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AWARENESS TOWARDS TOURETTE SYNDROME

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AWARENESS TOWARDS TOURETTE
SYNDROME (TS) AMONG HEALTH
SCIENCE AND NON-HEALTH SCIENCE
STUDENTS IN A PRIVATE UNIVERSITY

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HEALTH SCIENCE AND NON-HEALTH SCIENCE STUDENTS IN A
PRIVATE UNIVERSITY**

By

TAN KAI XUAN

A Research project submitted to the Department of Physiotherapy
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AWARENESS TOWARDS TOURETTE SYNDROME (TS) AMONG HEALTH SCIENCE AND NON-HEALTH SCIENCE STUDENTS IN A PRIVATE UNIVERSITY.

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Abstract

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Background and Objectives Tourette syndrome (TS) is a neurodevelopmental disorder that causes an individual to have involuntary movements and sounds which are often called tics. This is clarified by the Diagnostic and Statistical Manual of Mental Disorder (DSM-5) with the existence of motor and vocal tics before the age of 18 which last for more than 12 months. In DSM-5, tics are defined as sudden, rapid, recurrent, nonrhythmic motor movements or vocalizations, generally preceded by urge. TS often occurs with attention-deficit hyperactivity disorder (ADHD), obsessive-compulsive disorder (OCD) and other comorbid psychological disorders or learning difficulties. This study would aim to investigate the level of awareness toward TS among health science and non-health science students at Universiti Tunku Abdul Rahman (UTAR).

Methods This cross-sectional study was done among 377 students of UTAR Sungai Long and Kampar campuses. A tailor-made questionnaire was developed. The level of awareness towards Tourette Syndrome was assessed using the questionnaire. The data were analyzed using the Chi-Square test of association.

Results There is no significant association between sociodemographic variables or health science and non-health science students and their level of awareness towards Tourette Syndrome. The *p* values are more than 0.05. Although there is no statistically significant in gender, the result showed that females have a slightly higher awareness of Tourette syndrome compared to males.

Conclusion The students from health science as well as non-health science students in a private university have low awareness towards TS. In medical education, there should be more time for learning TS and tics disorder which would help the health science students to understand more about TS and the differential diagnosis.

Keywords: Awareness, Tourette syndrome, university students

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APPROVAL SHEET

This Research project entitled **“AWARENESS TOWARDS TOURETTE SYNDROME (TS) AMONG HEALTH SCIENCE AND NON-HEALTH SCIENCE STUDENTS IN A PRIVATE UNIVERSITY”** was prepared by TAN KAI XUAN and submitted as partial fulfilment of the requirements for the degree of Bachelor of Physiotherapy (Hons) at Universiti Tunku Abdul Rahman (UTAR).

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PERMISSION SHEET

It is hereby certified that **TAN KAI XUAN** (ID No: **18UMB03501**) has completed this Research project entitled “**AWARENESS TOWARDS TOURETTE SYNDROME (TS) AMONG HEALTH SCIENCE AND NON-HEALTH SCIENCE STUDENTS IN A PRIVATE UNIVERSITY**” under the supervision of Mr Avanianban Chakkarapani (Supervisor) from the Department of Physiotherapy, Faculty of Medical and Health sciences.

Yours truly,

(TAN KAI XUAN)

DECLARATION

I, Tan Kai Xuan hereby declare that the Research project is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UTAR or other institutions.

Name _____

Date _____

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LIST OF ABBREVIATIONS

UTAR	Universiti Tunku Abdul Rahman
TS	Tourette Syndrome
OCD	Obsessive-Compulsive disorder
ADHD	Attention-Deficit Hyperactivity Disorder
BOTOX	Botulinum toxin
CBT	Cognitive Behavioral Therapy
SPSS	Statistical Package for the Social Sciences
sd	Standard Deviation
df	Degree of Freedom

CHAPTER 1

INTRODUCTION

1.1 Background of TS

Tourette syndrome (TS) is a neurodevelopmental disorder that causes an individual to have involuntary movements and sounds which are often called tics. This is clarified by the Diagnostic and Statistical Manual of Mental Disorder (DSM-5) with the existence of motor and vocal tics before the age of 18 which last for more than 12 months (Billnitzer & Jankovic, 2020). In DSM-5, tics are defined as sudden, rapid, recurrent, nonrhythmic motor movements or vocalizations, generally preceded by urge (Hallett, 2015). TS often occurs with attention-deficit hyperactivity disorder (ADHD), obsessive-compulsive disorder (OCD) and other comorbid psychological disorders or learning difficulties (Set & Warner, 2021). In TS, the tics can either be transient tics or chronic tics disorders. According to Knight et al, 2012, the prevalence of transient tics and chronic tics disorder in school-based studies is 2.99% and 1.61% respectively. Transient tics disorder is also known as provisional tics disorder which is in the DSM-5 criteria with one or more motor or phonic tics for less than one-year period of time while chronic tics disorder is present in one or more motor or vocal tics for almost every day with many times per day for more than one-year period of time (Efron & Dale, 2018).

The prevalence of TS is around 0.3% to 1% globally. A study done by the Centers for Disease Control and Prevention (CDC) states that in the United States,

the prevalence of TS is 0.3% and 1 out of 333 children between the age of 3 to 17 had been diagnosed with TS. While there is one study that shows 1 out of every 162 children with diagnosed and undiagnosed TS which is 0.6% (Knight et al, 2012). This means there are about half of the TS children are undiagnosed. From 2016 to 2017, 44% of the diagnosed with TS children have moderate to severe TS. The ratio between male and female TS children is 3:1 with children aged 12 to 17 twice more than children of age 6 to 11. In TS children, they can have more than one mental, behavioural or developmental disorder, 83% of the diagnosed TS children have at least one of the disorders. 61% of the children having anxiety problems, 52% have ADHD, 34% have an oppositional defiant disorder (ODD) or conduct disorder (CD), 34% have difficulty in learning, 26% have developmental delays, 21% have autism spectrum disorder, 20% having depression, 15% having speech or language problems and 8% having intellectual disabilities (Charania et al, 2021).

There are seven differential diagnoses of TS which are anxiety disorder, ADHD, autism spectrum disorder, cocaine toxicity, OCD, Huntington disease dementia and Wilson disease (Verma, 2020). ADHD and OCD will be further described in this part since a high percentage of TS patients will be associated with these two mental disorders. ADHD is a neurological disorder that causes an individual difficulty focusing in doing things, it can occur in children as well as adults. The prevalence of ADHD in children is estimated to be 3-5% globally while in adults is 4-8% worldwide (Freeman, 2007; Sayal, 2017). According to the study that was done by Kurlan et al, there is a rate of 38.4% of ADHD who

have tics. While OCD is a disorder that has feelings triggered by obtrusive or unwanted thoughts or images that lead to behaviours to decrease the individual stress by trying to get rid of the compulsion with repetitive movement. OCD is also closely related to TS as they will have repetitive movements as well. The prevalence of OCD in children is less than 1% and 2-3% in older adolescence and adults. In OCD, there is term 'tic-like' compulsion is related to touching, taping and rubbing repeatedly, for example, putting an object down and picking it up again a few times which is similar to TS tics (Lombroso & Scahill, 2007).

There are various treatments to control the tics and emotions in TS such as medication to reduce muscle contractions, deep brain stimulation, BOTOX injection and cognitive behavioural therapy (CBT). CBT in a few articles mentioned it is a way to reduce the tics which is often called habit reversal (Lavoie, Imbriglio & Stip, 2011; O'Connor et al, 2008). CBT includes cognitive and behavioural restructuring in the starting phase. Habit reversal can reduce muscle contraction by activating the counter response for example reversing the shoulder elevation contraction can relax the overall posture (O'Connor et al, 2008). According to Brody et al, 1998, the preferentially respond to CBT in participants with different patterns of metabolism compared to medication. There is also a strong relationship between brain glucose metabolism in OCD and symptom reduction. CBT is a small part of physiotherapy, therefore physiotherapists can help in treating tics in TS patients.

It is assumed that the awareness of Tics and the management of Tics among the different categories of people is very important as TS patients have the

same intelligence and appearance as normal people and they are in society together with normal people. With awareness towards TS, people will not look down on them. Also, physiotherapy students might encounter these patients in the clinic and might need to treat patients with the above-mentioned disorders that are closely related to TS for example autism spectrum disorder is commonly treated by neuro physiotherapists. In this view, this present study will find out the awareness of TS among university students that would help in the future for all the stakeholders like doctors, physiotherapists and parents to plan accordingly.

1.2 Problem Statement

There is a lack of research on the awareness towards Tourette Syndrome as it has been neglected. As the incidence and prevalence of TS are slowly increasing, it might become a common condition in the future. Hence, the objective of this study is to fill the research gaps by finding the awareness towards TS among health science and non-health science student in UTAR. This research will also benefit the future of all stakeholders.

1.3 Research Objectives

1.3.1 Primary Objectives

To determine the level of awareness towards TS among university students

1.3.2 Secondary Objectives

To determine the association between the level of awareness towards TS and factors such as health science and non-health science students, age group, and gender.

1.4 Research Question

1. Is there an association between sociodemographic variables and the level of awareness towards TS among university students?
2. What is the level of awareness towards TS among health science and non-health science students?

1.5 Hypothesis

1.5.1 Null hypothesis

H₀₁: There is no significant association between health science students and the level of awareness towards TS.

H₀₂: There is no significant association between non-health science students and the level of awareness towards TS.

H₀₃: There is no significant association between gender and the level of awareness towards TS.

H₀₄: There is no significant association between age and the level of awareness towards TS.

1.5.2 Alternate hypothesis

H_{A1}: There is a significant association between health science students and the level of awareness towards TS.

H_{A2}: There is a significant association between non-health science students and the level of awareness towards TS.

H_{A3}: There is a significant association between gender and the level of awareness toward TS.

H_{A4}: There is a significant association between age and the level of awareness toward TS.

1.6 Operational Definitions

1.6.1 Awareness

Awareness is categorized into high awareness, moderate awareness and poor awareness.

1.6.2 Tourette Syndrome

A neurological disorder that has the cardinal feature of tics.

1.6.3 Non-health science student

The faculty include FCI, FAM, LKC FES, CFS, FBF, FICT, FEGT, IPSR, and ICS.

1.6.4 Health science students

The faculty include FMHS, Foundation in Science, FAS and FSc.

1.6.5 University Students

Individuals currently enrolled and pursuing a full-time foundation, undergraduate and postgraduate education in Universiti Tunku Abdul Rahman, Sungai Long and Kampar campus.

1.7 Rationale of the study

TS is one of the conditions that had been neglected in Malaysia. Awareness towards TS act as an important role in early diagnosis and reducing the dropout rate from school. However, the study stated that the level of awareness even among medical students and primary physicians is generally low (Alalwan, 2022). Until today, there was a lack of studies done to determine the level of awareness towards TS in Malaysia. Furthermore, the incidence rate and prevalence of TS are slowly increasing. Therefore, this study aims to determine the level of awareness toward TS among private university students.

CHAPTER 2

LITERATURE REVIEW

2.1 Tics in TS

The occurrence of Tics can be due to some structural or functional changes in the nervous system. In TS patients, there is a circuit called cortico-striatal-thalamo-cortical (CSTC) loop which has structural and functional abnormalities at numerous levels. CSTC loop is responsible for voluntary actions and habit formation and researchers found a relationship between CSTC loop and tics production (Ganos & Martino, 2015). Another study found that a reduction of caudate volume in the brain will cause severe tics in early adulthood. There is reduced connectivity between the basal ganglia and supplementary motor area following the increased grey matter in the midbrain, ventral putamen and left hippocampus (Cheng et al, 2014; Garraux et al, 2006; Ludolph et al, 2006). Another study mentioned that tics are closely related to over-reactive dopaminergic systems. The reward is one of the functions of dopamine. When the patient feels relieved and better after performing the tics, it is considered a reward and this will cause repeated movement to become an involuntary habit (Hallett, 2015).

Motor and phonic tics can be further divided into simple and complex tics. There is a sensory stimulus or unwanted feelings that induced the tics to be involuntary or semi-voluntary is called premonitory urges. There are 80% of TS patients disclose the premonitory urge of tics (Set & Warner, 2021). The most

common premonitory urge thinking is they must do it to feel relieved. Simple motor tics are just the involvement of one muscle group for example clonic tics. While dystonic and tonic tics are referring to brief sustained abnormal postures and isometric contraction of one muscle group respectively. Examples of simple clonic motor tics are eyes blinking, head jerking, face hitting, nose twitching and shoulder elevating. While forceful eyes closure, sustained mouth opening, shoulder rotation and contacting abdominal or limb muscles are examples of simple dystonic tics. There is a rare situation in which a TS patient touches or scratches other people or objects is called extracorporeal phantom tics (Patel, Jankovic & Hallett, 2014). While for complex tics, a few terms are frequently used which are echolalia, echopraxia, coprolalia and copropraxia. Echolalia and coprolalia are for phonic tics while echopraxia and copropraxia are for complex motor tics (Set & Warner, 2021). Echolalia is the patient trying to imitate words from others and coprolalia is shouting bad words. While echopraxia and copropraxia are mimicking gestures from others, they can be humans or animals and holding or exposing genitals respectively. Other complex motor tics can be occurred purposeful for example touching, kicking, hitting or throwing and purposeless bending of the body or head shaking.

2.2 Depression and quality of life in TS

According to Rizzo et al, 2017, depression in TS will cause increased severity of tics in children. Children with TS will have four times more to diagnose depression than normal children. Another study mention that depression

can be seen in male more than female (Piedad & Cavanna, 2016). TS patient with depression shows a significantly high percentage of palilalia and coprophenomena. Palilalia is the automatic repetition of one's own words. Adult TS patients will have a higher prevalence of mood disorders than children TS patients. The occurrence of depressive symptoms probably has multifactorial aetiology which includes the high rate of association with ADHD and OCD, the side effects of drugs for tics, the family history of depression and the mental consequences of being neglected socially (Rizzo et al, 2017). A Motor tic, Obsessions and compulsions, Vocal tic Evaluation Survey (MOVES) was conducted on TS patients in a research done by Rizzo et al, shows a higher score in TS patients with depression compared to those without depression ($p < 0.0001$). A Canadian study investigated that 40% of TS children developed depression or OCD (Gorman et al, 2010).

TS patients are believed to have reduced quality of life (QoL) in self, relationship and general domain (Eddy et al, 2011; Rizzo, 2017). TS patients associated with OCD and ADHD will have a significantly lower QoL score by using the Youth quality of life instrument-research version (YQOL-R), a self-reporting instrument used to measure QoL in young people. Another study done by Doja et al, compared the high activity group (HAG) and low activity group (LAG) which means more than or equal to 12 000 steps and less than 12 000 steps per day respectively. Data analyses showed that HAG has a better performance in physical functioning, social, school, psychosocial and total QoL scores compared

to LAG. While emotional functioning in both groups did not have many differences when relating to physical activity.

2.3 Management of TS

In recent articles, there are a few ways for managing TS symptoms for example behavioural therapy, pharmacological therapy, and surgical therapy (Thenganatt & Jankovic, 2016). These therapies can improve the QoL of a TS patient by reducing their tics. As first management for TS patients should be behavioural therapy before starting any other intervention (Quezada & Coffman, 2018). Behavioural therapy is proven by several randomized controlled trials (RCTs) research to be effective (McGuire et al, 2014; Piacentini et al, 2010; Wilhelm et al, 2012). According to Wilhelm et al, there is a significant reduction in the Yale Global Tic Severity Scale (YGTSS) after 3 months of behavioural therapy.

If behavioural therapy does not work on the patient for example the patient is too young to follow instructions, then the second choice of pharmacological therapy will be chosen. There are a few types of pharmacological therapy which include Alpha-2 Agonists to control mild tics, first-, second- and third-generation antipsychotic medication the dopamine receptors blocker, D1 receptor antagonist, cannabis-based medications and botulinum toxin injections. Alpha-2 agonist medications including clonidine and guanfacine are proven to be effective interventions, especially in children with mild tics (Billnitzer & Jankovic, 2020).

Next, an example of antipsychotic drugs is haloperidol (first-generation), pimozide (second-generation) and aripiprazole (third-generation) approved by FDA are found effective to reduce the frequency and intensity of tics. While there are some new and emerging pharmacological therapies which are the D1 receptor antagonist and cannabis-based medications. The D1 receptor antagonist, ecopipam, has a promising result in improving the YGTSS score after 8 weeks of intervention (Thenganatt & Jankovic, 2016). While cannabis-based medication is used to improve tics and OCD behaviour for example delta 9-tetrahydrocannabinol. There are also a few other recent medications in managing TS patients which are anticonvulsant agents, antispasticity agents and botulinum toxin. Anticonvulsant agents for example topiramate and clonazepam in managing tics. Topiramate shows efficacy in managing TS tics while clonazepam shows poor efficacy. While Baclofen is a type of antispasticity agent that is used to manage spasticity in TS patients (Pandey & Dash, 2019). Lastly, botulinum toxin injection is used to relax a particular muscle to reduce the tics.

Lastly, for surgical therapy, there is deep brain stimulation (DBS) that mainly targets the thalamus. DBS is efficient for TS with the combination of medication and behavioural therapy. DBS can also increase the QoL score in TS patients (Thenganatt & Jankovic, 2016). There is a case report study done in Indonesia saying that DBS targeting the bilateral thalamus can drastically reduce the tics and this is the first long-term follow-up study that was done in South East Asia (Inggas et al, 2022).

2.4 Awareness towards TS

From 2007 to 2015, the incidence rate of children and adolescents TS patients are increasing from 19.58 to 31.79 per 100,000 person-years in Taiwan which is considered a high incidence rate (Chou et al, 2022). All of the TS patients will have the same intelligence and lifespan as normal people (Karuppanan et al, 2021). A cross-sectional study done by Alalwan et al, in Saudi Arabia found that even among physicians, the awareness towards TS is low. There are just 3.48% of the physicians have a TS knowledge score of more than 80% and 42.41% of physicians have a knowledge score of less than 60%. This will reduce the efficacy of physicians to diagnose properly. Furthermore, in this study, the physician response rate is low as they are busy with their practices. The knowledge of TS in medical students and physicians is equal which has an average knowledge score of 61%. This study showed that 89.9% of primary care physicians have never treated TS patients. In another study done among high school students in Israel, the knowledge score is 68.9% while the attitude score achieved a level of 55.3% which is low and this study was done in 2006 (Brook & Boaz, 2006). There were only 99 students are included in the study with a mean age of 16.7. There were also talks and discussions in the class before the research started. Currently, there is limited awareness towards TS studies done in Malaysia.

CHAPTER 3

METHODOLOGY

3.1 Study Design

An observational quantitative cross-sectional study was conducted to determine the level of awareness towards TS among university students. Online questionnaires were distributed as Google Forms to students currently pursuing higher education in UTAR, Sg Long and Kampar campuses. This study design is relatively easier to conduct, faster and more inexpensive as compared to other types of study design.

3.2 Setting of the Study

This study was conducted at Universiti Tunku Abdul Rahman, Sungai Long campus, located at Kajang, Selangor. The Sungai Long branch comprises several faculties, centres and institutes as listed below:

1. Faculty of Accountancy and Management (FAM)
2. Faculty of Medicine and Health Science (FMHS)
3. Faculty of Creative Industries (FCI)
4. Lee Kong Chian Faculty of Engineering and Science (LKC FES)
5. Institute of Chinese Studies (ICS)
6. Centre for Foundation Studies (CFS)
7. Centre for Extension Education (CEE)

8. Institute of Management and Leadership Development

9. Institute of Postgraduate Studies and Research (IPSR)

While the faculties, centres and institutes for the Kampar branch are listed below:

1. Faculty of Arts and Social Science (FAS)
2. Faculty of Business and Finance (FBF)
3. Faculty of Engineering and Green Technology (FEGT)
4. Faculty of Information and Communication Technology (FICT)
5. Faculty of Science (FSc)
6. Centre for Extension Education (CEE)
7. Centre for Corporate and Community Development (CCCD)
8. Centre for Foundation Studies (CFS)
9. Institute of Chinese Studies (ICS)
10. Institute of Postgraduate Studies and Research (IPSR)

3.3 Population

The target population in this study was university students who are currently pursuing their foundation, undergraduate and postgraduate studies at Universiti Tunku Abdul Rahman, Sungai Long and Kampar campus. This would include students of different grades of courses from all of the faculties, centres and institutes stated above.

3.3.1 Inclusion Criteria

1. University students who are pursuing foundation, undergraduate and postgraduate.
2. Foundation, undergraduates and postgraduates who are currently studying at Universiti Tunku Abdul Rahman, Sungai Long and Kampar Campus

3.3.2 Exclusion Criteria

1. University students who decline participation through the consent form
2. University students that are not able to access the google form
3. Participants who are graduated

3.4 Sampling

3.4.1 Sampling Method

Snowball sampling was used as the sampling method in this study. This sampling method was chosen because of its easy accessibility, convenience, and time-saving, and it is inexpensive. As it is a non-probability sampling, this sampling helps to save time as the participants are encouraged to identify a potential subject and send the google form to them and continue like a rolling snowball. Students who fulfilled the eligibility criteria from Universiti Tunku

Abdul Rahman, Sungai Long and Kampar campus were recruited as they were easily accessible to the researcher.

3.4.2 Sampling Size

The sample size was calculated using the Krejcie and Morgan, 1970 formula. According to Krejcie and Morgan's formula, a population size of 26,000 is reflected in to sample size of 377.

Table 3.1									
<i>Table for Determining Sample Size of a Known Population</i>									
N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	346
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	354
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	191	1200	291	6000	361
45	40	170	118	400	196	1300	297	7000	364
50	44	180	123	420	201	1400	302	8000	367
55	48	190	127	440	205	1500	306	9000	368
60	52	200	132	460	210	1600	310	10000	370
65	56	210	136	480	214	1700	313	15000	375
70	59	220	140	500	217	1800	317	20000	377
75	63	230	144	550	226	1900	320	30000	379
80	66	240	148	600	234	2000	322	40000	380
85	70	250	152	650	242	2200	327	50000	381
90	73	260	155	700	248	2400	331	75000	382
95	76	270	159	750	254	2600	335	100000	384
<i>Note: N is Population Size; S is Sample Size</i>					<i>Source: Krejcie & Morgan, 1970</i>				

3.5 Instruments

A tailor-made questionnaire will be developed myself. A consent form will be attached to the first page of the questionnaire for the participants to sign before answering the questionnaire. The questionnaire consists of 3 sections which the second section having four sub-sections. The first section is demographic data, the second section is awareness towards TS and the third section will be the interest of participants towards TS.

3.5.1 Section 1: Demographic Data

The first section will be the part where demographic data was collected. The demographic data include gender, age group, faculty, TS status and whether they know TS patients. The gender data was referred to in an article named ‘The Assessment of Knowledge about Tourette’s Syndrome among Medical Students and Primary Physicians in Riyadh, Saudi Arabia: A Cross-Sectional Study’ (Alalwan et al, 2022).

3.5.2 Section 2: Awareness towards Tourette Syndrome

The second section will be the awareness towards TS and this section have 4 subsections, general awareness, awareness of symptoms, awareness of risk factors and awareness of the treatment. The scoring system will be using the Likert scale, extremely aware (4 points), very aware (3 points), moderately aware

(2 points), slightly aware (1 point), and not at all aware (0 points). There are a total of 26 items in this section and have a total of 104 points. If a participant scores more than or equal to 83, the level of awareness is considered high level. If they score 62 to 82, the level of awareness is at a moderate level whereas, less than or equal to 61 is considered a low level of awareness. These categories of level of awareness are based on the article ‘The Assessment of Knowledge about Tourette’s Syndrome among Medical Students and Primary Physicians in Riyadh, Saudi Arabia: A Cross-Sectional Study’ (Alalwan et al, 2022).

3.5.3 Section 3: Interest towards Tourette Syndrome Education

The third section of this questionnaire will be about the interest to know more about TS. It is just a yes or no question with further elaborating the preference of their study place. Participants that choose ‘Yes’ indicated that they are interested in TS while ‘No’ means not interested.

3.6 Data Collection Procedure

A tailor-made questionnaire will be developed and add on some questions from a few articles and combined as one questionnaire that meets the objectives of the study. After combining the questionnaire, the questionnaire was submitted to lecturers for review and validation. A consent form, inclusion criteria of participation, personal data protection and aims of the study will be attached to the questionnaire. After done with the questionnaire and proposal preparation, the

proposal will be presented to the examiner to get approval to conduct the study. Approval from the Ethical Review Committee (SERC) of UTAR is also needed before start conducting the study and recruiting the participants.

Once the proposal has been approved and signed by both supervisor and UTAR Ethical Review Committee, the selection of participants was based on the inclusion and exclusion criteria. Participants that met the inclusion criteria were recruited through the snowball sampling method via online platforms. Participants were required to fill in the consent form if they volunteer to participate in this study, after signing the consent form, the participants can start to fill in the questionnaire with three different sections. After participants completed the questionnaire, the questionnaire was submitted to the conductor of this research. Data collected were analyzed through SPSS software and undergo a particular statistical test. After analyzing the data, the data was interpreted and started to prepare for the writing process of the thesis.

3.7 Statistical Analysis

Data collected from this study were computed and analyzed using the IBM Statistical Package for the Social Science (SPSS) version 20.0 software. Data will be coded using Microsoft Excel. The overall level of awareness towards TS and level of interest towards TS education were analyzed through descriptive statistics by calculating the frequency and percentage. The association between the level of awareness and factors such as health science students, non-health science students,

gender and age were analyzed using the Chi-square test. P-values were calculated to identify any significant result in which a p-value of less than 0.05, the null hypothesis will be rejected, considered as a statistically significant association between the health science and non-health science students and level of awareness towards TS.

3.8 Ethical Approval

The study is subjected to ethical approval from the Scientific and Ethical Review Committee (SERC) of Universiti Tunku Abdul Rahman. Informed consent was given to participants before they start participating in this study.

CHAPTER 4

DATA ANALYSIS AND RESULTS

4.1 Characteristics of Participants

A total of 390 participants responded to this study before the exclusion criteria were applied. Among the google forms, 7 responses failed to meet the eligibility criteria and were excluded as one of them disagree with the consent of the questionnaire and 6 of them disagreed with the personal data protection statement that their data will not be processed. 5 participants are graduated and meet the exclusion criteria, therefore will be excluded from the research. In summary, 12 responses were ruled out from this study. The final 378 responses were selected after the exclusion criteria and data cleaning process and there were no missing data among these responses. With this information, it was noted that the prevalence of Tourette syndrome (TS) was 0.8% which is similar to the global prevalence of 1%. Besides, there are also 9.8% of the participants are aware of their friends or family that are having TS. Table 4.1.1 and 4.1.2 depicts the characteristics and demographic information of the participants that were involved in this study. Lastly, Table 4.1.3 shows the course of study from 12 different faculties.

Table 4.1.1: Characteristics of Participants, N= 378

Sociodemographic variables		n	%
Gender	Male	136	36.0
	Female	242	64.0
Age Group	17-18	23	6.1
	19-20	165	43.7
	21-22	149	39.4
	23-24	33	8.7
	≥25	8	2.1
Ethnicity	Chinese	363	96.0
	Malay	3	0.8
	Indian	10	2.6
	Portuguese	1	0.3
	Sino	1	0.3
Year of Study	Year 1	150	39.7
	Year 2	85	22.5
	Year 3	74	19.6
	Year 4	66	17.5
	Year 5	3	0.8

N= total sample size, n= total number of participants

Table 4.1.2: Faculty of Participants

Sociodemographic variable		n	%
Faculty	Centre for Foundation Studies (CFS)	40	10.6
	Faculty of Accountancy and Management (FAM)	34	9.0
	Faculty of Arts and Social Science (FAS)	11	2.9
	Faculty of Business and Finance (FBF)	41	10.8
	Faculty of Creative Industries (FCI)	17	4.5
	Faculty of Engineering and Green Technology (FEGT)	9	2.4
	Faculty of Information and Communication Technology (FICT)	35	9.3
	Faculty of Science (FSc)	30	7.9
	Institute of Chinese Studies (ICS)	4	1.1
	Institute of Postgraduates Studies and Research (IPSR)	7	1.9
	Lee Kong Chian Faculty of Engineering and Science (LKC FES)	65	17.2
	M Kandiah Faculty of Medicine and Health	85	22.5

Table 4.1.3: Course of Study of Participants

		Course of Study	
Sociodemographic variable		n	%
Course of study	Bachelor in Chemical Engineering (Hons)	8	2.1
	Bachelor of Accounting (Hons)	29	7.7
	Bachelor of Agricultural Science (Hons)	1	0.3
	Bachelor of Arts (Hons) Chinese Studies	3	0.8
	Bachelor of Arts (Hons) Game Design	1	0.3
	Bachelor of Biomedical Science	12	3.2
	Bachelor of Biotechnology (Hons)	2	0.5
	Bachelor of Broadcasting	2	0.5
	Bachelor of Business Administration (Honours)	14	3.7
	Bachelor of Chemistry (Hons)	1	0.3
	Bachelor of Chinese Medicine (Honours)	2	0.5
	Bachelor of Civil Engineering (Hons)	9	2.4
	Bachelor of Communication (Hons) Advertising	3	0.8
	Bachelor of Computer Science (Hons)	25	6.6
	Bachelor of Construction Management (Hons)	2	0.5
	Bachelor of Corporate Communication (Hons)	4	1.1
	Bachelor of Digital Animation (Hons)	1	0.3
	Bachelor of Early Childhood Education	2	0.5
	Bachelor of Economics (Honours) Financial Economics	3	0.8
	Bachelor of Economics (Hons) Global Economic	2	0.5
	Bachelor of Engineering (Hons) Electronic Engineering	1	0.3
	Bachelor of Engineering (Hons) Environmental Engineering	3	0.8
	Bachelor of Engineering (Hons) Mechanical Engineering	5	1.3
	Bachelor of Finance (Hons)	10	2.6
	Bachelor of financial technology	1	0.3
	Bachelor of Graphic Design and Multimedia	3	0.8

Bachelor of Industrial Management	1	0.3
Bachelor of Information Systems (Honours)	6	1.6
Business Information Systems		
Bachelor of Information Technology (Hons)	3	0.8
Communication and Networking		
Bachelor of Information Technology (Hons)	1	0.3
Digital Economy		
Bachelor of International Business (Hons)	9	2.4
Bachelor of Logistics and International	2	0.5
Shipping		
Bachelor of Marketing (Hons)	6	1.6
Bachelor of Mass Communication	1	0.3
Bachelor of Mechatronic Engineering	4	1.1
Bachelor of Media and Creative Studies	3	0.8
(Hons)		
Bachelor of Medicine and Bachelor of	11	2.9
Surgery (MBBS)		
Bachelor of Microbiology (Hons)	1	0.3
Bachelor of Nursing (Hons)	5	1.3
Bachelor of Petrochemical Engineering	1	0.3
Bachelor of Physiotherapy (Hons)	67	17.7
Bachelor of Quantity Surveying (Hons)	10	2.6
Bachelor of Retail Management	1	0.3
Bachelor of Science (Hons) Architecture	1	0.3
Bachelor of Science (Hons) Actuarial Science	7	1.9
Bachelor of Science (Hons) Applied	4	1.1
Mathematics with Computing		
Bachelor of Science (Hons) Dietetics	10	2.6
Bachelor of Science (Hons) Environmental	1	0.3
Occupational Safety and Health		
Bachelor of Science (Hons) Physics	1	0.3
Bachelor of Science (Hons) Software	16	4.2
Engineering		
Bachelor of science Honours Biochemistry	1	0.3
Bachelor of Social Science (Hons) Guidance	1	0.3
and Counseling		
Bachelor of Social Science (Hons)	7	1.9
Psychology		
Doctor of Philosophy	1	0.3
DOCTOR OF PHILOSOPHY (SCIENCE)	1	0.3

Foundation In Arts	26	6.9
Foundation in Science	14	3.7
Foundation of Chinese Studies	1	0.3
Master of Engineering Science	2	0.5
Master of Philosophy	1	0.3
PhD in Social Science	1	0.3
PhD of Engineering	1	0.3

Figure 4.1.1 illustrates the distribution of participants by gender. The proportion of female participants was higher with a percentage of 64% (n=242) as compared to male participants with a percentage of 36% (n=136).

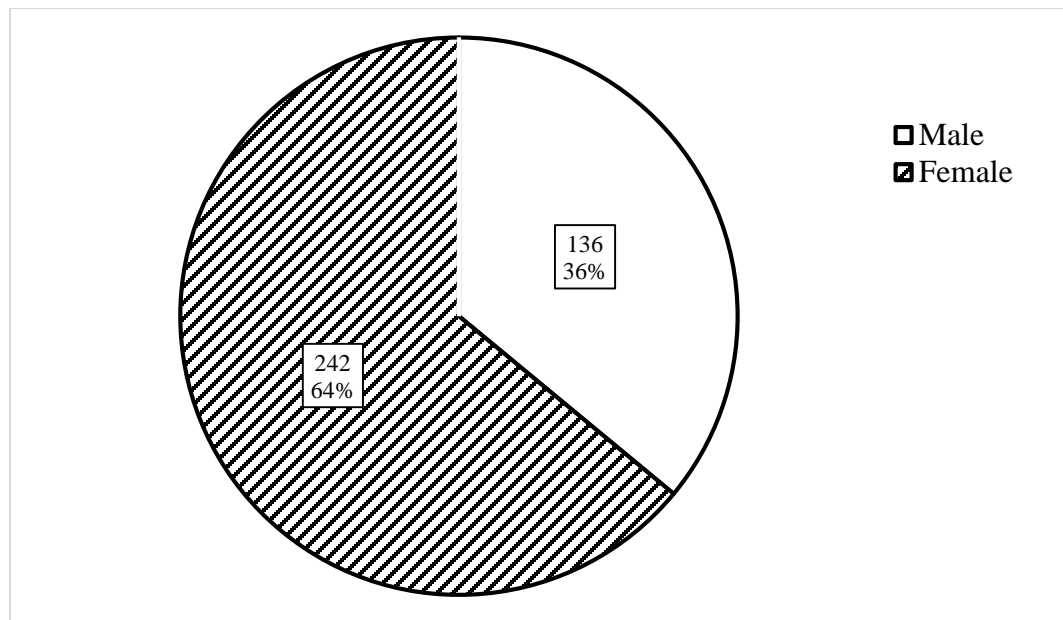


Figure 4.1.1 Distribution of Participants by Gender

Figure 4.1.2 depicts the distribution of participants by age group. The age of participants was further categorized into the 17-18 years old group, 19-20 years old group, 21-22 years old group, 23-24 years old group and more than or equal to 25 years old group and distributed accordingly. The majority of the participants belonged to the age group of 19-20 years old covering 43.7% (n=165) followed by the age group of 21-22 years old with 39.4% (n=149), the age group of 23-24 years old with 8.7% (n=33), age group of 17-18 years old with 6.1% (n=23), and the least belong to the ≥ 25 with 2.1% (n=8).

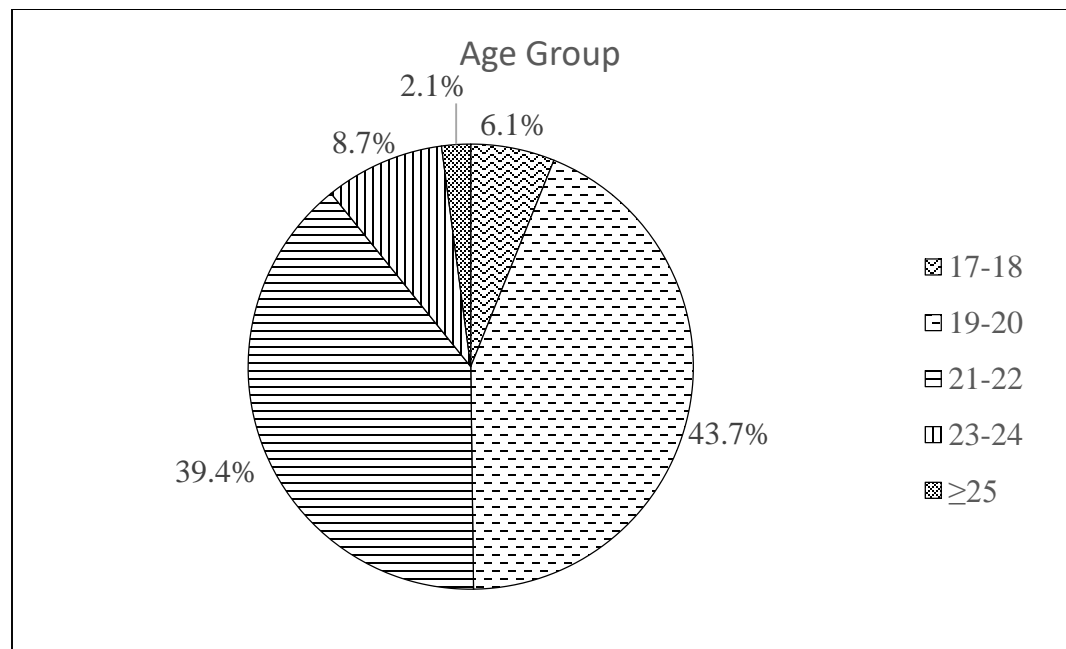


Figure 4.1.2 Distribution of Participants by Age Group

Figure 4.1.3 depicts the distribution of participants according to ethnicity. The responses collected were divided into 5 categories, mainly Malay, Chinese, Indian, Portuguese and Sino. Most of the participants were of Chinese ethnicity

making up 96.0% (n=363), followed by Indian with 2.6% (n=10), then Malay with 0.8% (n=3), and both Portuguese and Sino shared the same distribution which is 0.3% (n=1) respectively.

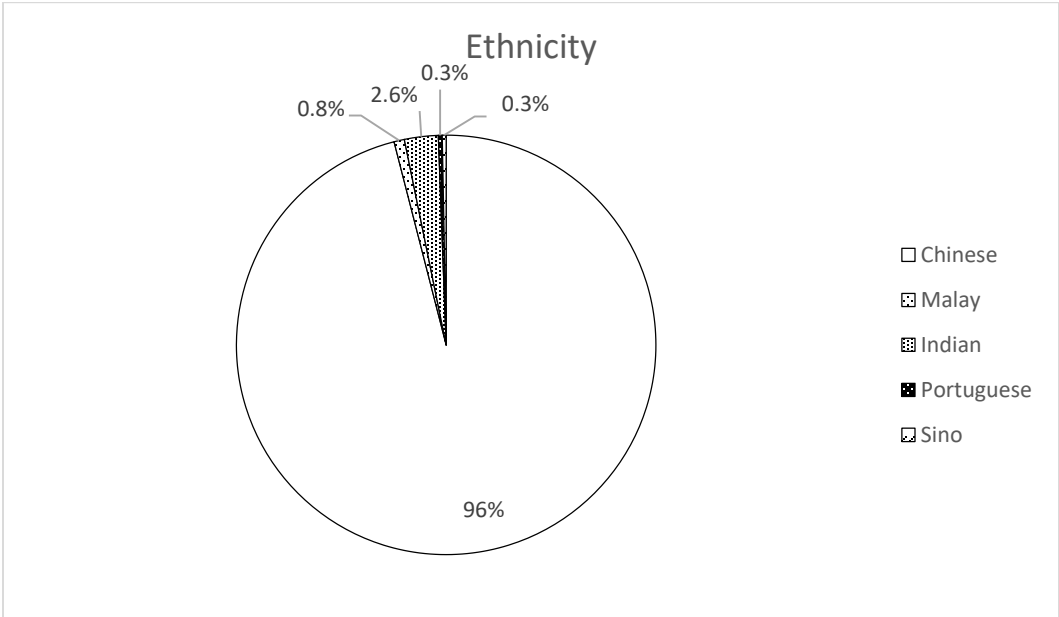


Figure 4.1.3 Distribution of Participants by Ethnicity

Figure 4.1.4 illustrates the distribution of participants according to the year of study. The data collected was from students of year 1 to year 5. The most percentage of participants was from Year 1 and was followed by Year 2, Year 3, Year 4 and Year 5 with 39.7% (n=150), 22.5% (n=85), 19.6% (n=74), 17.5% (n=66) and 0.8% (n=3) respectively.

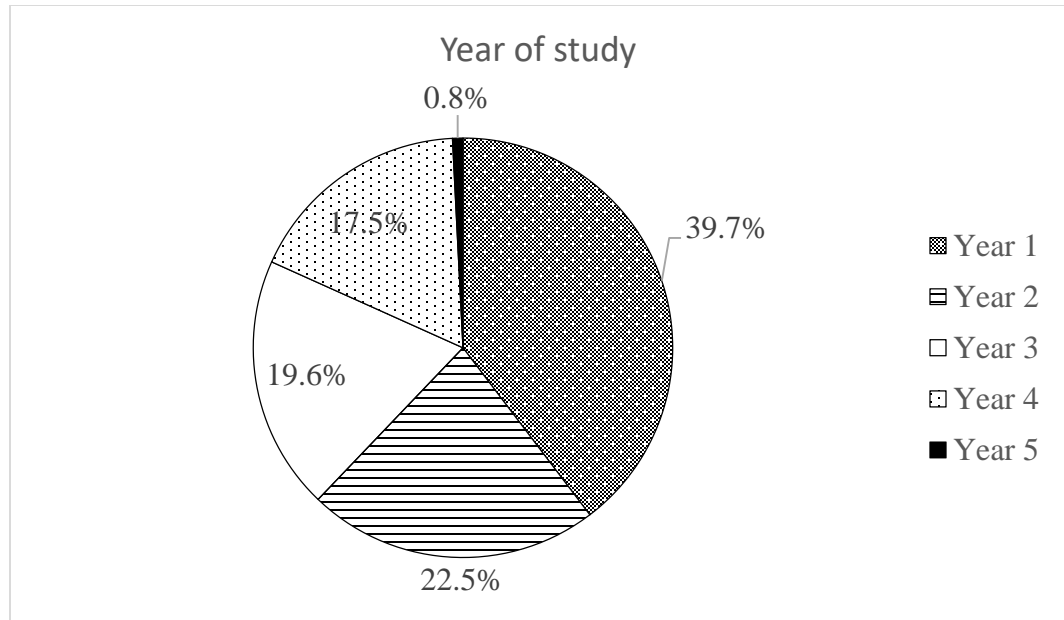


Figure 4.1.4 Distribution of Participants by Year of Study

Figure 4.1.5 shows the allocation of participants based on their faculty. There is a total of 12 faculties, centres and institutes were collected from the participants. The largest proportion of participants was from MK FMHS with a sample size of 85 which have 22.5% of the total sample size. The second largest proportion is from LKC FES with 17.2% (n=65). According to Figure 4.1.5, there are 37% (n=140) of the participants are health science students while 63% (n=238) are non-health science students.

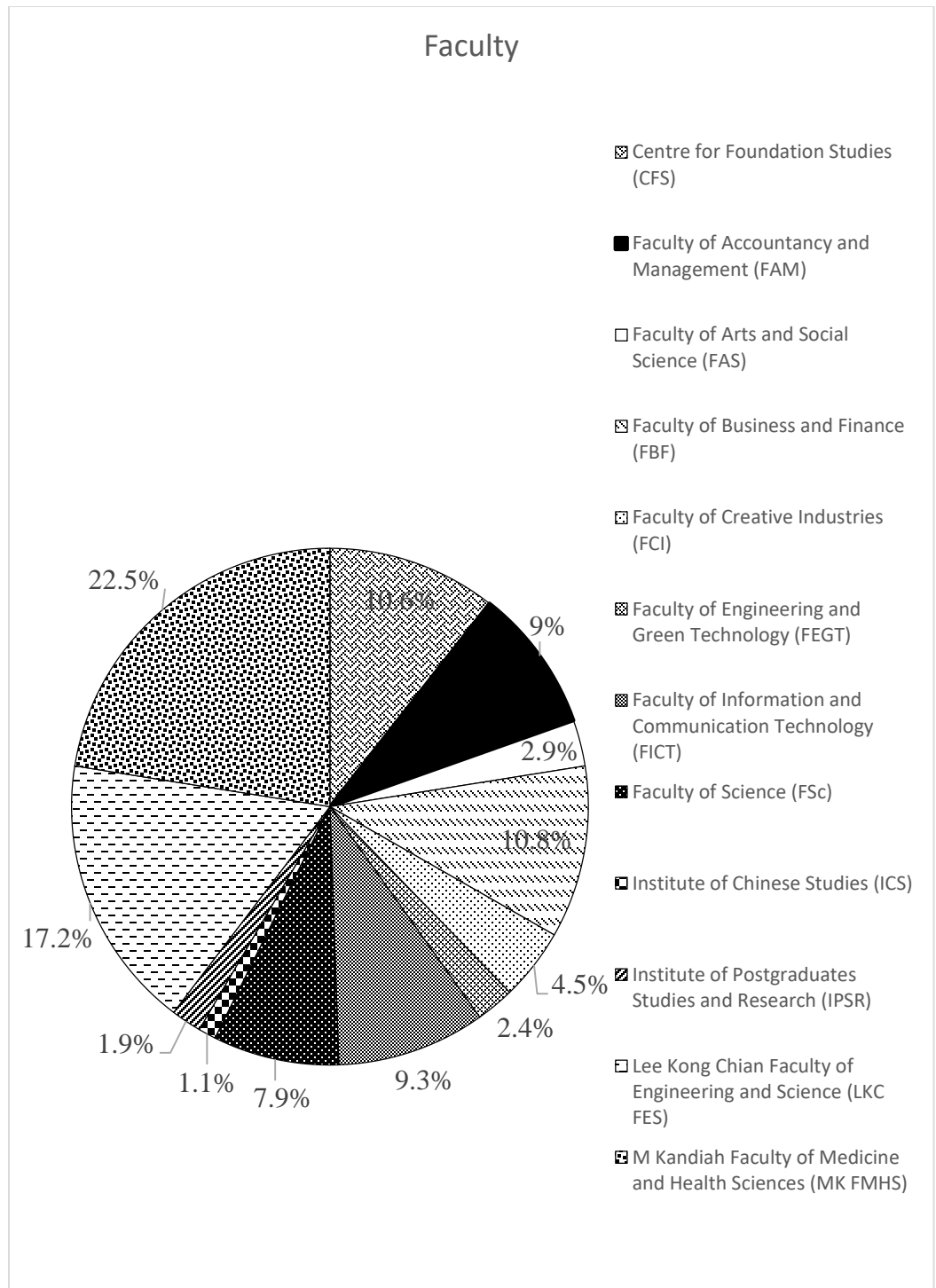


Figure 4.1.5 Distribution of Participants by Faculty

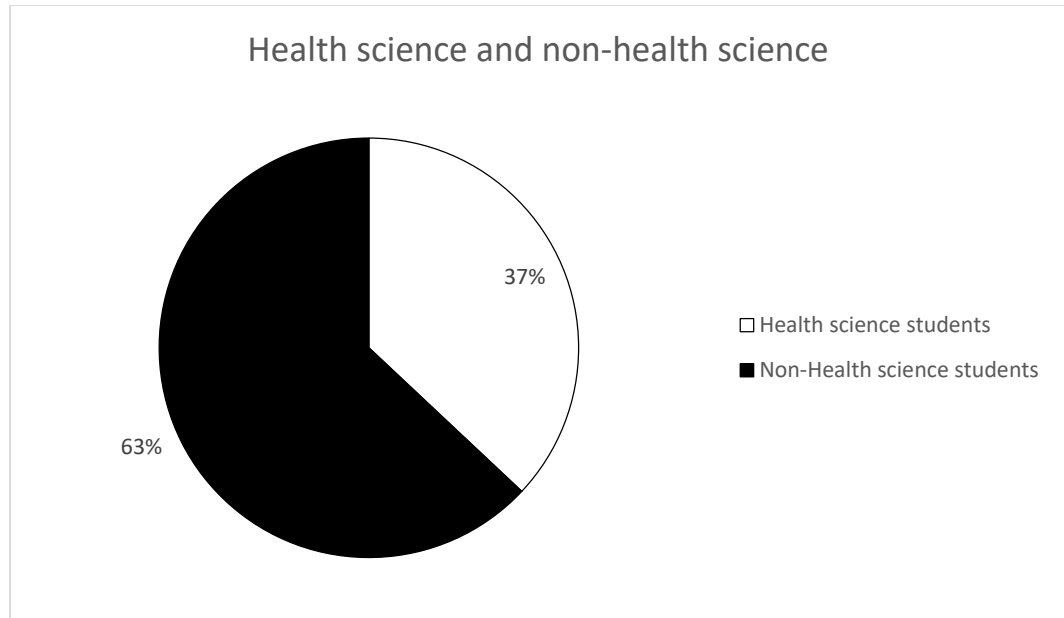


Figure 4.1.6 Distribution of Participants by Health science and Non-health science

4.2 Diagnostic Status of Participants

Table 4.2.1 illustrates the diagnostic status of TS, ADHD or OCD. There are 3.2% (n=12) of the participants answered yes to the question that asked whether they had been diagnosed with TS, ADHD or OCD and the rest of the participants answered no to this question. There is one participant who chose yes on Table 4.2.1 who did not mention the diagnosed disorders. From Table 4.2.2, there are two participants with 0.5% being diagnosed with ADHD, 8 participants chose OCD and 0.5% (n=2) of participants been diagnosed with TS. Among the 8 participants who answered OCD in Table 4.2.2, two of them were not diagnosed with it. Figure 4.2.1 shows that ADHD is more common among males which has a total of 2 male participants had been diagnosed with it. Figure 4.2.1 also shows that OCD has a higher prevalence among females.

Table 4.2.1: Question Asked Participants Whether They Diagnosed with TS, ADHD or OCD

Diagnostic status		n	%
Answer	No	366	96.8
	Yes	12	3.2

Table 4.2.2: Question Asked Participants Which of the Following had been Diagnosed

Diagnostic status		n	%
Answer	Did not answer	366	96.6
	ADHD	2	0.5
	OCD	8	2.1
	TS	2	0.5

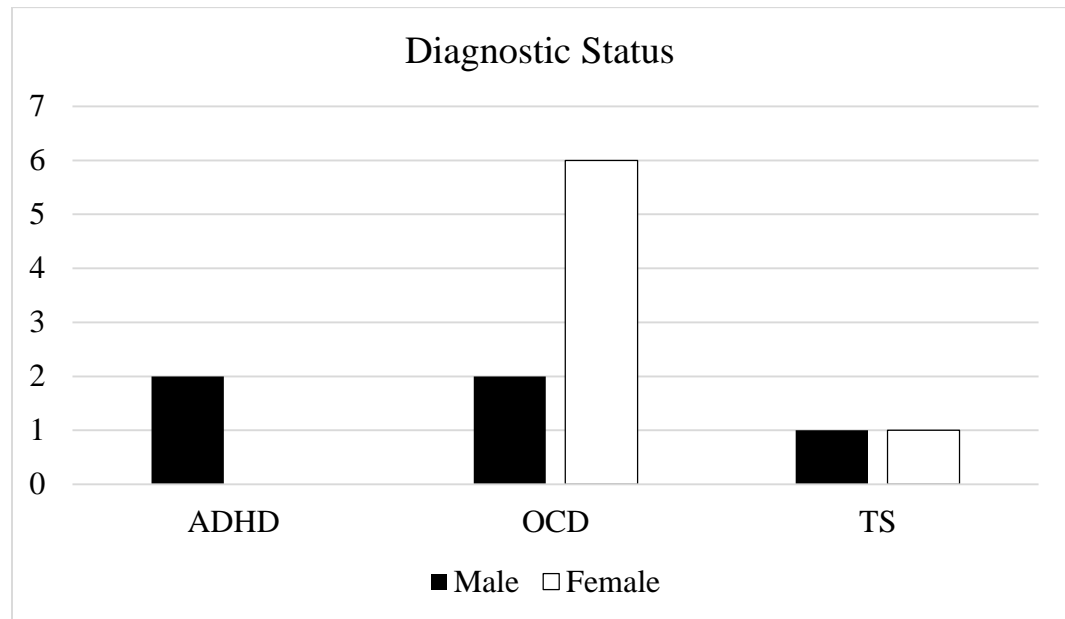


Figure 4.2.1: Diagnostic Status Based on Gender

4.3 Awareness Towards Surrounding TS Patients of the Participants

Table 4.3.1 illustrates the responses from participants regarding the awareness towards TS patients of the surrounding people. There are 9.8% (n=37) of the participants know that someone besides them has TS while 13.2% (n=50) answered maybe they know but they not sure about it and most of the participants did not know anyone that is having TS which is 77% (n=291) of the participants.

Table 4.3.1: Awareness Towards Surrounding TS patient Responses

Question: Do you know anyone that is/is suffering from Tourette Syndrome?

Responses	n	%
Yes	37	9.8
No	291	77
Maybe	50	13.2

Table 4.3.2 shows that there are 5.9% (n=8) of the male participants know someone that is having TS while 12% (n=29) of the female participants know. There are 29.6% (n=112) of the total population of male participants do not know about anyone that is having TS while 47.4 (n=179) of female participants. Lastly, 4.2% (n=16) of the male participants might know someone who has TS and 9% (n=34) of the female participants.

Table 4.3.2: Awareness Towards Surrounding TS patient Responses by Gender

Question: Do you know anyone that is/is suffering from Tourette Syndrome?

Responses	Yes	No	Maybe
	n (%)	n (%)	n (%)
Male	8 (2.1)	112 (29.6)	16 (4.2)
Female	29 (7.7)	179 (47.4)	34 (9)

Table 4.3.3 illustrates the awareness towards TS based on the year of study of participants. From Table 4.3.3, we can know that participants from Year 1 are the most that answered yes which has 20 participants made up of 5.3% compared to other categories of the year of study. The percentage of answered yes by the participants decreases with the increasing year of study.

Table 4.3.3: Awareness Towards Surrounding TS patient Responses by Year of Study

Question: Do you know anyone that is/is suffering from Tourette Syndrome?

Responses	Yes n (%)	No n (%)	Maybe n (%)
Year 1	20 (5.3)	114 (30.2)	16 (4.2)
Year 2	9 (2.4)	61 (16.1)	15 (4.0)
Year 3	5 (1.3)	60 (15.9)	9 (2.4)
Year 4	3 (0.8)	54 (14.2)	9 (2.4)
Year 5	0 (0)	2 (0.5)	1 (0.3)

Table 4.3.4 depicts the awareness towards surrounding TS patients based on faculty. From Table 4.3.4, the most that answered yes is from the Centre for Foundation Studies (CFS) which have 2.4% (n=9) of the participants and the least is from the Faculty of Creative Industries (FCI) which has 0%. The second most that answered yes is M Kandiah Faculty of Medicine and Health Sciences (MK FMHS) which has 2.1% (n=8) followed by Faculty of Science (FSc) with 1.6% (n=6) and Lee Kong Chian Faculty of Engineering and Science (LKC FES) with 1.3% (n=5). And according to Table 4.3.5, there is a higher response rate of health science students with 5.3% (n=20) to yes even with a lower response rate compared to non-health science students with 4.5% (n=17).

Table 4.3.4: Awareness Towards Surrounding TS patient Responses by Faculty

Question: Do you know anyone that is/are suffering from Tourette Syndrome?

Responses	Maybe n (%)	No n (%)	Yes n (%)
Centre for Foundation Studies (CFS)	7 (1.9)	24 (6.3)	9 (2.4)
Faculty of Accountancy and Management (FAM)	3 (0.8)	30 (7.9)	1 (0.3)
Faculty of Arts and Social Science (FAS)	1 (0.3)	9 (2.4)	1 (0.3)
Faculty of Business and Finance (FBF)	9 (2.4)	29 (7.7)	3 (0.8)
Faculty of Creative Industries (FCI)	3 (0.8)	14 (3.7)	0 (0)
Faculty of Engineering and Green Technology (FEGT)	2 (0.5)	5 (1.3)	2 (0.5)
Faculty of Information and Communication Technology (FICT)	9 (2.4)	25 (6.6)	1 (0.3)
Faculty of Science (FSc)	0 (0)	24 (6.3)	6 (1.6)
Institute of Chinese Studies (ICS)	1 (0.3)	2 (0.5)	1 (0.3)
Institute of Postgraduates Studies and Research (IPSR)	0 (0)	7 (1.9)	0 (0)
Lee Kong Chian Faculty of Engineering and Science (LKC FES)	5 (1.3)	55 (14.6)	5 (1.3)
M Kandiah Faculty of Medicine and Health Sciences (MK FMHS)	10 (2.6)	67 (17.7)	8 (2.1)

Table 4.3.5: Awareness Towards Surrounding TS patient Responses by Health Science and Non-health Science Students

Question: Do you know anyone that is/is suffering from Tourette Syndrome?

Responses	Yes n (%)	No n (%)	Maybe n (%)
Health science	20 (5.3)	107 (28.3)	13 (3.4)
Non-health science	17 (4.5)	184 (48.7)	37 (9.8)

4.4 General Awareness Towards TS of the Participants

Participants were asked about the system that is affected in TS patients. Table 4.4.1 shows that the majority of the participants chose the right

answer which is the nervous system with 85.2% (n=322). The rest of the participants chose an answer other than the nervous system which the second most participants with 9% (n=34) chose the musculoskeletal system and followed by the respiratory system with 2.9% (n=11), the circulatory system with 1.6% (n=6) and digestive system with 1.3% (n=5).

Table 4.4.1: System Affected by TS

Question: In your opinion, which of the following system do you think is affected in TS patients?

Human system	n	%
Circulatory system	6	1.6
Digestive system	5	1.3
Musculoskeletal system	34	9.0
Nervous system	322	85.2
Respiratory system	11	2.9

Table 4.4.2, illustrates the responses for general awareness towards TS which is in part 2.1 of the questionnaire. The majority of the participants 47.1% (n=178) responded to ‘Not aware at all – 0’, especially for question 6 which is asking about the prevalence. Table 4.4.3 and Table 4.4.4 illustrates the participants that responded to the nervous system on the first question. The mean score in Table 4.4.5 is calculated from ‘Extremely aware – 4 score’, ‘Very aware – 3 score’, ‘Moderately aware – 2 score’, ‘Slightly aware – 1 score’ and ‘Not aware at all – 0 score’. There is a maximum of 30 scores in this section of general awareness. Table 4.4.5 showed that the mean score of the health science students is 9.62 which is slightly higher than the non-health science students with a mean score of 8.77.

Table 4.4.2: General Awareness Towards TS of Participants
Questionnaire Part 2.1

Questions	Extremely aware n (%)	Very aware n (%)	Moderately aware n (%)	Slightly aware n (%)	Not aware at all n (%)
1. Have you ever heard of TS?	25 (6.6)	49 (13)	97 (25.7)	103 (27.2)	104 (27.5)
2. Are you aware that there is currently no cure for TS?	24 (6.3)	53 (14)	96 (26.4)	70 (18.5)	135 (35.7)
3. Have you ever heard of tics as a symptom?	55 (14.6)	63 (16.7)	80 (21.2)	69 (18.3)	111 (29.4)
4. Are you aware that emotions can affect tics?	26 (6.9)	85 (22.5)	93 (24.6)	71 (18.8)	103 (27.2)
5. Are you aware that the appearance of TS is normal?	66 (17.5)	88 (23.3)	96 (25.4)	58 (15.3)	70 (18.5)
6. Are you aware that TS affects 1% globally?	9 (2.4)	21 (5.6)	72 (19)	98 (25.9)	178 (47.1)

n = Sample size, % = Percentage of total population

Table 4.4.3: General Awareness Towards TS of 85.2% of Participants That Responded to Nervous System of Health Science Students
Questionnaire Part 2.1: Health Science, n=125

Questions	Extremely aware n (%)	Very aware n (%)	Moderately aware n (%)	Slightly aware n (%)	Not aware at all n (%)
1. Have you ever heard of TS?	7 (5.6)	23 (18.4)	34 (27.2)	30 (24)	31 (24.8)
2. Are you aware that there is currently no cure for TS?	8 (6.4)	18 (14.4)	35 (28)	20 (16)	44 (35.2)

3. Have you ever heard of tics as a symptom?	22 (17.6)	28 (22.4)	24 (19.2)	15 (12)	36 (28.8)
4. Are you aware that emotions can affect tics?	9 (7.2)	31 (24.8)	32 (25.6)	18 (14.4)	35 (28)
5. Are you aware that the appearance of TS is normal?	27 (21.6)	31 (24.8)	37 (29.6)	12 (9.6)	18 (14.4)
6. Are you aware that TS affects 1% globally?	4 (3.2)	7 (5.6)	21 (16.8)	38 (30.4)	55 (44)

n = Sample size, % = Percentage of total health science

Table 4.4.4: General Awareness Towards TS of 85.2% of Participants That Responded to Nervous System of Non-health Science Students
Questionnaire Part 2.1: Non-Health Science, n=197

Questions	Extremely aware n (%)	Very aware n (%)	Moderately aware n (%)	Slightly aware n (%)	Not aware at all n (%)
1. Have you ever heard of TS?	13 (6.6)	22 (11.2)	50 (25.4)	62 (31.5)	50 (25.4)
2. Are you aware that there is currently no cure for TS?	14 (7.1)	26 (13.2)	49 (24.9)	42 (21.3)	66 (33.5)
3. Have you ever heard of tics as a symptom?	23 (11.7)	31 (15.7)	47 (23.9)	46 (23.4)	50 (25.4)
4. Are you aware that emotions can affect tics?	14 (7.1)	45 (22.8)	51 (25.9)	40 (20.3)	47 (23.9)
5. Are you aware that the appearance of TS is normal?	32 (16.2)	48 (24.4)	47 (23.9)	35 (17.8)	35 (17.8)
6. Are you aware that TS affects 1% globally?	4 (2)	10 (5.1)	39 (19.8)	49 (24.9)	95 (48.2)

n = Sample size, % = Percentage of total non-health science

Table 4.4.5: Mean Score of General Awareness Towards TS Among Health Science and Non-health Science Students

	Health Science	Non-health Science
	Mean (sd)	Mean (sd)
General awareness towards Tourette syndrome	9.62 (6.294)	8.77 (5.887)

4.5 Awareness of the Symptom and Physical Tics of the Participants

Table 4.5.1 depicts the awareness of symptoms and physical tics among health science students and Table 4.5.2 illustrates the awareness of symptoms and physical tics among non-health science students. The maximum score for awareness towards symptoms is 8 while for physical tics is 20. From Table 4.5.3, the mean score for awareness towards symptoms of health science is 3.44 and for non-health science students is 3.09. While the mean score for physical tics of the health science students is 9.05 and for non-health science is 8.09. Participants have higher awareness towards symptoms and physical tics than general awareness. For extremely aware, the most respond rate was question 3 and question 4 which have 21.4% (n=30) and 22.1% (n=31).

Table 4.5.1: Awareness Towards TS Symptoms And Physical Tics of the Health Science Student

Questionnaire Part 2.2: Health Science

Questions	Extremely aware	Very aware	Moderately aware	Slightly aware	Not aware at all
	n (%)	n (%)	n (%)	n (%)	n (%)

1. Are you aware the main symptom of TS is a tic?	22 (15.7)	37 (26.4)	31 (22.1)	18 (12.9)	32 (22.9)
2. Are you aware that there are physical and vocal tics?	17 (12.1)	18 (12.9)	28 (20)	25 (17.9)	52 (37.1)
3. Physical tics – Blinking, eye rolling and grimacing	30 (21.4)	38 (27.1)	29 (20.7)	23 (16.4)	20 (14.3)
4. Shoulder shrugging and jerking of head and limbs	31 (22.1)	35 (25)	27 (19.3)	20 (14.3)	27 (19.3)
5. Jumping and spinning around (in a fixed position)	13 (9.3)	22 (15.7)	25 (17.9)	28 (20)	52 (37.1)
6. Touching objects or other people repeatedly	13 (9.3)	17 (12.1)	29 (20.7)	30 (21.4)	51 (36.4)
7. Hurt themselves by knocking or punching their head	23 (16.4)	35 (25)	20 (14.3)	25 (17.9)	37 (26.4)

n = Sample size, % = Percentage of total health science

Table 4.5.2: Awareness Towards TS Symptoms And Physical Tics of the Non-health Science Students

Questionnaire Part 2.2: Non-health Science

Questions	Extremely aware n (%)	Very aware n (%)	Moderately aware n (%)	Slightly aware n (%)	Not aware at all n (%)
1. Are you aware the main symptom of TS is a tic?	29 (12.2)	39 (16.4)	60 (25.2)	56 (23.5)	54 (22.7)
2. Are you aware that there are physical and vocal tics?	19 (8)	37 (15.5)	43 (18.1)	54 (22.7)	85 (35.7)
3. Physical tics – Blinking, eye rolling and	36 (15.1)	55 (23.1)	43 (18.1)	56 (23.5)	48 (20.2)

grimacing					
4. Shoulder shrugging and jerking of head and limbs	33 (13.9)	47 (19.7)	50 (21)	58 (24.4)	50 (21)
5. Jumping and spinning around (in a fixed position)	14 (5.9)	35 (14.7)	52 (21.8)	58 (24.4)	79 (33.2)
6. Touching objects or other people repeatedly	16 (6.7)	30 (12.6)	55 (23.1)	59 (24.8)	78 (32.8)
7. Hurt themselves by knocking or punching their head	33 (13.9)	49 (20.6)	43 (18.1)	56 (23.5)	57 (23.9)

n = Sample size, % = Percentage of total non-health science

Table 4.5.3: Mean Score of Awareness Towards TS Symptoms and Physical Tics Among Health Science and Non-health Science Students

Section 2.2	Health science	Non-health science
	Mean (sd)	Mean (sd)
Awareness towards TS symptoms	3.44 (2.587)	3.09 (2.467)
Awareness towards TS physical tics	9.05 (6.022)	8.19 (5.847)

4.6 Awareness of the Vocal Tics of the Participants

Table 4.6.1 illustrates the awareness towards vocal tics among health science students while Table 4.6.2 illustrates the awareness towards vocal tics among non-health science students. For all the questions of awareness towards vocal tics, the most responded answer was not aware at all. The highest responded to extremely aware was question 1 which is grunting and making animal sounds followed by questions 5 and 6. Most of the participants were not aware about

some TS patients will say bad words all the time which has 45% (n=63) from health science and 37% (n=88) from non-health science students. The maximum score for this section is 28. The mean score for health science students is 11.96 while for non-health science is 10.76.

Table 4.6.1: Awareness Towards TS Vocal Tics of the Health Science Students

Questionnaire Part 2.2: Health Science

Questions	Extremely aware n (%)	Very aware n (%)	Moderately aware n (%)	Slightly aware n (%)	Not aware at all n (%)
1. Grunting and making the animal sound	28 (20)	25 (17.9)	29 (20.7)	19 (13.6)	39 (27.9)
2. Sniffing sound	22 (15.7)	21 (15)	29 (20.7)	23 (16.7)	45 (32.1)
3. Whistling and making coughing sounds	24 (17.1)	18 (12.9)	26 (18.6)	25 (17.9)	47 (33.6)
4. Tongue clicking and throat-clearing sound	24 (17.1)	22 (15.7)	28 (20)	21 (15)	45 (32.1)
5. Saying random words and phrases	26 (18.6)	33 (23.6)	17 (12.1)	22 (15.7)	42 (30)
6. Repeating a sound, word or phrase	26 (18.6)	33 (23.6)	25 (17.9)	19 (13.6)	37 (26.4)
7. Saying bad words all the time	19 (13.6)	14 (10)	19 (13.6)	25 (17.9)	63 (45)

n = Sample size, % = Percentage of total health science

Table 4.6.2: Awareness Towards TS Vocal Tics of the Non-health Science Students

Questionnaire Part 2.2: Non-health Science

Questions	Extremely aware	Very aware	Moderately aware	Slightly aware	Not aware at all
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	n (%)	n (%)	n (%)	n (%)	n (%)
1. Grunting and making the animal sound	27 (11.3)	44 (18.5)	41 (17.2)	61 (25.6)	65 (27.3)
2. Sniffing sound	21 (8.8)	37 (15.5)	53 (22.3)	56 (23.5)	71 (29.8)
3. Whistling and making coughing sounds	22 (9.2)	29 (12.2)	55 (23.1)	55 (23.1)	77 (32.4)
4. Tongue clicking and throat-clearing sound	23 (9.7)	33 (13.9)	41 (17.2)	68 (28.6)	73 (30.7)
5. Saying random words and phrases	33 (13.9)	47 (19.7)	39 (16.4)	52 (21.8)	67 (28.2)
6. Repeating a sound, word or phrase	33 (13.9)	41 (17.2)	54 (22.7)	45 (18.9)	65 (27.3)
7. Saying bad words all the time	29 (12.2)	27 (11.3)	38 (16)	56 (23.5)	88 (37)

n = Sample size, % = Percentage of total health science

Table 4.6.3 Mean Score Awareness Towards TS Vocal Tics Among Health Science and Non-health Science Students

Section 2.2	Health science	Non-health science
	Mean (sd)	Mean (sd)
Awareness towards vocal tics	11.96 (9.2)	10.76 (8.364)

4.7 Awareness of the Risk Factors of the Participants

Table 4.7.1 and 4.7.2 illustrates the awareness towards risk factors among health science and non-health science respectively. It was noted that the awareness towards risk factors was alarmingly low. Among the 3

questions asked in this section, the lowest awareness among health science and non-health science was more males than female was suffering from TS. There are 52.1% (n=73) of health science students and 45.8% (n=109) of non-health science students were not aware at all. The maximum score for this section is 12. The mean score from Table 4.7.3 was lower among health science and non-health science students which is 3.16 and 3.33 respectively compared to other sections of the questionnaire.

Table 4.7.1: Awareness Towards TS Risk Factors Among Health Science Students

Questionnaire Part 2.3: Health Science

Questions	Extremely aware n (%)	Very aware n (%)	Moderately aware n (%)	Slightly aware n (%)	Not aware at all n (%)
1. Are you aware that TS can be passed down from family?	9 (6.4)	10 (7.1)	30 (21.4)	35 (25)	56 (40)
2. Are you aware that there is more male than female?	7 (5)	6 (4.3)	45 (18.9)	54 (22.7)	73 (52.1)
3. Are you aware that TS can be triggered by dopamine?	8 (5.7)	12 (8.6)	29 (20.7)	31 (22.1)	60 (42.9)

Table 4.7.2: Awareness Towards TS Risk Factors Among Non-health Science Students

Questionnaire Part 2.3: Non-health Science

Questions	Extremely aware	Very aware	Moderately aware	Slightly aware	Not aware
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	n (%)	n (%)	n (%)	n (%)	at all n (%)
1. Are you aware that TS can be passed down from family?	14 (5.9)	31 (13)	46 (19.3)	50 (21)	97 (40.8)
2. Are you aware that there is more male than female?	7 (2.9)	23 (9.7)	45 (18.9)	54 (22.7)	109 (45.8)
3. Are you aware that TS can be triggered by dopamine?	10 (4.2)	29 (12.2)	37 (15.5)	60 (25.2)	102 (42.9)

Table 4.7.3: Mean Score of Awareness Towards TS Risk Factors Among Health Science and Non-health Science Students

Section 2.3	Health science Mean (sd)	Non-health science Mean (sd)
Awareness towards TS risk factors	3.16 (2.979)	3.33 (3.255)

4.8 Awareness of Treatment of Participants

Table 4.8.1 and 4.8.2 depicts the awareness towards the treatment of TS among health science and non-health science students. The results showed that awareness of treatment for TS patients is the least in the questionnaire among health science and non-health science students. The maximum score for this section is also 12 while the mean score for health science and non-health science students is 2.59 and 2.63 respectively.

Table 4.8.1: Awareness Towards TS Treatment Among Health Science Students

Questionnaire Part 2.4: Health Science

Questions	Extremely aware n (%)	Very aware n (%)	Moderately aware n (%)	Slightly aware n (%)	Not aware at all n (%)
1. Are you aware that TS can be managed by CBT?	4 (2.9)	18 (12.9)	33 (23.6)	29 (20.7)	56 (40)
2. Are you aware that tics can be managed by Pimozide or Orap?	2 (1.4)	4 (2.9)	17 (12.1)	25 (17.9)	92 (65.7)
3. Are you aware that BOTOX injection can reduce the production of tics?	5 (3.6)	12 (8.6)	16 (11.4)	31 (22.1)	76 (54.3)

Table 4.8.2: Awareness Towards TS Treatment Among Non-health Science Students

Questionnaire Part 2.4: Non-health Science

Questions	Extremely aware n (%)	Very aware n (%)	Moderately aware n (%)	Slightly aware n (%)	Not aware at all n (%)
1. Are you aware that TS can be managed by CBT?	5 (2.1)	19 (8)	46 (19.3)	55 (23.1)	113 (47.5)
2. Are you aware that tics can be managed by Pimozide or Orap?	6 (2.5)	19 (8)	37 (15.5)	45 (18.9)	131 (55)
3. Are you aware that BOTOX injection can reduce the production of tics?	7 (2.9)	15 (6.3)	42 (17.6)	45 (18.9)	129 (54.2)

Table 4.8.3: Mean Score of Awareness Towards TS Treatment Among Health Science and Non-health Science Students

Section 2.4	Health science	Non-health science
	Mean (sd)	Mean (sd)
Awareness towards TS treatment	2.59 (2.732)	2.63 (3.071)

4.9 Interest Towards TS Education of Participants

The majority of the participants were interested in knowing more about TS which have 84.7% (n=320). And most of them preferred to know more about TS on social media at 69.1% (n=221) followed by the university at 32.1% (n=74), the radio station at 3.1% (n=10), television at 2.8% (n=9) and magazine with 1.9% (n=6).

Table 4.9.1: Interest Towards TS Education of Participants

Responses	Yes n (%)	No n (%)
Do you want to know more about TS?	320 (84.7)	58 (15.3)

Table 4.9.2: Preferred Medium of Communication for TS Education

Question: If yes from Table 4.9.1, which is your preferred medium of communication to receive information about TS?

Responses	n	%
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Social media	221	69.1
University	74	32.1
Magazine	6	1.9
Radio station	10	3.1
Television	9	2.8

4.10 Distribution of Level of Awareness of the Participants

Figure 4.10.1 illustrates the level of awareness toward TS among health science and non-health science students. The less than 62 column is the mark the respondent score is categorized as 'poor awareness' while 62 – 82 is moderate awareness and lastly the more than 82 is high awareness. There are 77.1% (n=108) of the health science students are having poor awareness compared to 81.1% (n=193) of the non-health science students are having poor awareness. For moderate awareness, the health science with 20% (n=28) is slightly higher than the non-health science with 16% (n=38). For high awareness, both health science and non-health science are having the same percentage which is 2.9% with n=4 and n=7 respectively.

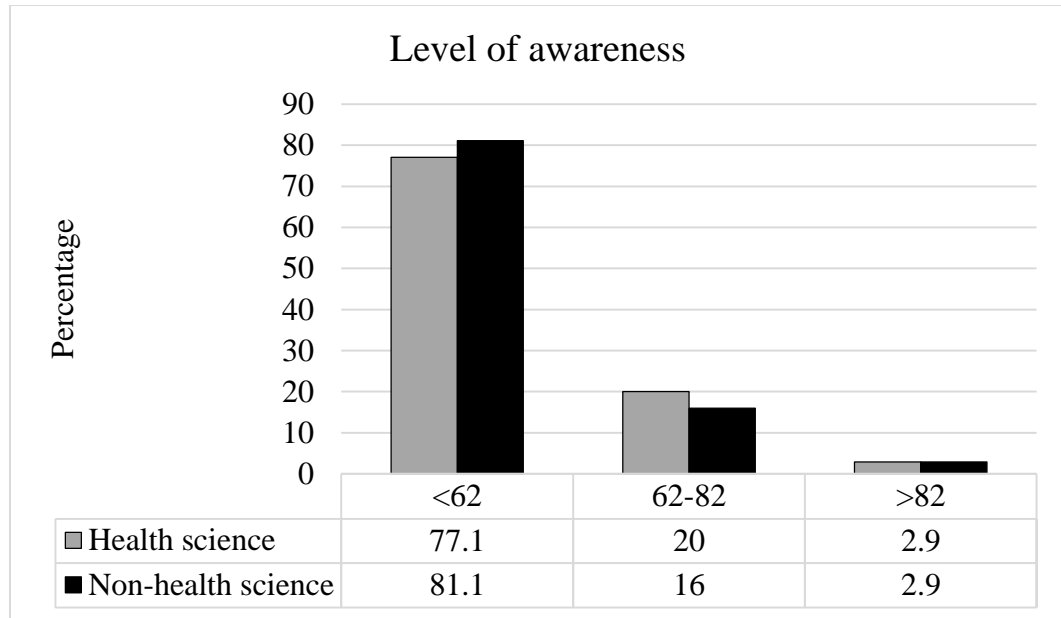


Figure 4.10.1: Level of Awareness Towards TS Among Health Science and Non-health Science Students

4.11 Association between Sociodemographic Variables and Level of Awareness Towards TS

Based on Table 4.11.1, a high respondent rate was from poor awareness which has the majority. The age group more or equal to 25 has the highest percentage of moderate awareness which is 37.5% and followed by the age group of 21-22, 19-20, 23-24 and 17-18. While for gender in Table 4.11.1, the results showed that females have slightly higher awareness towards TS compared to males.

The results of the Chi-square test ($X^2 = 10.606$, $p = 0.225$) for the age group showed that there was no statistically significant association between the age group and level of awareness as $p > 0.05$. Thus, the null hypothesis (H_{01}) failed to reject. There is no association between age group and level of awareness

towards TS among university students. While for gender, a Chi-square test ($X^2 = 1.655, p = 0.437$) was also performed and it showed that there was no statistically significant association between gender and level of awareness toward TS. Thus, the null hypothesis (H_{01}) also failed to reject.

Table 4.11.1 Association between Sociodemographic Variables and Level of Awareness

Variables	Level of Awareness			χ^2	df	p-value
	Good awareness n (%)	Moderate awareness n (%)	Poor awareness n (%)			
Age group						
17-18	2 (8.7)	2 (8.7)	19 (82.6)	10.606	8	0.225
19-20	6 (3.6)	27 (16.4)	132 (80)			
21-22	1 (0.7)	29 (19.5)	119 (79.9)			
23-24	2 (6.1)	5 (15.2)	26 (78.8)			
≥25	0 (0)	3 (37.5)	5 (62.5)			
Gender						
Male	2 (1.5)	23 (16.9)	111 (81.6)	1.655	2	0.437
Female	9 (3.7)	43 (17.8)	190 (78.5)			

A Chi-Square test was performed, level of significance at $p < 0.05$, df=degree of freedom

4.12 Association between Health Science and Non-health science Students and Level of Awareness Towards TS

According to Table 4.12.1, 77.1% (n=108) of the health science students have poor awareness towards TS followed by 20% (n=28) having moderate awareness and 2.9% (n=4) having good awareness. While for non-health science students, the highest respond rate is poor awareness with 81.1% (n=193) followed by moderate awareness with 16% (n=38) and good awareness with 2.9% (n=7). The results of the Chi-square test ($X^2 = 0.996$, $p = 0.608$) for health science and non-health science students showed that there was no statistically significant association between health science and non-health science students and level of awareness as $p > 0.05$. Thus, the null hypothesis (H_{01}) failed to reject. There is no association between health science and non-health science students and the level of awareness towards TS among university students.

Table 4.12.1 Association between Health Science and Non-health science Students and Level of Awareness

Variables	Level of Awareness			χ^2	df	p-value
	Good awareness n (%)	Moderate awareness n (%)	Poor awareness n (%)			
Health science	4 (2.9)	28 (20)	108 (77.1)	0.996	2	0.608
Non-health science	7 (2.9)	38 (16)	193 (81.1)			

A Chi-Square test was performed, level of significance at $p < 0.05$, df=degree of freedom

CHAPTER 5

DISCUSSION

5.1 Principal Findings

The first objective was to find the level of awareness towards TS among university students. Based on the findings of this study, the level of awareness is alarmingly low. The second objective is to find the association between sociodemographic variables (age and gender) and the level of awareness towards TS. The null hypothesis failed to reject. The next objective was to find whether there was any relationship between health science and non-health science students and the level of awareness towards TS. We fail to reject the null hypothesis.

5.2 General Awareness Towards TS and Sociodemographic Variables

The results obtained from this study indicated that there was no association between the level of awareness towards TS with sociodemographic variables (age, gender) among university students. Based on the results of the study, the prevalence of TS patients is 0.5%, which is similar to a meta-analysis done by Jafari et al on 2022 stated that adolescents have a prevalence of 0.7%. The response rate of females is higher than males as most replies in MTeams are from female participants.

Also, Year 1 and Year 2 participants dominate the questionnaire as they are not involved in interns or clinical posting. Another reason for the lower response rate for Year 3 onwards participants is that they did not check MTeams frequently as all lecture classes, posting and interns are converting to physical. While OCD in females is around 1.6 times higher than the male prevalence in females is 1.5% while the male is 1% which matches the data above stating that female prevalence is 1.6% (Fawcett, Power & Fawcett, 2020). The highest respond rate according to the course of study is Bachelor of Physiotherapy as it is easier to convince friends to fill in the questionnaire.

The mean score for health science students on part 2.1 of the questionnaire was 1.65 while for non-health science students was 1.51. Since TS is underrecognized and undertreated in most of the country (Alalwan et al, 2021). The results also showed that the level of awareness towards TS is relatively low among health science and non-health science students.

5.3 Awareness Towards Symptoms, Risk Factors and Treatment of TS Among University Students

The low awareness towards TS tics is due to the delay in the diagnosis of TS from the onset of tics with an average of 3 years. There are lack of clear care pathways for children and adolescents with tics and

TS. Inadequate care for children and adolescents with TS may result from a lack of integration in physical and mental health services for children and adolescents with TS care falling between this gap (Hollis et al, 2016).

The mean score for pimozide or Orap is alarmingly low, it is because according to Besag et al, 2021 stated that no medications are superior to any and have poor quality and short duration of most of the studies that had done previously. Also, there is a lack of evidence to determine whether adults respond differently from children. As it had not yet been clinically proven so there is low awareness among the public. The BOTOX injections have a positive effect on reducing the motor tics and frequency of the urge to perform the tics, however, there are no global measures of improvement of the tic severity. There is also low-quality evidence from one small cross-over trial that botulinum toxin significantly reduced the severity since there are few cases with adverse effects (Pandey et al, 2018).

5.4 Level of Awareness Towards TS among Health Science and Non-health Science Students

The result showed that the level of awareness towards TS among health science students was almost equal to the non-health science students. The maximum mark for the questionnaire was 104 score. The mean score for health science students was 39.83 and for non-health science was 36.77 which is around 36% of the total score. It is much lower than the score reported by Alalwan et al with an overall score of 61%.

There was no association between health science and non-health science students and their level of awareness towards TS. Although there was no statistically significant, we can see from the result that the female gender has a slightly better awareness than the male. Both health science and non-health science students showed a high interest in learning more about TS.

As the present study had a large proportion of Chinese participants, it is encouraged for further studies to involve a normally distributed ethnicity group to provide a more precise result regarding the relation of awareness towards TS with ethnicity.

CHAPTER 6

LIMITATION AND CONCLUSION

6.1 Limitations of the Study

There were several limitations acknowledged in the present study. Firstly, the unequal stratification of population size such as in the variables of age, gender, ethnicity and grade of study could potentially affect the accuracy of results most significantly when investigating the association factors between sociodemographic variables with the level of awareness towards TS. Furthermore, the present study had only recruited participants from one institution which is mostly Chinese and is not representative of the whole university student population in Malaysia. Besides, snowball sampling was used whereby the findings cannot be generalized to represent the whole population because this sampling method does not seem to have much effect on the data collection process. In the end, the sampling method was changed to convenient sampling. In addition, the instrument used for this study is a tailor-made questionnaire which is not used by any of the articles. Due to this, there is a high risk of misunderstanding and misinterpreting the questionnaire and this will lead to incorrect expressions from the respondent. Since the questionnaire was spread online, there was no way to supervise the participants as they

answered. Hence, there was a possibility of introducing bias into the present study.

6.2 Implications of the Study

The current study had not determined the association between variables and the level of awareness towards TS among university students. As TS prevalence had shown an incline growing rate, this study also provided the respondent with some information regarding TS so that in the future they will have some knowledge when they encounter a TS patient. Furthermore, the TS patient would not be excluded from society as many people have knowledge and empathy towards TS patients. Future research should be explored beyond this study to maximize the data collection in different populations.

6.3 Recommendations

Future research is encouraged to recruit participants equally from a sociodemographic view and cover different institutions or different populations to make the findings more generalizable. Random sampling is also recommended to improve generalizability. Lastly, future investigations are recommended to carry out as a face-to-face questionnaire to better study the awareness towards TS more effectively as respondents can ask questions and understand on the spot. Future studies

can also include physicians from different hospitals or clinics to investigate the level of awareness.

6.4 Conclusion

There was no association between any of the variables discussed above and the level of awareness toward TS even after the data of gender, age as well as health science and non-health science being normally distributed. The students from health science as well as non-health science students in a private university have alarmingly low awareness towards TS. In medical education, there should be more time for learning TS and tics disorder which would help the health science students to understand more about TS and the differential diagnosis. Most importantly, more studies about TS should be conducted in the future.

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APPENDIX A



UNIVERSITI TUNKU ABDUL RAHMAN

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Re: U/SERC/224/2022

4 November 2022

Mr Muhammad Noh Zulfikri Bin Mohd Jamali
 Head, Department of Physiotherapy
 M. Kandiah Faculty of Medicine and Health Sciences
 Universiti Tunku Abdul Rahman
 Jalan Sungai Long
 Bandar Sungai Long
 43000 Kajang, Selangor

Dear Mr Muhammad Noh,

Ethical Approval For Research Project/Protocol

We refer to your application for ethical approval for your students' research project from Bachelor of Physiotherapy (Honours) programme enrolled in course UMF3026. We are pleased to inform you that the application has been approved under Expedited Review.

The details of the research projects are as follows:

No	Research Title	Student's Name	Supervisor's Name	Approval Validity
1.	Knowledge and Attitude Towards Overweight and Obesity Among Physiotherapy and Medical Students: A Cross-Sectional Study	Ching Yung Shan	Mr Muhammad Noh Zulfikri Bin Mohd Jamali	4 November 2022 – 3 November 2023
2.	Effects of Different Gluteal Strengthening Programs on Strength, Pain, Functional Disability and Balance Among University Students with Non-specific Chronic Low Back Pain: A Randomized Controlled Trial	Lee Kah Yi		
3.	Effects on Menstrual Cycle on Dynamic Balance and Muscle Strength Among Recreational Players	Ler Chai Hong		
4.	Knowledge and Awareness Towards Pneumonia Among UTAR Non-Health Sciences Undergraduate Students	Chooi Yan Yee	Prof Nurul Husna Binti Khairuddin	
5.	The Effect of Active Video Games on 6-Minute Walk Test in Overweight and Obese Children	Chin Jay Ven		
6.	Association of Functional Ability of Upper Extremity and Scoliosis Among College Students: A Correlational Study	Sammi Leong Sing Yee	Dr Deepak Thazhakkattu Vasu	
7.	A Correlation Study Between Achilles Tendon Contracture and Posterior Tibial Tendon Dysfunction on Ankle Instability Among Young Adults with Pes Planus	See Wan Ni		
8.	A Correlational Study of the Relationship Between Flat Foot with Anterior Pelvic Tilt and Sacroiliac Joint Dysfunction Among Undergraduate Students	Tan Bee Thong		
9.	Association Between Physical Activity, Learning Style and Academic Performance Among UTAR Health Science Undergraduates	Yeoh Zhe Yi	Ms Kamala a/p Krishnan	

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 Tel: (603) 9086 0288 Fax: (603) 9019 8868
 Website: www.utar.edu.my



No	Research Title	Student's Name	Supervisor's Name	Approval Validity
10.	Comparison of Immediate Effect of Soft Tissue Manipulation (STM) and Ice Massage in Mechanical Neck Pain	Wong Hui Lin	Ms Kamala a/p Krishnan	4 November 2022 – 3 November 2023
11.	Association Between Forward Head Posture and Screening Programme of Scoliosis Among UTAR Undergraduate Students	Wong Shi Yi		
12.	Prevalence of Low Back Pain and Its Association with Ergonomic Usage Among UTAR Students	Ian Lee Haorong	Ms Swapneela Jacob	
13.	Awareness, Knowledge and Attitude Towards Artificial Intelligence in Learning Among Faculty of Medicine and Health Science (FMHS) Students in UTAR	Hwang Ji Yen	Co-Supervisor: Mr Tarun Amalnerkar	
14.	Awareness & Knowledge of Breathing Exercise as Covid-19 Management Among UTAR Students	Low Wai Kit	Ms Meneka Naidu a/p Mohanraja	
15.	Awareness on the Adverse Effects of Vaping on Health Among UTAR Students	Lim Yu Hui		
16.	Awareness Towards Bell's Palsy Among University Students	Pong Jia Shan		
17.	The Impact of Ocular Exercises on Headache Symptoms and Sleep Quality Among University Students with Refractive Error	Pea Wan Theng	Ms Kiruthika Selvakumar	
18.	A Study to Analyze the Impact of Balance Exercise Improving Hand to Eye Coordination Among University Students in Selangor	Ong Wesley		
19.	Prevalence of Adolescent Migraine in Malaysia and The Common Triggers for It: A Cross-Sectional Study	Ong Chua Chyi		
20.	Correlation Between Carrying Angle of Elbow and Upper Limb Flexibility Among Basketball Players	Gienisha a/p Thanapalan	Ms Siti Hazirah Binti Samsuri	
21.	Correlation Between Lower Limb Alignment and Patellofemoral Pain Syndrome Among Badminton Players in UTAR	Hee Ziyu		
22.	Effectiveness of Mindfulness Meditation on Blood Pressure and Resting Heart Rate Among Pre-Hypertensive Young Adults	Toh Jen Min	Mr Imtiaz Ali Mir	
23.	Comparison of Combined Effect of Aerobic Exercise Training and DASH Diet with DASH Diet Alone on Blood Pressure and Resting Heart Rate Among Physically Inactive Pre-Hypertensive Young Adults	Toh Xue Ying		
24.	Effectiveness of Continuous Moderate-Intensity Training and Mindfulness Meditation on Blood Pressure and Resting Heart Rate Among Physically Inactive Pre-Hypertensive Young Adults	Wan Cai Hui		
25.	Comparison between Inclined Treadmill Sprint Training and Plyometric Exercise in Improving Sprint Performance Among Healthy Young Adults	Jasmine Song WenHui	Ms Premala a/p Krishnan	
26.	Effect of Pilates-Based Exercise on Young Adults with Patellofemoral Pain	Jesslyn Ng Jee Cheng		
27.	Association Between Quadriceps Angle and Hamstring Flexibility with Knee Injuries Among Weight Lifters	Teh Wei Ze	Ms Ambusam a/p Subramaniam	
28.	Knowledge, Awareness and Perception of Prostate Cancer Among Undergraduate in University Tunku Abdul Rahman (UTAR)	Tan Kean Guan		
29.	Prevalence of joint Hypermobility and Association with Musculoskeletal Injuries Among University Students in UTAR	Khor Suky	Mr Nizar Abdul Majeed Kutty	
30.	Association of Social Physique Anxiety with Physical Activity and Body Image Satisfaction Among University Students: A Cross-sectional Study	Lau Hong Jie		

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Tel: (603) 9086 0288 Fax: (603) 9019 8868
Website: www.utar.edu.my



No	Research Title	Student's Name	Supervisor's Name	Approval Validity
31.	Association of Postural Awareness with Sedentary Behavior and Back Pain During the Hybrid Study Among Undergraduate Students	Low Xin Yuen	Mr Martin Ebenezer Chellappan	4 November 2022 – 3 November 2023
32.	Impact of Social Media Addiction on Physical Activity Among Undergraduate Students	Mak Kai Nan		
33.	Tibial Torsion and Leg Length Discrepancy in Idiopathic Scoliosis Among UTAR Students	Khoo Wan Qi		
34.	Prevalence of Patellofemoral Pain Among University Students	Khoo Wen Han	Pn Nadia Safirah Binti Rusli	
35.	Prevalence of Varicose Veins Among Fast Food Employees in Cheras, Selangor: A Cross Sectional Study	Ropheca Phuah Su Hui		
36.	The Effect of Unstable Modified Wall Squat on Dynamic Balance Among Recreational Athletes	Chu Sin Jiet	Mr Sathish Kumar Sadagobane	
37.	Knowledge, Perception, and Attitude Towards Breast Cancer and Breast Self-Examination (BSE) Among Non-medical Private University Students	Foo Jes Mynn		
38.	Perception, Knowledge and Attitude Towards the Impact of Daytime Nap on the Risk of Stroke Among Non-Healthcare Undergraduate Students: A Cross-Sectional Study	Chan Chi Kuan	Mr Tarun Amalnerkar Co-Supervisor: Ms Swapneela Jacob	
39.	Awareness, Knowledge and Attitude Toward Orthostatic Hypotension Among Elderies	Ch'ng Hui Kee		
40.	Effect of TikTok on Student Learning Among Physiotherapy Students	Tan Eng Jing	Mr Avaniarban Chakkarapani	
41.	Awareness Towards Tourette Syndrome Among Health Science and Non-health Science Students in A Private University, Malaysia	Tan Kai Xuan		
42.	Effect of Scapular Retraction Exercise on Forward Head Posture Among University Students	Tay Kai Wei		
43.	Comparison Between Effect of Lower Limb Cyclic Stretching and Ballistic Stretching on Jumping Distance Among Undergraduate Students: A Comparative Study	Ng Zi Ru	Ms Mahadevi A/P Muthurethina Barathi	
44.	Relationship of Physical Activity with Anxiety and Depression Among University Students	Ong Aiwei		
45.	Gender Discrepancy and Its Association with Shoulder Pain Among Malaysian Recreational Badminton Players	Khoo Je-Yique	Pn Nur Aqiliriana Binti Zainuddin	
46.	Obesity, Eating Habits and Physical Activity Before and During Covid-19 Pandemic Among University Lecturers	Khoo Tze Sean		

The conduct of this research is subject to the following:

- (1) The participants' informed consent be obtained prior to the commencement of the research;
- (2) Confidentiality of participants' personal data must be maintained; and
- (3) Compliance with procedures set out in related policies of UTAR such as the UTAR Research Ethics and Code of Conduct, Code of Practice for Research Involving Humans and other related policies/guidelines.
- (4) Written consent be obtained from the institution(s)/company(ies) in which the physical or/and online survey will be carried out, prior to the commencement of the research.

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Website: www.utar.edu.my



Should the students collect personal data of participants in their studies, please have the participants sign the attached Personal Data Protection Statement for records.

Thank you.

Yours sincerely,



Professor Ts Dr Faiz bin Abd Rahman
Chairman
UTAR Scientific and Ethical Review Committee

c.c. Dean, M. Kandiah Faculty of Medicine and Health Sciences
Director, Institute of Postgraduate Studies and Research



APPENDIX B

PERSONAL DATA PROTECTION NOTICE

Please be informed that in accordance with Personal Data Protection Act 2010 ("PDPA") which came into force on 15 November 2013, Universiti Tunku Abdul Rahman ("UTAR") is hereby bound to make notice and require consent in relation to collection, recording, storage, usage and retention of personal information.

1. Personal data refers to any information which may directly or indirectly identify a person which could include sensitive personal data and expression of opinion. Among others it includes:
 - a) Name
 - b) Identity card
 - c) Place of Birth
 - d) Address
 - e) Education History
 - f) Employment History
 - g) Medical History
 - h) Blood type
 - i) Race
 - j) Religion
 - k) Photo
 - l) Personal Information and Associated Research Data
2. The purposes for which your personal data may be used are inclusive but not limited to:
 - a) For assessment of any application to UTAR
 - b) For processing any benefits and services
 - c) For communication purposes
 - d) For advertorial and news
 - e) For general administration and record purposes
 - f) For enhancing the value of education
 - g) For educational and related purposes consequential to UTAR
 - h) For replying any responds to complaints and enquiries
 - i) For the purpose of our corporate governance
 - j) For the purposes of conducting research/ collaboration
3. Your personal data may be transferred and/or disclosed to third party and/or UTAR collaborative partners including but not limited to the respective and appointed outsourcing agents for purpose of fulfilling our obligations to you in respect of the purposes and all such other purposes that are related to the purposes and also in providing integrated services, maintaining and storing records. Your data may be shared when required by laws and when disclosure is necessary to comply with applicable laws.
4. Any personal information retained by UTAR shall be destroyed and/or deleted in accordance with our retention policy applicable for us in the event such information is no longer required.

5. UTAR is committed in ensuring the confidentiality, protection, security and accuracy of your personal information made available to us and it has been our ongoing strict policy to ensure that your personal information is accurate, complete, not misleading and updated. UTAR would also ensure that your personal data shall not be used for political and commercial purposes.

Consent:

6. By submitting or providing your personal data to UTAR, you had consented and agreed for your personal data to be used in accordance to the terms and conditions in the Notice and our relevant policy.
7. If you do not consent or subsequently withdraw your consent to the processing and disclosure of your personal data, UTAR will not be able to fulfill our obligations or to contact you or to assist you in respect of the purposes and/or for any other purposes related to the purpose.
8. You may access and update your personal data by writing to us at _____.

Acknowledgment of Notice

- [] I have been notified and that I hereby understood, consented and agreed per UTAR above notice.
- [] I disagree, my personal data will not be processed.

.....
Name:
Date:

APPENDIX C

INFORMED CONSENT FORM

AWARENESS TOWARDS TOURETTE SYNDROME (TS) AMONG HEALTH SCIENCE AND NON-HEALTH SCIENCE STUDENTS IN A PRIVATE UNIVERSITY

You are invited to participate in a research study conducted by Tan Kai Xuan from Bachelor of Physiotherapy (Hons) Universiti Tunku Abdul Rahman (UTAR), Sungai Long Campus. This study aims to assess the awareness towards Tourette Syndrome (TS) among health science and non-health science students in UTAR.

Participation

Your participation in this study is completely voluntary and withdrawal from this study is allowed at any time. Your information and data will be kept confidential. All associated data collected will be immediately destroyed wherever possible.

To participate in this study, you must be

1. Studying foundation, undergraduate or postgraduate in UTAR Sungai Long and Kampar campus

In this questionnaire, you will be answering questions about awareness towards TS.

This questionnaire contains 3 sections:

1. Demographic data
2. Awareness towards TS
3. Interest towards TS

Benefits and Risk

Participants will receive a pamphlet regarding TS after the research is done.

There is no risk in participating this questionnaire.

Should you have any enquires regarding the study, please feel free to contact me at:

Email: luffy000416@lutar.my

Contact number: 012-5856575

Signature:

Name of participant:

APPENDIX D

AWARENESS TOWARDS TS QUESTIONNAIRE

Section 1: Demographic Data

1) Gender:

Male ()

Female ()

2. Age:

- < or equal to 16

- 17-18

- 19-20

- 21-22

- 23-34

- > or equal to 25

3. Ethnicity:

Malay ()

Chinese ()

Indian ()

Other ()

4. Faculty:

Faculty of Arts and Social Science (FAS)

Faculty of Accountancy and Management (FAM)

Faculty of Business and Finance (FBF)

Faculty of Creative Industries (FCI)

Faculty of Engineering and Green Technology (FEGT)

Lee Kong Chian Faculty of Engineering and Science (LKC FES) F

Faculty of Information and Communication Technology (FICT)

M Kandiah Faculty of Medicine and Health Sciences (MK FMHS)

Faculty of Science (FSc)

Centre for Foundation Studies (CFS)

Institute of Chinese Studies (ICS)

Institute of Postgraduate Studies and Research (IPSR)

5. Course of study

Ans: _____

6. Year of study

- Year 1

- Year 2

- Year 3

- Year 4

- Year 5

- Other

7. Have you been diagnosed with Tourette's Syndrome (TS), Attention-Deficits/Hyperactivity Disorder (ADHD) or obsessive-compulsive disorder (OCD)?

() Yes

() No

8. Which of the following have you been diagnosed with? (Please skip if you choose no from Q7)

- TS

- ADHD

- OCD

9. Do you know anyone that is/are suffering from Tourette Syndrome?

- Yes

- No

- Maybe

Section 2.1 – General Awareness

Q1 Have you ever heard of Tourette syndrome?

- Extremely aware
- Very aware
- Moderately aware
- Slightly aware
- Not aware at all

Q2 In your opinion, which of the following system do you think is affected in TS patient?

- Respiratory system
- Nervous system
- Digestive system
- Circulatory system
- Musculoskeletal system

Q3 Are you aware that there is currently no cure for TS?

- Extremely aware
- Very aware
- Moderately aware
- Slightly aware
- Not aware at all

Q4 Have you ever heard of tics as a symptom?

- Extremely aware
- Very aware
- Moderately aware
- Slightly aware
- Not aware at all

Q5 Are you aware that all the emotions like anger, stress, sad, excited or nervous will affect the tics in TS?

- Extremely aware
- Very aware
- Moderately aware
- Slightly aware
- Not aware at all

Q6 Are you aware that appearance of TS patient is just same as normal person?

- Extremely aware
- Very aware
- Moderately aware
- Slightly aware
- Not aware at all

Q7 Are you aware that TS affects around 1% of the global population?

- Extremely aware
- Very aware
- Moderately aware
- Slightly aware
- Not aware at all

Section 2.2- Awareness on the symptoms

Number	Questions	Extremely aware	Very aware	Moderately aware	Slightly aware	Not at all aware
1.	Are you aware that the main symptoms of Tourette syndrome is tic					
2.	Are you aware that Tourette syndrome having physical tics and vocal tic					

Physical tics

Number	Questions	Extremely aware	Very aware	Moderately aware	Slightly aware	Not at all aware
1.	Do you know that the physical tics have blinking, eye rolling and grimacing?					
2.	Do you know that the physical tics have shoulder shrugging and jerking of head and limbs?					
3.	Are you aware that the physical tics have jumping and spin around?					
4.	Do you know that the physical tics is touching objects or other people repeatedly?					
5.	Do you know that the TS					

	patient will sometimes hurt themselves by knocking their head or punching themselves?					
--	---	--	--	--	--	--

Vocal tics

Number	Questions	Extremely aware	Very aware	Moderately aware	Slightly aware	Not at all aware
1.	Are you aware that the vocal tics have grunting and making animal sound?					
2.	Are you aware that the vocal tics have sniffing?					
3.	Are you aware that the vocal tics have whistling and coughing?					
4.	Are you aware that the vocal tics have tongue clicking and throat clearing?					
5.	Are you aware that the vocal tics have saying random words and phrases?					
6.	Are you aware that the vocal tics have repeating a sound, word or phrase?					
7.	Are you aware					

	that the vocal tic is saying bad words all the time?					
--	--	--	--	--	--	--

Section 2.3: Awareness on risk factors

Number	Questions	Extremely aware	Very aware	Moderately aware	Slightly aware	Not at all aware
1.	Do you aware of Tourette syndrome due to genetic pass from family					
2.	Do you aware of boys are more than girls in Tourette syndrome					
3.	Do you aware of Tourette syndrome can be trigger by abnormal breakdown of dopamine in brain					

Section 2.4: Awareness on treatment

Number	Questions	Extremely aware	Very aware	Moderately aware	Slightly aware	Not at all aware
1.	Do you aware of CBT can be part of treatment for TS patient					
2.	Do you aware that Pimozide/Orap can be used to control the tics in TS?					
3.	Do you aware that BOTOX					

	injection can help to reduce the tics in TS?					
--	--	--	--	--	--	--

*CBT – Cognitive behavioural therapy is a kind of talk therapy that help people to reframe their behavioural thoughts.

**BOTOX – Botulinum toxin is a protein that causes a certain muscle to reduce the activities.

Section 3 – Interest towards TS education

1. Are you interested in knowing more about TS

- yes

- no

2. If yes, which source do you prefer to know more about TS

- School
- Social media
- Magazine
- Radio station
- Others: Please state.....

APPENDIX E

Turnitin Originality Report



Turnitin Originality Report

AWARENESS TOWARDS TOURETTE SYNDROME (TS) AMONG HEALTH SCIENCE AND NON-HEALTH SCIENCE STUDENTS IN A PRIVATE UNIVERSITY
by Tan Kai Xuan

From Kinesiology (Assignment)

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