Original Article

A Comparative Study on the First-Day Interview Psychological Test of Medical Students with and without Mental Illness

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Background: Mental illness are common among medical students. Currently, there is increasingly emboldened literature around mental illness and suicide in medical students. More attention has begun to be paid about psychological screening of medical students.

Objective: To analyze whether or not the psychological test on the first day of interview can distinguish medical students without mental illness from those with mental illness.

Materials and Methods: A retrospective study was conducted in 115 medical students of the Faculty of Medicine, Srinakharinwirot University, Thailand. The psychological tests, 16 personality factors (PF) test, emotional intelligence (EQ) test, and draw a person test were used to measure psychological well-being of case group and control group on their first day of interview. There were 23 medical students with mental illness in the case group and 92 medical students without mental illness in the control group. Chi-square and Fisher's exact test were used to make the group comparisons.

Results: The results obtained from statistical analysis indicated that relationship was important predictor of mental illness. Most students (56.52%) have mental illness on the fourth year. The demographic data revealed that female medical students had suffered more mental illness (1.8 times than males). On group comparisons, there was no statistically significant difference in demographic data between the case group and the control group.

Conclusion: Mental illness appears to be common in medical students and varies by gender. Interpersonal relationship is an important predictor for mental illness in Thai medical students, and therefore, needs to be more carefully adopted when conducting psychological screening. A closer attention to applying more psychological tests that measure the students' relationship is suggested when planning to address the mental health of medical students.

Keywords: Medical students; The psychological test; Mental illness

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More medical students admitted into the Faculty of Medicine can be affected by intense competition in assessment-driven process and academic pressure of the intensive course of medicine and learning methods. As a result, medical students had suffered more mental problems[1,2],with the increase in the number of damage[3] in learning areas, such as having to repeat classes, wasting time, failing exams, failing grades, depression, and decreased self-worth. The medical students with mental illness may not be able to finish medical school or even if they graduate, they may be incapable of providing treatments, or lacking suitability for being a qualified doctor. If mental illness can be identified from the beginning of medical school, it could be interviewed early and therefore may not have many negative consequences afterward. Hence, there is a need for the research into valid and reliable psychological test that can help classify mental disorders at the first day of interview, and this will in turn can reduce the negative consequences and ensure better outcomes. Moreover, providing accurate psychological test is crucial in selecting suitable candidates for medical school.

However, there has been minimal information in current literature about psychological tests that accurately classify mental illness in Thai medical students. Therefore, the present study aimed to analyze the psychological tests of medical students on their first day of interview and to compare students with mental illness to those without mental illness.

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Materials and Methods

Study design and participant

This study was approved by the Human Ethics Committees of the Faculty of Medicine, Srinakharinwirot University, Bangkok, Thailand (240/60). Clinical trial number is TCTR20210222002.

Participants

All participants were recruited from the Faculty of Medicine, Srinakharinwirot University, Thailand. The participants were divided into case group and control group. The case group comprised 23 medical students who were diagnosed with mental illness by the Faculty of Medicine, Srinakharinwirot University's psychiatrists. The diagnosis were major depressive disorder, adjustment disorder, anxiety disorder, psychosomatic disorder, paranoid personality disorder, obsessive compulsive disorder, Asperger, schizophrenia, and suicidal ideation. There were five of second-year medical students, 13 of fourth-year medical students, four of fifth-year medical students, and one of sixth-year medical students. The inclusion criteria for the case group included all medical students that were diagnosed with mental illness from 2008 to 2018 by the psychiatrists and that they have to complete three psychological tests. The control group consisted of 92 medical students without mental health problems using random sampling method.

Methods

This study was a retrospective study. The demographic data and the psychological tests of the case and control groups performed on the first day of interview were analyzed. The psychological tests were 16PF, EQ, and Draw a person tests.

Personality test 16PF (Form A)

The Sixteen Personality Factor Questionnaire (16PF) is a self-report personality test developed by Cattle, using Factor Analysis research between 1935 and 1970 by using word focused on the basic elements of personality[4]. It has a personality application of approximately 4,000 words that Allport&Odbert collected[4] that divided in 180 groups and then use the collective term for a correlation of 45 groups, including an analysis of the composition until there are 12 factors (Factor A-O).

Later, Cattell added the non-analytical components, seeing that they were important in daily life and different from other elements obtained from elemental analysis. Therefore more elements were created, which made the 16 PF personality test a total of 16 elements known as element Q (Q1-Q4), and in turn gave rise to vital components of the present instrument[4].

The 16 PF explores individual difference in personality traits, and is widely used for career guidance in education. Including clinical practice which form A will be a standard test for adults over 16 years of age. The questionnaire consists of 187 questions, which take approximately 50 minutes to complete. This questionnaire was translated in Thai by Choopakdee P[5] and to find validity and arranged to closely match the original meaning of the questions. It has also been improved to conform to thai culture as much as possible and adjusted to be consistent with the living of Thailand[5]. In 1990, Faculty of Psychology, Department of Medical Services, Ministry of Public Health have improved and validated some questions in the test to make them more appropriate and validity.

The test was conducted to determine Split-Half reliability coefficient by Hall and Lindsay and found an average Cronbach's alpha of 0.80[6].

It is an objective test with a self-report questionnaire, including a total of 187 items. Each item is a descriptive text with three answer choices: yes, not sure, not choice (the Force-Choice Technique).

The test assesses the five personality elements:

1) Ego strength and self-control
2) Responsibility
3) Anxiety
4) Aggressive Technique or Hostility
5) Neurotic conflict (conflict and grieving)

The test time is 50 minutes, which can be self-administering.

Reliability & Validity

Abroad, form A, B have reliability 0.7 from split-half 0.8 method.

In Thailand, reliability 0.88 from test-retest method.

Validity - construct validity, criterion related validity.

Emotional intelligence (EQ) assessment

Emotional intelligence (EI) emerged as a psychological construct in 1990 by two psychologists, Peter Salovey and John D. Mayer who defined EI as "It is a form of social intelligence that consists of the ability to perceive one's own and others' emotions and feelings. They are able to differentiate the emotions that arise and use this information to guide our thinking and actions".

Later Daniel Goldman, a science journalist from New York Times and a PhD graduate from Harvard University has took this conceptual basis of EI seriously. He wrote a book entitled "Emotional Intelligence" and defined emotional intelligence as "multiple ability, control themselves to the goal. Have the ability to control their own conflicts, waiting to get better results, have empathy for others, able to deal with various emotional discomfort and live in hope".

After Daniel Goldman's book, Emotional Intelligence went public, people are becoming more interested in emotional intelligence. Along with recent research, there has been extensive research confirming the importance of emotional intelligence[7].

The Department of Mental Health therefore developed the concept of emotional intelligence that consists of 3 important factors: smartness, goodness, happiness. They recognized the importance of emotional intelligence and

created an assessment form for people to use to assess themselves. The emotional Intelligence Questionnaire can be used for testing from 12 to 60 years of age and consisted of 52 questions, and classified into 3 sub-areas: smartness, goodness and happiness. Emotional intelligence differentiates people with high emotional intelligence from low emotional intelligence. In this evaluation, Alpha accuracy values for smartness, goodness, happiness and average emotional intelligence were 0.75, 0.76, 0.81, and 0.85 respectively and the Split-Half reliability of smartness, goodness happiness and overall accuracy values were 0.83, 0.86, 0.71, and 0.84, respectively. Among the sex variables, there were no statistically significant differences in the overall mean score of men and women, and in all 3 aspects. For the age scale variables, it was found that the low age group had mean score for overall emotional intelligence and the mean scores in all 3 aspects were significantly lower than those with the higher age group. In the status variable, it was found that the subjects with marital status had mean scores on overall emotional intelligence and mean scores on smartness and happiness were higher than those who were single, widowed, divorced or separated. As for job position variables, it was found that executive positions had mean scores for overall emotional intelligence, and the average score of smartness and happiness were significantly higher than that of the operator level. In conclusion, these series of Emotional Intelligence Assessments have the discriminatory power that can distinguish between high and low emotional intelligence in three areas: smartness, goodness and happiness. A low score does not mean that the person has a disorder. Rather, it is an indication that the person has self-awareness in order to continue to develop and improve his weaknesses in that area[8].

Projective drawing test

Florence Goodenough (1926) used the projective technique by painting the first "Draw-A-Man Test".

Buck (1948) developed HTP as a more complete tool for intelligence testing.

Karen Machover (1952) developed the DAP Test to study Personality and self-concept.

Dale Harris developed the Goodenough-Harris drawing test, which detailed scoring system.

Burns and Kaufman (1970) developed K-F-D (Kinetic Family Drawing) to assess family relationship and family dynamics.

Koppitz (1984) developed the cognition and emotion personality development assessment with a grading system.

Therefore, using a Projective Drawing test[9] to assess personality is important. The test allows a person to create theme, dynamics, attitudes and reflect feeling, content of thought, interpersonal conflict in his/her mind and his/her personality down on the picture drawn. This test aims to study personality by observations from the subject's drawing behavior and the picture that reflect emotions, thoughts, conflicts, attitudes towards the outside world and experiences in the past. It can be used in both children and adults and can be done both individually and in groups. Caution is that it cannot be tested on people with visual problems such as visual impairments[9].

Each psychological test can indicate an abnormality. According to clinical psychology test standards, Clinical psychologists are required to perform at least three tests on the subject to confirm that the abnormalities found in each test are consistent. The 16 PF test was used as the main test. The EQ test and the Draw a person Test were utilized as joint tests.

All 3 tests were analyzed and classified into 6 domains as follows:

1) Emotional stability
   C = emotional stability (high)
   Q3 = self-discipline (high)
   G = conformity (high)
2) Relationship
   A = easy to get along with others, warm nature, love to participate in activities (high)
   N = social skill, intelligent, shrewdness (high)
   Introvert, Extrovert = Passive, Active
3) Responsibility
   Q3 = Obey the rules, self-discipline (high)
   G = responsible, moral, conformity (high)
4) Reasonable
   B = intelligent, abstract thinking, high mental capacity (high)
   L = Skeptic, decision, suspiciousness (high)
   M = artistic, creativity, reasoning, imagination (high)
5) Tolerance
   B = intelligent, abstract thinking, high mental capacity (high)
   F = impulsivity (high)
   Q3 = Obey the rules, self-discipline (high)

Data from each five domains can were divided into 5 levels.

1. Very high, scores 9 to 10
2. High scores 7 to 8
3. Moderate scores 5 to 6
4. Low score 3 to 4
5. Very low, scores 1 to 2

6) Capability to study

- If there is a very low score in one domain, interpreted as 'having problem in learning medicine in the future'.

- If there are low score in one more than or equal to one domain or with moderate score in another domain, interpreted as 'may have problem in learning medicine in the future'.

Statistical analysis

The sample size was calculated using two groups - test difference of - 2 independent proportions.

Test of difference in 2 independent proportions (p_1, p_2)

p_1, p_2 = Proportion of case group, and control group in group 1 and 2

$p = (p_1 + p_2) / 2$

$$n_{case} = \left[\frac{z_1-\frac{\alpha}{2}\sqrt{\bar{p}\bar{q}\left(1+\frac{1}{r}\right)}+z_1-\beta\sqrt{p_1q_1+\frac{p_2q_2}{r}}}{\Delta}\right]$$

$P_1 = p(exposure \mid case)$, $q_1 = 1 - p_1$

$P_2 = p(exposure \mid control)$, $q_2 = 1 - p_2$

$$\bar{p} = \frac{p_1+p_2 r}{1+r}, \bar{q} = 1-\bar{p}, r = \frac{n_{control}}{n_{case}}$$

Substitute the p (exposure / control) value = 0.10.
Substitute the p (exposure / case) value = 0.40
Substitute the value r = 4.

The comparison of the demographic data of each group and the factors affecting mental disorders were evaluated by Chi-square and Fisher's exact Ttest.

Results

Demographic data showed the majority of the sample was female, 65.2% in the control group and 65.2% in the case group 89.1% of the parents in the control group were married and 78.3% of the parents in the case group were married. For the mean scores before admission to medical school 82.4% of the subjects in the control group and 73.9% in the case group had grade point average (GPA) ≥3.5. The results from Chi-square and Fisher's exact test analysis revealed no statistically significant difference (p>0.05). The demographic characteristics of participants and descriptive findings are presented in Table 1.

In comparisons of the mean scores of factors affecting mental health, the results revealed as follows: Emotional stability, the mean score of control group was more than the case group. Responsibility, the control group

Table 1. Demographic data of the case and control group

	Group		p-value
	Control n=92 (%)	Case n=23 (%)	
Gender			
Male	32 (34.8%)	8 (34.8%)	1.000[a]
Female	60 (65.2%)	15 (65.2%)	
Year of birth			
<1995	49 (53.3)	12 (52.2)	0.926[a]
≥1995	43 (46.7)	11 (41.8)	
Stay with			
Parent	85 (92.4)	20 (87.0)	0.416[b]
Non-parent	7 (7.6)	3 (13.0)	
Status of parent			
Marriage	82 (89.1)	18 (78.3)	0.177[b]
Single parent	10 (10.9)	5 (21.7)	
Level of study of father			
< Bacherlor degree	25 (27.8)	3 (13.0)	0.144[a]
≥ Bacherlor degree	65 (72.2)	20 (87.0)	
Missing	2	0	
Level of study of mother			
< Bacherlor degree	18 (20.5)	4 (17.4)	1.000[b]
≥ Bacherlor degree	70 (79.5)	19 (82.6)	
Missing	4	0	
Grade			
<3.5	16 (17.6)	6 (26.1)	0.381[b]
≥3.5	75 (82.4)	17 (73.9)	
Missing	1	0	

[a] = Chi-square; [b] = Fisher's exact test

was more than the case group. Reasonable, the control group was more than the case group. Tolerances were similar in both two groups. Capability to study, the control group was more than the case group. However, when the above factors were analyzed using the Fisher's exact test, there was no statistically significant difference found ($p>0.05$) (Table 2). For Relationship, the mean score of the control group was more than the case group and statistically significant ($p<0.05$), analyzed by Fisher's exact test (Table 2).

Discussion

The objective of this research was to analyze whether or not the psychological tests on the first interview day can distinguish medical students without mental illness from medical students with mental illness. This study found that the one domain that can predict mental illness during medical school, is relationship ($p<0.05$). This finding is consistent with the research by Katumarn P[10]. Common personality problems are other specific personality trait and disorders with an incidence of 2.8: 1,000 per year and anxious (avoidant) personality trait and disorder with an incidence of 1:1,000 per year. These personality problems caused interpersonal relationship problems that made medical students seek consultations from the psychiatrists at the counseling unit of Faculty of Medicine Siriraj Hospital between academic years 1982 and 2007. And this is consistent with the research by Limsricharoen K[11] and Ausavarungnirun R[12] Limsricharoen K found that the prevalence of depression evaluated from PHQ-9 (Thai version) was 19.6%. Factors associated with depression were family problems and partner relationship problem. Ausavarungnirun R found that the significant cause of stress of Srinakharinwirot University medical students are relationship with parents and ability to talk to trusted friends.

Therefore, the psychological tests of medical students on the first interview day are effective because their relationship domain can predict mental illness statistically significant difference ($p<0.05$) (Table 2). The relationship can in turn affect the medical students' ability to study medicine. So the prevention is adding training on human relation for medical students.

However, when the medical students were enrolled, there might be other factors that could impact the psychological changes during the study. Most of the case group developed mental illness on their 4th year of medical school. Although not investigated in this study, possible explanations that most medical students began to experience first onset of mental illness in the 4th year = 13 might be their inability to cope with potentially stressful experiences during clinical trainings. The students have to master the clinical skill requirements as well as cognitive maturity tasks such as social decision-making, self-control, and compliance skills. They also have to involve in interviewing and examining patients, laboratory examinations and writing

Table 2. Factors affecting mental health

Composition	Control n=92 (%)	Case n=23 (%)	p-value
Emotional stability			
High + moderate	82 (89.1)	20 (87.0)	0.722[b]
Low	10 (10.9)	3 (1 3 .0)	
Relationship			
High + moderate	81 (88.0)	14 (60.9)	0.005[b]
Low	11 (12.0)	9 (39.1)	
Responsibility			
Very high + high + moderate	86 (93.5)	19 (82.6)	0.111[b]
Low	6 (6.5)	4 (17.4)	
Reasonable			
High + moderate	79 (85 .9)	16 (69.9)	0.119[b]
Low	13 (14.1)	7 (30.4)	
Tolerance			
High + moderate	89 (96.7)	21 (91.3)	0.261[b]
Low	3 (3.3)	2 (8.7)	
Capability to study			
No problem	83 (90.2)	15 (65.2)	0.006 [b]
May have problem + have problem	9 (9.8)	8 (34.8)	

[b] = Fisher's exact test

reports. In addition to academic requirements, the 4th-year medical students are demanded to work with others in the wards including patients, mentors, senior doctors, nurses, and other medical personnel. In these contexts, many medical students may experience exacerbations of stress and depression.

The academic pressure and clinical responsibilities can make the medical education environment mentally demanding and challenging, which may result in more stress and psychological distress to build up in medical students. The findings were in line with previous studies that reported mental health problems in medical students become worse towards the end of medical education, this agrees with Kulsoom B[1] who found that higher levels of depression have been reported during internship and residency due to highly challenging environments as compared to other undergraduate years. The 4th year medical student who found the incidence of stress more than other years. This agrees with Kulsoom B[1] found that the fourth year had the highest depression and anxiety scores.

In addition, this study found female medical students had mental illness 1.8 times higher than males, which was agreed with Kunadison W[13] who found that female medical students had a 1.73 times higher risk of mental health problems than males and it was inconsistent with Katumarn P[10] and Paholpak S[14] Katumarn P[10] found that males had a higher rate of psychiatric problems (1.7 times higher than females, and 2.6 times more likely to develop personality problems than females). Paholpak S[14] found that males had more psychiatric problems than females. The incompatibility of this study's findings from previous studies that female students had higher rates of psychiatric problems than male students, may be due to having to deal with stressful circumstances of separation and individuation from their family, which may have more effects on females than males. So they must be closely monitored.

Conclusion

Findings from this study revealed that mental illness was more obvious in the fourth year of medical education and that mental illness was more common among female students. One domain of psychological screening tests that was significantly associated with mental illness was interpersonal relationship. Thus, the interpersonal relationship domain of psychological tests needs to be more carefully addressed when screening psychological well-being of medical students, and closer attention to its implication as an important predictor for later mental health problems may prevent negative consequences such as impaired competency and ensure better outcomes such as graduation.

What is already known on this topic?

Male medical students have higher rates of psychiatric problems. 1.7 times higher than females personality problems that are very common are Other specific Personality Trait and disorders and anxious (avoidant) personality trait and disorder[10].

What this study adds?

The factor that predicts mental health problems towards the end of medical education is interpersonal relationship. There should be a more detailed screening of human relations in psychological tests of medical students on the first day of interview.

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Potential conflicts of interest

The authors declare no conflict of interest.

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