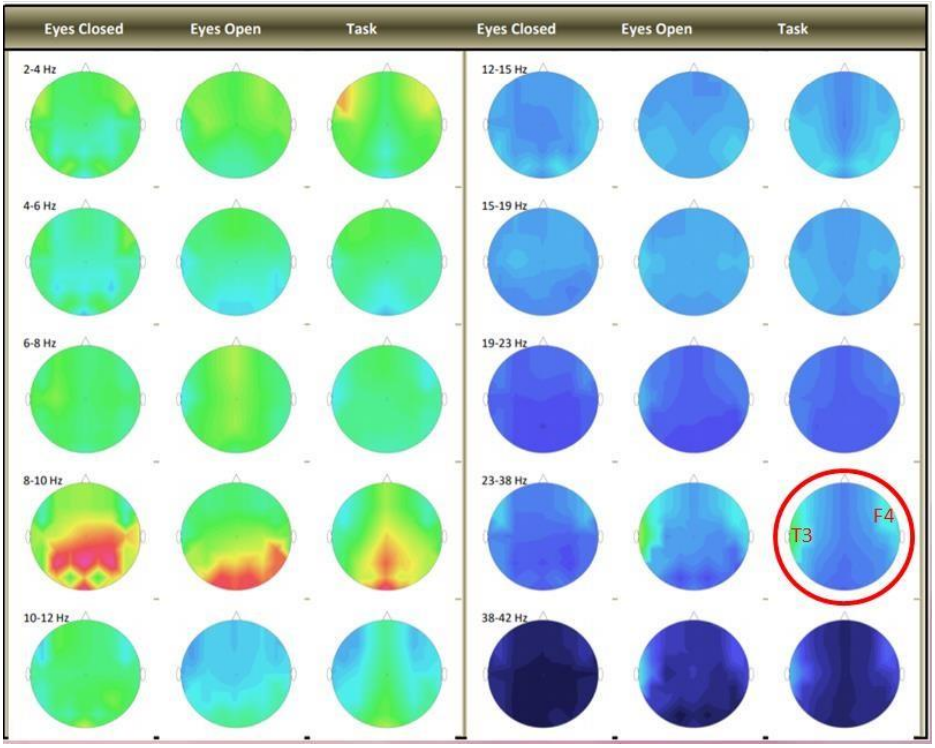

Figure 1: Computer-generalized Report of Brain Mapping

Procedure

After preparing and deciding all the instruments, researcher proceeds with implementation write up and ethical approval. After that, researcher recruited participants through poster advertising.

For the first phase of research, STAIC-T was administered as a screening tool to recruit children with high trait anxiety level as participants through purposeful sampling. By this phase, demographic questionnaire was administered to gather the respondent profile. Before this, informed consent was distributed to seek permission from guardian for participating in this

research along with the explanation of the objective, procedure, possible risk and instruction of this research.

For those who fulfilled the inclusion criteria with 35 scores and above for STAIC-T were recruited to second phase of qEEG brain mapping. They are assigned to do five groups of brain mapping tasks with 60 seconds each by following the sequences; i) Task: Eyes closed, Eyes open, Watching movie task; ii) Task 2: Eyes closed, Eyes open, Digit-spam task; iii) Task 3: Eyes closed, Eyes open, Imagination task: iv) Task 4: Eyes closed, Eyes open, Reading task and, v) Task 5 : Eyes closed, Eyes open, Pattern recognition task. Concurrently, their parents were recruited to answer STAI-T which took 10 to 15 minutes. A stress ball with stress relief effect was given to participant as a token of appreciation.

Results

Respondent Profile

Table 1: Frequency Analysis of Respondent Profile

Variable	Frequency (*f*)	Percentage (%)
Gender		
Male	10	27.78
Female	26	72.22
Number of Siblings		
1	8	22.20
2	11	30.6
3	9	25.0
4	6	16.70
5	2	5.60
Schooling		
Public school	28	77.80
International school	8	22.20
Monthly income		
RM1000 and below	2	5.60
RM1001 - RM2000	2	5.60
RM2001 – RM3000	4	11.10
RM3001 – RM4000	7	19.40
RM4001 – RM5000	11	30.60
RM5001 and above	10	27.80
Total	**36**	**100.00**

Table 2: Descriptive Analysis of Respondent Profile

Variable	*M*	*SD*
Age	10.28	1.73
STAIC-T	47.81	7.11
STAI-T	42.75	4.75

A total of 36 Chinese children with mean age, *M*=10.28 (*SD*=1.73) were recruited in the present study and their demographic profile was studied. Refer to Table 1, the majority of respondents (72.22%) were female 26 of them. In terms of number of siblings including themselves, the majority of respondents, 11 of them have two siblings (30.6%) while there is none of them with more than five siblings. For schooling, the majority of them, 28 (77.80%) are from public school and only 8 (22.20%) are from international school. Next, for socioeconomic status of family total income per month, the majority of them, 11 (30.60%) have total income of RM 4001 to RM 5000 while only a minority of them with RM 1001 to RM 2000 or below than RM 1000 with 2 (5.60%) of them each for these two categories respectively.

STAIC-T and STAI-T were administered to children and parents respectively in order to study their trait anxiety level. Both children and parents showed high trait anxiety level as it exceeds the cut-off point of 35 scores. Specifically, children trait anxiety showed higher scores of *M* = 47.28 (*SD* = 7.11) while parents trait anxiety showed lower scores of *M* = 42.75 (*SD* = 4.75).

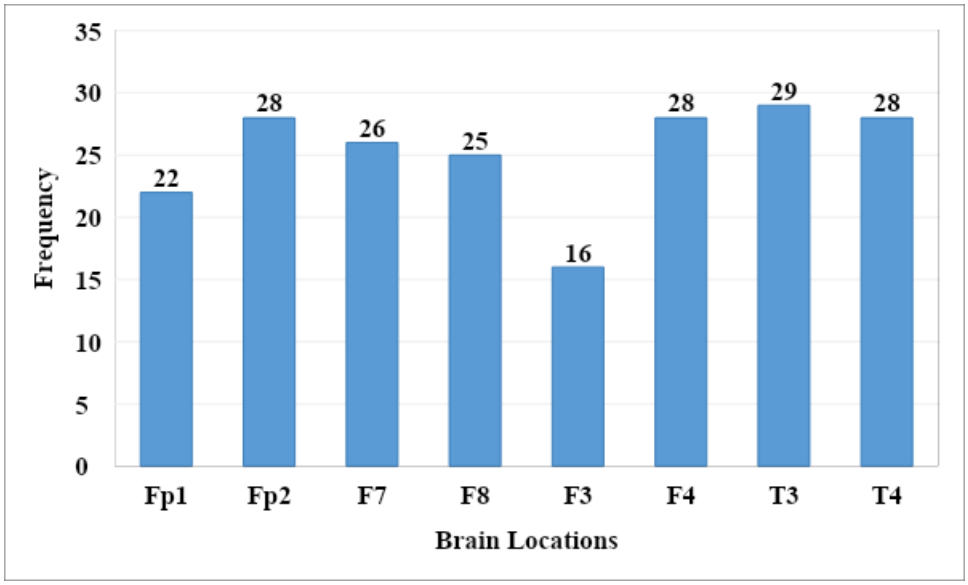

Figure 2: Frequency of Lighted-up Brain Locations

A total of eight brain locations from prefrontal cortex (Fp1, Fp2, F7, F8, F3, F4) and temporal lobe (T3, T4) were studied. By summarizing the light up brain parts, the brain location that lighted-up the most frequent is T3 area while the least dominant area is F3. Specifically, 29 out of 36 participants, their T3 area lighted up and only 16 out of 36 participants, their F3 location lighted up. While for area Fp1, Fp2, F7, F8, F4 and T4, among 36 participants, the lighted-up frequencies are 22, 28, 26, 25, 28, and 28 respectively.

Table 3. Pearson's Correlation (*r*) of Trait Anxiety Level with Biological Attributed Risk Factors of Brain Electrical Activity, Hereditary and Gender

		1	2	3	4	5	6	7	8	9	10	11
1.	[a] STAI-T	1										
2.	[b] STAIC-T	.595**	1									
3.	Fp1	.124	.128	1								
4.	Fp2	.080	.357*	.122	1							
5.	F3	-.008	-.099	.014	-.033	1						
6.	F4	.050	.390*	-.034	.371*	-.277	1					
7.	F7	.128	.191	.255	.209	.055	-.013	1				
8.	F8	.042	.357*	.122	.518**	-.331*	.661**	-.060	1			
9.	T3	-.024	.379*	.184	.244	-.305	.741**	-.267	.750**	1		
10.	T4	.071	.428**	.122	.357*	-.331*	.806**	-.194	.839**	.919**	1	
11.	Gender	-.186	-.255	.342*	.000	-.124	-.302	.224	-.134	-.211	-.267	1

Notes. * significant level at $p < 0.05$., ** significant level at $p < 0.01$; [a]STAI-T State-Trait Anxiety Inventory – Trait scale, [b]STAIC-T State-Trait Anxiety Inventory for Children – Trait scale

Pearson's correlation (*r*) analysis was carried out to study the relationship between trait anxiety levels of children with biological attributed risk factors. Specifically, 8 brain locations of Fp1, Fp2, F3, F4, F7, F8, T3 and T4 can be indicated from the qEEG brain mapping. Besides, trait anxiety levels of parents were studied in order to study the hereditary and lastly the gender effect on the trait anxiety level of children.

Based on Table 1, STAI-T score of parents showed there is a significant positive correlation with the STAIC-T from children score r (34) = .595, n = 100, $p < 0.01$. Besides, among the eight brain locations, five locations of Fp2, F4, F8, T3 and T4 showed positive significant relationship with trait score of children. Specifically, Fp2 has a value of r (34) = .357, n = 36, $p < 0.05$, F4 has a value of r (34) = .379, n = 36, $p < 0.05$, F8 has a value r (34) = .357, n = 36, $p < 0.05$, T3 has a value of r (34) = .428, n = 36, $p < 0.05$ and T4 has a value of r (34) = .428, n = 36, $p < 0.01$.

Discussion

Discussion on Level of Variables

In terms of gender, there is a huge difference in gender whereby more female exceed the inclusion criteria of exceeding 35 scores for trait anxiety. For this, past research showed that females are more likely to experience fear, worry and anxious feeling due to brain regulation system (Marques, Bevilaqua, Fonseca, Nardi, Thuret & Dias, 2016). Fluctuation of hormone in female affected the activity of hippocampal neurogenesis that responsible for regulating anxious feelings.

Secondly, in terms of number of siblings including themselves, family in Kuala Lumpur, a rural area tends to have fewer children compared to urban area whereby majority of them only have two siblings and only 4 siblings at most. This might be due to an increase in educational level of parents in this era, especially in rural areas. Parents with higher education tend to have fewer children as they focused on desire quality over quantity living (Josipovic, 2007). They prefer long-term romantic relationships with partner along with better quality of life. With fewer

children, they can have more investment in education for specific children whereby they focused on quality but not quantity. Other than this, among the three main races in Malaysia, Chinese have the lowest fertility rate with only 2.8 children per woman that tally with this finding (Kamaruddin, 2017).

Thirdly, the majority of them are from public schools with minority of them from international school. Most of them followed public school as this is the ordinary pathway for as Malaysian children. Children can easily access to public schools that near to their living area as there is a variety of public schools that distributed in all the states in Malaysia. According to MoE Malaysia (2012), there are 10101 public schools in Malaysia that provided a great source for education and increase the chances for children to study in public schools. Besides, Malaysian parents preferred to send their children to study in public school as it provided a comprehensive school system that governed by the Ministry of Education Malaysia. On the contrary, fewer parents allow their children to study in international school as it is much more expensive and can only be afforded by those families with higher income.

Lastly, in terms of socioeconomic status (SES) based on total family monthly income, majority of the recruited families are from high SES status whereby their monthly income is between RM 4001 to RM 5000 and more than RM 5000. Higher income is needed for them to survive in Kuala Lumpur, the capital of Malaysia with higher daily expenses. According to the Consumer Price Index Malaysia January 2019, Kuala Lumpur has the highest index among all the states and even showed increased in the index for Food & Non-Alcoholic Beverages. This showed that residents in Kuala Lumpur need to bare higher expenses in their daily life that elevated their urge to obtain high income per month in order for them to survive.

Discussion on Trait Anxiety Score

Firstly, there are some prominent findings according to trait anxiety scores from both children and parents. According to descriptive analysis, both trait anxiety score obtained from STAICT for children and trait anxiety score obtained from STAI-T for parents showed high mean score. As suggested by developer Spielberger, a cut-off point of 35 scores indicated high trait anxiety level, so for both children and parents are experiencing high trait anxiety level. The high anxiety level might due to environmental background. All the participants are living in Kuala Lumpur, a busy and hectic big city that full of hustle and bustle, fast living pace might be the main factor that cause the high anxiety level. This result is supported by National Health and Morbidity Survey (2017), 39.8% of adults in Kuala Lumpur are suffering from mental health problem, the state with highest prevalence rate in West Malaysia. While for children in Kuala Lumpur, 13.6% of them are suffering from mental disorder with ranked 3 of prevalence rate. Besides, according to this survey, by comparing between urban and rural areas, estimated population of 431,924 from urban area showed symptoms of mental health problems compared to only 162,332 of residents in rural area. Besides, majority of the past researches showed that technology advancement especially in big city induced higher stress and anxious feeling for a person. Urban area affected mental health negatively in which mood and anxiety disorders and schizophrenia are more prevalent in big cities (Krabbendam & van Os, 2005; Peen, Schoevers, Beekman, & Dekker, 2010). With consistent exposure to stressful environment, they have the higher tendency to suffer from anxious feelings and early onset of anxious symptoms since birth. On top of that, parents with high trait anxiety tends to inherit the trait anxiety gene to their children, generation by generation, the high trait anxiety is lopping and associated with this group of people who are living in stressful environment (Mortensen et al., 1999).

On the other hand, based on the Pearson's Correlation results, STAI-T scores are significantly positive correlated with STAIC-T. STAI-T scores from parents indicated the trait anxiety level

from parents while STAIC-T indicated the trait anxiety level of their children. This result showed that children tend to have higher anxiety level when their parents exhibit higher anxiety level and vice versa. This finding is parallel with the findings of Masi, Favilla, Mocci and Millepiedi (2000) on inheritance of anxiety symptoms and findings of Bradley and Hood (1995) on anxiety panic disorders. Both of these findings showed that children have higher tendency to suffer from anxiety disorders when there is a family history of anxious symptoms and majority of the children with high anxiety level will have either one parent with anxiety symptoms. Parents played a role in inheriting the anxious gene to children that increase their vulnerability to stress. This generalized biological vulnerability formed the first anxious personality of children since birth will reduce their resilient to fearful and stressful events that cause them to suffer from anxiety symptoms more easily.

Discussion on Brain Electrical Activity

Secondly, associated brain locations also provided some significant results for trait anxiety among children. According to descriptive analysis, the left side of temporal lobe, T3 is the area that lighted-up the most among children with trait anxiety compared to other brain locations. This might due to hectic and stressful city living in Kuala Lumpur that associated with increased amygdala activity that responsible for stress processing (Lederbogen et al., 2011). As amygdala is deeply embedded in the temporal lobe of the human brain, T3 area is one of the most direct locations that can detect the stress processing and stress response that resulted in frequent lighted-up and affected the trait anxiety level of participants who are living in urban area the most.

Besides, according to inferential analysis of Pearson's Correlation, brain electrical activity that obtained through qEEG brain mapping provided a clear indication regarding the specific brain locations that associated with trait anxiety. Based on the results, 5 out of 8 brain locations showed significant positive correlation with trait anxiety level of children. Brain locations Fp2, F4, F8, T3 and T4 associated with trait anxiety. This result was supported by the previous research that done by Antoniadis and McDonald (2001) on brain parts hippocampus and amygdala that responsible for fear response. Hippocampus and amygdala are the brain parts that located at prefrontal cortex and temporal lobe respectively that responsible for processing fear and worry feeling. Activation of prefrontal cortex (Fp2, F4, F8) and temporal lobe (T3, T4) are responsible for trait anxious feeling. On the other hand, among the 8 brain locations, all the right brain locations (Fp2, F4, F8 and T4) showed significant relationship with trait anxiety, this showed that trait anxiety exhibit more right-than-left activity. Children with right brain dominant have the higher possibility to exhibit trait anxious feeling.

Discussion on Gender

However, biological attribution of gender did not show significant relationship with trait anxiety among children although there are more female with high trait anxiety were recruited in this research. This current result showed that there is no gender difference in trait anxiety among children population from age 8 to 13. This result is contradicted with previous finding whereby female exhibit more anxious feelings and more likely to feel fear and stress in daily life (Guzelhan, Conkbayir, Ugurlucan, Yildiz, Alpagut & Bozbuga, 2018; Blau, Dimino, Demaria, Beverly & Chessler, 2016; Hantsoo and Epperson, 2017). This contradicted result might due to limitation of age range whereby this current study only focuses on children population from age 8 to 13. There is a possibility that gender effect is less significant for this age group of children.

Implication of Study

By studying the biological attributed risk factors of brain electrical activity, hereditary and gender effect on trait anxiety, the preliminary findings can provide some insight regarding the relationship between all these risk factors with trait anxiety level among anxious children. It provided some basic information regarding all the studied variables that can help in enriching current research pool of related field. Besides, preliminary findings can be a reference for future study that can intense study the relationship or even causal relationship between each biological attributed risk factors with trait anxiety among children with trait anxious symptoms.

Besides, the findings can help in implementing the early intervention and precaution for children. With this, early intervention since birth can be carried out to target children with biological attributed vulnerability and deal this their first anxious personality since birth. For those with a family history of anxiety, children should be taught with stress coping skills so that they have the ability to deal with fear and stress during their developmental stage. Besides, by identifying the associated brain locations for trait anxiety, neuroimaging can help for early identification of trait anxiety symptoms and intervention can be more targeted to the specific brain locations. For this, Clinical Neurofeedback can help in regulating undesirable brain electrical activity at specific brain parts that result in high trait anxious feelings and address this issue directly from their biological brain.

Limitation

However, there are some limitations that might affect the current findings. Since this is just a preliminary study, the sample size is relatively small, thus the results cannot represent all the children in rural areas and the results cannot be generalized to other populations. Besides, due to the restriction of questionnaire, the age range is limited to 8 to 13 years old that might not represent the full childhood period. Next, this research only recruited Chinese children from Kuala Lumpur area thus the results obtained cannot be generalized to other races in Malaysia.

Recommendation

As a recommendation, future studies should include a larger sample size of children. Besides, for research that focuses on childhood should widen the age range that can cover the whole childhood stage. Furthermore, different countries have different definitions and cut off point for childhood stage, so the hallmark that indicate childhood stage should be taken into consideration based on the different background of the country. Next, future researchers may work together in different countries and promote sample diversity to study the associated biological risk factors for trait anxiety for children from different countries and how it affects children from different background when social or environmental factors come along. Lastly, more research can be done in the future to focus on the unexpected finding in this research of right brain activation associated with trait anxiety.

Conclusion

In short, biological vulnerability to anxiety had put children at risk for anxiety. In order to prevent the early onset of anxiety symptoms during childhood, more targeted preventative precaution should focus on addressing the most preliminary level of trait anxiety feeling, that is the innate anxious personality rather than symptoms treatment. Besides, biological attributed risk factors had not resulted in early onset but also reduce the resilient of a child to stress and fear during their developmental stage when psychological and social factors come along. So, by studying the biological aspect of brain components and genetic influence on anxiety, early intervention since childhood can reduce and prevent anxiety disorders in an effective way.

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