Stress Resistance, Adaptability, and Emotional Stability of Medical Students Obtaining Categories 4 and 5 on the Psychometric Test and Related Factors

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Abstract

Background: In its effort to produce high quality graduates, the Faculty of Medicine University of Indonesia administered psychological tests to assess first year medical students' logical thinking skills and personality. The results of those tests are divided into 5 categories of recommendation, 1 to 5, based on the capability of the students to complete their studies. Fifty six point forty five percent of the students receiving recommendation categories 4 and 5, were considered as at-risk students who were predicted to have difficulties in completing their education. In addition, there were many non-academic factors that affect the learning process to achieve the clinical competence required by the Competence Standard for Indonesian Doctors.
Research Objectives: to study the psychological profile of students in the at-risk category and related factors, in which could affect the learning process.
Results: Using multivariable analysis, it was found that gender has a significant correlation to stress resistance and adaptability; motivation is significantly correlated to stress resistance and perseverance; whereas birth position has a significant correlation to stress resistance.
Conclusion: the psychological profile of medical students including their work attitude and personality as well as other related factors can be used as predictors of success in completing their education. Thus, support and guidance for students should be made available as early as possible in their medical education, particularly for those students in the at-risk category, to help them achieve clinical competence.

Key words: medical students, at-risk groups, psychological profile, clinical competence, stress resistance, adaptability, emotional stability

INTRODUCTION

In 2008 the Faculty of Medicine University of Indonesia administered psychological tests to obtain basic data on student reasoning capabilities and personality. These tests are administered in the first year of their studies. It is hoped that education managers will be able to use this data to design teaching methods in the framework of enhancing the quality of graduates, in accordance with the standard competence of Indonesian doctors (curriculum of the Faculty of Medicine University of Indonesia, 2005). Based on the tests, five recommendation categories were determined, namely 1) undoubtedly recommended; 2) recommended; 3) recommended with considerations; 4) doubtful; 5) not recommended. Students in recommendation categories 1 to 3 are categorized as no-risk students, whereas categories 4 and 5 are at-risk students (Menaldi, dkk., 2009, Santrock, 2009) which are predicted to face difficulties in completing their education.

Based on those psychological tests, it was found that 30 out of 186 students (16,13%) were in category 4, whereas 75 out of 186 students (40.32%) were in category 5. This means that the number of at-risk students was relatively big. However, in principle those students should get the same opportunities to achieve optimal academic performance (Syah, 2009). Thus, the at-risk groups of students should be given academic support services to be able to finish their studies.

Data derived from the counseling team for Medical Students, University of Indonesia (2009), showed that at-risk students face both academic as well as non-academic problems. Non-academic problems that occur are usually personal problems related to the family, finance, culture shock, unfulfilled interests, behavior, personality, and health. Such non-academic problems form part of the background which causes students to fail to achieve academic competence. In the light of this, a research into the at-risk groups was carried out to observe the psychological profile of these students as well as other related factors which are estimated to affect the learning process students go through to achieve competence at clinical level.

METHODS

This research employed a mixed method of quantitative and qualitative research methods. Respondents are 95 sixth semester medical students attending the regular class at the Faculty of Medicine, University of Indonesia, whose results in the psychometric test placed them in categories 4 and 5. In the initial stage, the respondents were given psychological tests and were requested to complete their personal information in the Life Environment sheet to in order to obtain a description of their: 1) Intelligence and general capability; 2) Working attitude including speed, accuracy, stress resistance and perseverance; 3) Personality which covers emotional stability and adaptability; and 4) Interests and motivation to excel. After that in-depth interview were conducted to 23 (24.2%) of the respondents which was carried out in March 2011.

The testing instrument used was the CFIT (Culture Fair Intelligence Test), Basic Capability Test, Kraepelin and SDS (Self-Directed Search) Holland and graphic tests. Those testing instruments have been standardized and produced by the Institute for the Development of Testing Instruments and Psychological Education (LPSP3)

Faculty of Psychology University of Indonesia. CFIT was used to assess intelligence using the following scales: 1) below average (80-89); 2) average (90-109); 3) above average (≥ 130). Other assessments were done using the five psychogram classification with a scale of 1-20, namely: 1) very poor or low (1-4); 2) poor (5-8); 3) sufficient (9-11); 4) good (12-15) and 5) very good or high (16-20).

The psychological test results were analyzed using a quantitative method to prove relations between variables. Dependent variables were speed, accuracy, stress resistance, perseverance, emotional stability and adaptability. Whereas the independent variables comprised gender, intelligence, interests, talents, motivation, learning behavior, life environment including age, birth position in family, place of residence and High school of origin. Statistical analysis was done in stages. First bi-variables followed by multivariable analysis using multiple linear regression analysis. All the statistical analysis was done using computer statistics software SPSS ver.11.5. In the following stage, the respondents went through an in-depth interview which was analyzed qualitatively to reinforce the quantitative tests (Creswell, 2003; Poerwandari, 2009).

RESULTS

Quantitative Analysis

The psychological tests produced psychological profiles of the respondents relating to talent, interests, motivation, working attitude and personality can be seen on table 1 and 2. Table 1 depicts the psychological profile of students in terms of talent, interest, motivation to excel and the learning behavior. Assessment of talent cannot be done only through one test. Higher percentages of female students (41.5% compared to 30%) were found at superior IQ levels. The SDS Holland test was used to assess vocational and educational interests based on individual personality, social, artistic, investigative, realistic, enterprising and conventional interests. Investigative interest ranks as the first interest for both male and female respondents, which the proportion of males is quite big (70%) and much bigger compared to that of female students (46.2%). Most of the respondents (82.26%) have sufficient motivation to achieve, whereas the rest (14.74%) lack this type of motivation. Through learning behavior, learning strategies/approaches, regularity, sufficient time allocated and time used to study, can be observed. Most of the respondents used a superficial learning approach (44.21%).

Table 1. Psychological profile of at risk respondents in terms of talent, interest, motivation to achieve/excel and learning behavior (N=95)

	Male		Female		Total	
Aspects	n	(%)	n	(%)	n	(%)
1. Talent						
a. Intelligence based on IQ (CFIT)						
Mean (90-109)	3	10,0%	6	9,2%	9	9,47%
Above average (110-119)	8	26,7%	11	16,9%	19	20%
Superior (120-129)	10	33,3%	21	32,3%	31	32,63 %

Very superior (130->145)	9	30,0%	27	41,5%	36	37,9%
b. General capability based on Kraepelin						
Sufficient (9 – 11)	3	10,0%	6	9,2%	9	9,47%
Good (12 – 15)	18	60,0%	32	49,2%	50	52,63 %
Very Good (16 – 20)	9	30,0%	27	41,6%	36	37,90 %
2. Interest based on SDS Holland test						
Social (S)	5	16,6%	19	29,3%	24	25,26 %
Artistic (A)	1	3,3%	11	16,9%	12	12,63 %
Investigative (I)	21	70,0%	30	46,2%	51	53,68 %
Realistic (R)	0	0%	0	0%	0	0%
Enterprising (E)	3	10,0%	4	6,2%	7	7,37%
Conventional (C)	0	0%	1	3,3%	1	1,05%
3. Motivation to Excel based on graphic tests						
Poor (5 – 8)	4	13,3%	10	15,4%	14	14,74 %
Sufficient (9 – 11)	26	86,7%	55	84,6%	81	85,26 %
4. Learning Behaviour based on life environment sheet						
Superficial	10	33,3%	32	49,2%	42	44,21 %
Deep	16	53,3%	19	29,2%	35	36,84 %
Achievement	4	13,3%	14	21,5%	18	18,95 %

Table 2 depicts the psychological profile of students in terms of work attitude and personality. Work attitude comprised work pace, meticulousness, stress resistance, and perseverance, whereas personality comprised emotional stability and adaptability. An analysis of work pace shows that 50.53% of the respondents are classified as 'good' which is the biggest psychogram classification; however, it was found that 8.42% of the respondents were in the 'poor' range. A greater part of the respondents (77.89%) were classified as sufficient, none were in the very good category (77.89%) in meticulousness. The percentage of females classified as very poor (1.54%) was lower than that of male respondents (3.33%). A greater number of the respondents have quite good stress resistance (83%) and the rest poor (16.84%), with all male respondents have sufficient stress resistance. In term emotional stability, it showed that both female and male respondents were classified as poor (41.05%) to sufficient (58.95%) in this aspect. The proportion of males with poor emotional stability was relatively smaller than females. In adaptability of personality, it was found that 57.90% of the respondents were in the sufficient classification and 42.10% in the poor classification. Fewer male respondents (40%) classified as sufficient compared to females (66.15%).

Table 2. Psychological Profile of work attitude and personality of the at-risk group (N = 95)

Aspect	Male		Female		Total	
	n	(%)	n	(%)	n	(%)
Work attitude						
Work pace						
Poor	3	3,16%	5	5,26%	8	8,42%
Sufficient	8	8,42%	21	22,10%	29	30,52%
Good	12	12,63%	36	37,90%	48	50,53%
Very good	7	7,37%	3	3,16%	10	10,53%
Meticulousness						
Poor	1	1,05%	1	1,05%	2	2,11%
Sufficient	2	2,11%	6	6,32%	8	8,42%
Good	25	26,31%	49	51,58%	74	77,89%
Very Good	2	2,11%	9	9,47%	11	11,58%
Stress Resistance						
Poor	0	0%	16	16,84%	16	16,84%
Sufficient	30	31,58%	49	51,58%	79	83,16%
Perseverance						
Poor	10	10,53%	15	15,79%	25	26,31%
Sufficient	20	21,05%	50	52,63%	70	73,69%
Personality						
Emotional Stability						
Poor	13	13,68%	26	27,37%	39	41,05%
Sufficient	17	17,90%	39	41,05%	56	58,95%
Adaptability						
Poor	18	18,95%	22	23,16%	40	42,10%
Sufficient	12	12,61%	43	45,26%	55	57,90%

Based on Table 3, it can be concluded that gender has a significant effect on stress resistance as a work attitude ($p = 0.003$), as well as adaptability which is a personality trait ($p = 0.016$). Motivation to excel has a significant effect on stress resistance ($p = 0.041$) and perseverance ($p = 0.001$). Position of birth in the family ($p = 0.030$) has a significant effect on stress resistance ($p = 0.030$), and tends to be correlated to emotional stability and adaptability ($p = 0.116$). IQ ($p = 0.062$), interest ($p = 0.157$) and talent ($p = 0.143$) tend to correlate to meticulousness as a working attitude. The respondent's age tends to correlate to working pace ($p = 0.146$). High school of origin also affects stress resistance ($p = 0.183$).

Table 3. Factors affecting the work attitude and personality of the at-risk group of students. (N = 95)

Variable	Work Attitude				Personality	
	Pace	Meticulous- ness	Stress Resistance	Perseverance	Emotional Stability	Adaptability
Gender	0,757	0,910	**0,003***	0,291	0,759	**0,016***

IQ	0,623	0,062	0,293	0,228	0,859	0,623
Talent	0,424	0,143	0,673	0,553	0,965	0,461
Interest	0,653	0,157	0,577	0,798	0,670	0,744
Motivation	0,389	0,655	**0,041***	**0,001***	0,882	0,069
Learning behavior	0,788	0,594	0,765	0,587	0,683	0,777
Age	0,146	0,651	0,766	0,286	0,782	0,235
Birth position	0,580	0,602	**0,030***	0,636	0,116	0,116
Place of Residence	0,249	0,800	0,457	0,741	0,539	0,320
Original School.	0,668	0,432	0,183	0,872	0,266	0,471

* $p < 0,05$

Qualitative analysis of research results

In-depth interviews were held with 23 (24.2%) respondents and were carried out by three independent psychologists. The results were written up in the form of an interview report and the themes obtained from the psychological interview reports are as follows.

Interests. Data obtained from the life environment sheets and the results of the interview could strengthen the results of the psychological tests. All the respondents clearly understood that a doctor's profession is a helping profession, as found in the following excerpts from the interviews

> ".....another thing that attracted him is the fact that in this field it is possible to help many people..." WPsi2/K/ar/e/26;22-24).
>
> ".....her desire to help other people made him choose medical science." "(WPsi2/H/ar/k/20;1-2).
>
> ".....her ambition is to establish a hospital for marginal people...." (WPsi2/K/ar/e/33;2-4).
>
> "......ever since she was in high school he was interested in health matters. Becoming a member of the Red Cross Youth developed this interest further. (WPsi2/D/ar/e/31;2-5).

The quotations above show that the great interest to become a medical doctor developed in early in the respondents' life. This interest grew stronger with their daily life experiences. This interest in medicine helps the students to finish their studies successfully as they are fully aware of their responsibilities during their medical education.

Motivation. Data on respondents' motivation to take up medicine at the faculty of medicine was obtained through the life environment sheets. 63.16% of the respondents, both males and females, have very good internal motivation to support their studies. In general, respondents with good internal motivation also have external motivation which supports their efforts to complete their studies. 29.47% of the respondents seemed be without any motivation, both internal and external motivation.

7.37% only had external motivation. Positive internal motivation themes found in the interviews are as follows:

> **"..**The reason for choosing the faculty of medicine was to improve the status of the family, because she believes that becoming a doctor is the highest profession. (WPsi2/ E/ar/e/04;5-8).

> "...My role model was my pediatrician when I was still in Bandung. The doctor was very pleasant and it was nice to talk to me, he made me feel comfortable not like the other doctors he had experienced. Those doctors were so different from the pediatrician. .." (WPsi2/K/ar/k/05;7-11).

Interviews with the respondents showed a lack of internal motivation but a strong external motivation as shown by the following excerpts:

> "...at first I was thinking of taking chemical engineering rather than medical science. ... However, during entrance examination preparation classes my teacher told me that the medical faculty would be a good choice for me. (WPsi2/ E/ar/e/06;1-6).

> "...Actually becoming a doctor was not my ambition when I was a child... my father planted this ambition in me... he told me the reasons, he gave me input and he urged me strongly to become a doctor. ...(WPsi2/H/ar/k/62;1-5).

Students with little internal motivation could perhaps complete their studies successfully if they get strong support from the environment. However, there were also students with sufficient internal motivation reinforced by external motivation, as seen in the following excerpts from the interviews:

> ".....his motivation to study medicine is that he believes that a medical doctor is very esteemed profession and he/she would like to have a doctor in his/her family..." (WPsi2/G/ar/e/17;6-8).

> ".....her parents really wanted one of their children to become a doctor; nevertheless, none of her elder brothers or sisters want to be a doctor. This is why she chose to study to become a doctor and this desire was supported by her family....." (WPsi2/D/ar/e/31;6-10).

Learning Behavior. The learning behavior of the respondents can be seen from the way they learn and the learning approach that they have chosen. Male and female respondents have their own approach to learning which varies a great deal, as reflected in the excerpts from the reports on the interviews:

> "...when he goes home in the evening, he goes to bed at 9 or 10 and then wake up at 3 o'clock in the morning to study. The learning strategy that he uses to study is by taking down notes while reading..." (WPsi2/I/ar/k/35;15-18).

> "...Although he does not have a daily and regular routine for studying, he/she usually sets aside time to study intensively when examination time approaches...." (WPsi2/I/ar/e/19;32-35).

> "...She realizes that it is easier for him/her to understand material by listening to people explain the material..." (WPsi2/D/ar/e/31;22-24).

> "...He also often explains material to friends when they are studying together as he/she thinks that by doing this he/she can understand the material much easier..." (WPsi2/K/ar/k/05;25-28).

> "...Learning by doing short screening, 1 or 2 days before the examinations he will study with friends. (WPsi2/K/ar/k/13;25-27).

Life environment. Based on personal and family data obtained from the life environment sheet, a majority of the respondents are first born. Based on that fact, it is expected that the respondents are more independent and have a bigger sense of responsibility which will enable them finish their studies. Nevertheless, independence and responsibility are also affected by environment. The following are excerpts from the interview reports conducted which show the effect of birth position on their studies:

> "...she did not desire to become a medical doctor; however, because of pressure from his/her family he/she finally decided to become a doctor..." (WPsi2/H/ar/e/34;20-22).

> "…In his family MFA is the first born of three siblings. At present his family is living in Germany... He always wanted to become a doctor." (WPsi2/K/ar/e/26;1-4).

The excerpt above shows that the responsibility that the first born shows towards his/her family and his/her decision to study to become a doctor, often overcomes his/her own ambitions. Nevertheless, quite a few of them chose to study medicine because of their own ambition to become a doctor, as well as patterns and habits that have been formed in the family, as seen from the following excerpts:

> "...AF is the third child of five siblings. He always wanted to study medicine..." (WPsi/I/ar/e/19;1-3).

> "...she is the youngest daughter in her family. Her father is a doctor. She has been exposed to the medical profession ever since she was a child and thus she became interested n becoming a medical doctor..." (WPsi2/H/ar/k/21;1-4).

Based on data about place of residence it was found that those respondents who did not live with their parents generally lived around the campus in boarding houses or rented rooms. Most of the respondents coming from Jakarta and the surrounding areas live in rented rooms during the week and go home to their parents on weekends or holidays. Female respondents generally live with their parents even though many of them complain about the distance they have to travel to get to campus as well as the transportation and the traffic jams in Jakarta. On the other hand, living in rented rooms, students still had other problems to cope with, among others the lack of internet connection. Although in terms of residence, student boarding houses are still very popular because they are cheap, breakfast is provided and internet connections are available. The short distance between their rooms and the campus can reduce physical fatigue and can save their time and energy. Thus the place of residence of the respondents does not pose problems in their education.

Excerpts from the interview reports show the various problems that occurred are related to family and living environment as well as social environment. These can affect the study pattern of the students in either a negative or positive way.

"...When her parents who lived in another city came to visit him/her, it was difficult for him/her to manage his/her time..." (WPsi2/D/ar/k/07;19-21).

"...Although he lives far from the family, he is still aware of the great support that he/she received from the family ..." (WPsi2/K/ar/e/26;38-40).

"...After the death of her mother, she felt a lot of pressure and family problems often disturbed his/her focus and concentration on learning..." (WPsi2/D/ar/e/31;45-48).

"...he had problems in socializing especially adapting himself to the environment due to the difference in cultural backgrounds which resulted in students forming groups..." (WPsi2/I/ar/e/19;18-21).

"...My parents are always there when I am down and they are always ready to listen. They also always give their support by listening and giving motivation..." (WPsi2/G/ar/e/35;45-48).

"...Usually the support of friends, who have been struggling together ever since they entered the Faculty of Medicine. is very helpful to revive their spirit to learn..." (WPsi2/K/ar/k/32;48-51).

Based on the excerpts above, it can be concluded that non-academic factors affect the learning process in both s positive and negative way.

Discussion

The mixed method, which used in this research, will integrate, link and analyze quantitative and qualitative data (Creswell, 2003). The quantitative approach makes use of certain standards that are not applicable to research into behavior (Poerwandari, 2009). Thus, the advantage of using this approach is that the qualitative approach can be used to reveal phenomena that occur, and can provide clarification and reinforce the findings of the quantitative research.

Gender has a significant statistical effect on stress resistance and adaptability. In this research it was found that males have better stress resistance than females; however, females did better in terms of adaptability. In various research related to gender, it was found that there is no difference between the cognitive abilities of males and females (Papalia, dkk., 2001; Santrock, 2003; Schunk, Pintrich, Meece, 2010). In the field of medicine, the biggest contribution related to gender is in doctor-patient communication. Women tend to orient themselves to their patients and thus establishing a good rapport with their patients is a priority. They do this by showing more empathy and asking more questions compared to men (Dielissen, et al., 2011). However, during their education, women tend to be more emotional and experience more somatic problems compared to men (Barbaria, et al., 2011; Niemi & Vainiomaki, 2006). The choice of interest, career and work is also influenced by gender (Crolla & Bamforth, 2011). Stress resistance, adaptability and morality are important factors during medical education especially when related to gender. This condition needs to be given special attention as there tends to be more female students than men at the faculty of medicine.

In this research it was found that motivation to excel has a significant statistical relationship with stress resistance and perseverance. In addition, internal motivation to

become a doctor who is quite significant for all respondents (65.16%), and is expected to provide the respondents with a good drive to reach their ambitions. Those respondents with little internal motivation should be given guidance (external motivation) to develop and strengthen their internal motivation. This is in line with the opinion of an educational psychologist (Adele Gottfried, 1990; in Santrock, 2003) who believes that strong internal motivation and low levels of anxiety are linked to the achievement that they want to attain. As for motivation in the learning process, research by Octaviana (2011) found that the total motivation is significantly higher in first-year students and students who are less than 20 years of age compared to fourth year students. Research by Samira (2011) also found that the strength of motivation as compared to students' learning approach will decrease with the period spent studying at university. With reference to the research by Octaviana (2011) and Samira (2011), the significant relation between the motivation to excel and stress resistance and perseverance showed that the motivation to become a medical doctor is a positive predictor of successful achievement of clinical competence. The academic supervisor plays a very important role in providing support for students lacking motivation or without stable motivation. This support should be provided to those students as early as possible in their medical education.

In this research, age, birth position in the family and place of residence are part of the living environment. Statistically, birth position in the family has a significant relationship with stress resistance and tends to be linked to emotional stability and adaptability. These results confirm Santrock's findings (2003) that the first born children in a family are more grown up, more helpful and more able to control themselves. When we take note of the findings of the interview report on life environment it can be seen that birth position in the family affects the students' sense of responsibility to finish their education. Parents often demand high standards of their first born children and expect them to achieve success in their studies as well as their careers. Parents also expect their first born children to have greater responsibility towards themselves and their families. Thus these children will train themselves to meet these demands and to cope with all the pressure, control their emotions and present themselves as more mature persons.

When linked to the respondent's interests and gender, the combination of investigation and social interests found in female respondents are essential for the profession of a doctor. Thus, a great interest in the field which induces one to choose to take up a medical education as stated in the psychological interviews report, should be able to enhance that person's precision and determination to complete his/her education. The talents that people have show their potentials (Anastasi, 1998, quoted by Semiawan, 2009) and this is necessary as a basis of their interests which influences the magnitude of the results achieved. Based on the analysis, intelligence and talents can become factors which influence the achievement of expected competencies.

The data in this research shows that the high school students have graduated from tends to be linked to their stress resistance as one of the aspects of work attitude. Students coming from high schools in Jakarta tend to have more resistance when put under pressure during their studies. This is because the environment of their present life is not too different from their environment during high school, or perhaps they were already aware of the characteristics of and the learning atmosphere at university. On the other hand, students from outside Jakarta need more time to adapt themselves

to the new environment and culture of the university which is different from what they were used to at school. The psychological interviews pertaining to that matter reinforce the quantitative results of this research. In addition, students from outside Jakarta often face financial problems which could affect their studies.

Nevertheless, when linked to the psychological interview report, it is clear that students have a wide variety of learning behaviors and an approach to learning that they adapt to the situation they find themselves in. This is supported by the findings of Octaviana's (2011) research which shows that students coming from high schools outside Jakarta have a stronger motivation and a greater variety of learning strategies compared to students from high schools in Jakarta.

Finally, Norman Garmezy's research (Garmezy & Masten 1985, 1993; quoted in Santrock, 2003) identifies three factors which could assist children and adolescents in developing resistance towards stress, namely: 1) cognitive skills and a positive response to others, 2) a friendly, warm, and intimate atmosphere, 3) a certain person or figure who can provide external support. Thus, it is very important for the education managers and academic supervisors to provide assistance to the at-risk group of students to enable them to complete their education.

CONCLUSION

In this research it was found that gender, motivation, birth position in the family and origin of high school of respondents have a significant relationship with stress resistance. It was also found that gender, i.e., female gender is closely related to adaptability. Apart from that birth position in the family has a significant relation to stress resistance, and tends to be related to emotional stability and adaptability. Thus, the psychological profile of students can be used as a predictor of success in completing their education at the faculty of medicine. The attention of the education managers as well as the guidance for the at-risk group of students provided by their academic supervisors should be implemented as early as possible to prepare them to achieve the required competence of a doctor as stipulated by the Indonesian Standards of competence.

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