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Psychiatry as a Career Choice among Medical Students: A Cross-Sectional Study Examining School-Related and Non-School Factors

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Abstract

Objectives: Given the low recruitment to psychiatry worldwide, the current study aimed to examine how pre- and intra- medical school factors, perception of career aspects, attitudes towards psychiatry, stigma towards mental illness, and personality traits may affect a choice in psychiatry as a career.

Design: Cross-sectional online study.

Participants: 502 medical students from two public medical institutions in Singapore.

Methods: We critically examined existing literature for factors identified to influence a psychiatric career choice and explored their joint effects among medical students in a cross-sectional study. To avoid overloading the regression model, this analysis only included variables shown to have significant association ($p<0.05$) with the outcome variable from the initial Chi-square tests and independent t-tests analyses.

Results: Both pre- and intra- medical school factors were found to affect students' choice of psychiatry as a career, including a considerable number of non-medical school factors such as pre-school influences, personality trait and importance of a high status specialty in medicine. Among medical school factors, only enrichment activities such as attending a psychiatry or mental health club or optional elective were influential factors associated with choosing a career in psychiatry. Negative attitudes towards psychiatry, but not stigma towards people with mental illness, significantly predicted the rejection of psychiatry as a career.

Conclusions: Improving education environment or teaching practice in psychiatric training may aid in future recruitment trend for psychiatrists. While the changing of pre-medical school influences or personality factors may be infeasible, medical schools and psychiatry institutes could play a more critical role by enhancing enrichment activities or clerkship experience to bring about a more positive attitudinal change towards psychiatry among students who did consider a career in psychiatry.

Strength and limitation of this study

- Although studies have examined factors associated with choosing psychiatry as a career, none have looked into such extensive range of factors in a single study.
- There have been limited studies that explored psychiatry career among a sample of Asian medical students.
- Cross-sectional study design limits the ability to draw causal conclusions.
- The lack of qualitative data may also limit our understanding of how students were being influenced by certain factors in determining their career choice.

Introduction

An estimated 450 million people worldwide are believed to suffer from a mental or behavioral disorder, and one in four people will be affected by these conditions in some point of their life [1]. Despite the substantial disease disability and burden associated with mental disorders, there has been a shortage of psychiatrists in the field, sometimes termed as the "recruitment crisis" [2]. For instance, the number of medical graduates choosing to specialize in psychiatry within the United States has shown a distinct decline from a consistent annual rate of 7-10% during post-World War II period to approximately just 3-4% in 2002-2007 [3, 4]. Although recent data from the US indicates a reversal of trends, World Health Organization data indicates that up to 45% of the world population lived in a country that did not meet recommended ratios of one psychiatrist for every 100,000 people.

Many factors influence medical students' career specialty decisions which may be decided before, during or after their training in medical school. The extant literature has emphasized on pre- and intra-medical school factors associated with choosing psychiatry as a specialty. The former include gender, ethnicity and exposure to mental illness while the latter include teaching methods, clinical exposure and enrichment activities related to the specialty [5-7]. Common reasons for rejection of psychiatry as a career include low respect for psychiatry among the various medical specialties, low salary and negative comments by friends and family about choosing psychiatry [8, 9]. The attitudes of medical students towards psychiatry have also been one of the most commonly researched topics in the psychiatry career literature. Most studies have reported an overall positive attitude towards psychiatry or a positive attitudinal change following psychiatric clerkship [10-12] but despite this, psychiatry as a career choice remains unpopular among students [13, 14]. Stigma towards mental illness has been increasingly identified as a potential factor that influences medical students' attitudes towards psychiatry and deters them from choosing psychiatry as a career [15, 16]. The personality correlates of a career interest in psychiatry were also explored in a few studies [17-19].

The recruitment of medical students into the field of psychiatry is important to mental health educators and has also become an increasing priority of healthcare policy makers [20]. Given the multifactorial nature of a student's specialty choice, understanding these

factors could aid in the recruitment and mentoring strategies to increase the uptake and quality of students choosing psychiatry [21]. The current study, therefore, seeks to identify factors associated with the choice of specialization in psychiatry among pre- and intra-medical school factors, perception of career aspects, attitudes towards psychiatry, stigma towards mental illness, and personality traits in a group of medical students from Singapore.

Methods

Study Participants

Students enrolled in the two most established medical schools (one undergraduate and one graduate medical school) in Singapore were invited to take part in a web-based survey administered in the English language via school email. A total of 502 students were recruited from August to September 2016. Quota limits were set to ensure adequate participation of students from each institution and across their academic years. Informed consent was administered prior to the survey. The study was approved by the ethics committee of the Domain Specific Review Board of the National Healthcare Group, Singapore.

Instrument

The current study adapted an online questionnaire used in a cross-sectional survey that aimed to investigate factors which influence psychiatric career choice among medical students across 20 other countries [6] and further modified it to include additional factors. The questionnaire collected sociodemographic data and the following information on:

Pre-Medical School Factors

These included pre-medical school influences in choosing medicine and psychiatry (e.g., parents' wishes, wider family and friends' advices, close contact with a trusted doctor/nurse who is a family member or a close friend, portrayal of doctor/nurses in books, television and the media, personal and family experience of a physical illness or mental illness, prior work experience), pre-medical school career choice, highest academic qualifications and subjects exposed to prior to admission (refer to Appendix A for the full list of subjects).

Intra-Medical School Factors

These included intra-medical school influences in choosing medicine and psychiatry (e.g., academics and lectures, school advisors or tutors, clinicians during placement, other students in the same course), psychiatry-related enrichment activities (e.g., optional electives, psychiatry/mental health club and program, research experience, volunteering with mentally-ill patients), weeks of psychiatric training attended, clinical exposure factors including reported highest responsibility for patient care during placement and subjects taught at medical schools (refer to Appendix B).

Importance of Career Aspects in Choice of Specialty

These included 12 individual factors namely academic opportunities, research opportunities, competition for training places, flexible working, job prospects, work-life balance, perception of competency, job satisfaction, likelihood of suffering emotional drain/burnout, pay, prestige among general public, high status among medicine, work-life balance, perception of competency, and job satisfaction. Participants were asked to rate whether each of these factors was important, not important, or indifferent in their choice of career.

Others

We also included two validated instruments- the Attitude to Psychiatry Scale (ATP-18) and the Opening Minds Stigma Scale for Healthcare Providers (OMS-HC) to measure stigma towards psychiatry and mental illness respectively. A principal component analysis of the ATP-18 revealed a 3-factor structure which reflected 1) an unsympathetic view of psychiatry- its practitioners, patients and treatments, 2) dissatisfaction with the subject matter of psychiatry and 3) approval and interest in psychiatric skills and methods [22] while the OMS-HC favored a 3- factor structure which included 1) attitudes towards people with mental illness, 2) disclosure/help-seeking and 3) social distance [23]. Finally, for the purpose of measuring the Big Five factors of personality (extraversion, agreeableness, conscientiousness, neuroticism and openness to experience) in our study, the Mini-International Personality Item Pool (mini-IPIP) [24] was used.

Coding of Outcome Variable

Participants were first asked to rate their likelihood of a career in various specialties—pediatrics, radiography, general practice/ primary care, clinical laboratory sciences,

anaesthetics, obstetrics and gynaecology, accident and emergency medicine, surgery, psychiatry and general internal medicine—before proceeding to the remaining questionnaire. This variable was measured on a 5-point Likert-type scale (no way, unlikely, possible, seriously considering and definitely). As proposed by Farooq et al. [6], the use of this outcome as a continuous variable was not recommended given that it was a subjective ordinal variable and the distribution was also not normal. A preliminary analysis revealed a less than 10% response rate for students who had endorsed strong likelihood (seriously considering and definitely) for specializing in psychiatry and would result in a low power for calculation. For the purpose of this study, we have therefore created a binary outcome, with students being "unlikely" to specialize in psychiatry (no way, unlikely) as the interest group versus students being "likely" to specialize in psychiatry (possible, seriously considering and definitely).

Statistical Analyses

Statistical analyses were performed using IBM Statistical Package for the Social Science (SPSS) version 23.0. Statistical significance was set at $p<0.05$ level. Descriptive statistics were tabulated for the overall sample. Frequency and percentage were calculated for categorical variables, while mean and standard deviation were calculated for all other continuous variables. Chi-square tests and independent t-tests were performed to analyze the effect of separate categorical and continuous variables respectively. A final multiple logistic regression was then performed to examine the factors associated with 'not choosing' psychiatry as a career. To avoid overloading the regression model, this analysis only included variables shown to have significant association with the outcome variable from the initial bivariate analyses. A backwards selection procedure was employed to allow elimination of non-significant variables one at a time, based on the probability of the Wald statistic, until only the statistically significant variables remained.

Results

Likelihood of Rejecting Psychiatry as a Career

In the current study, the majority 281 (56.0%) students were "unlikely" (no way, unlikely) to specialize in psychiatry while the rest were considered either possible or likely to specialize

in psychiatry (i.e., the "likely" group). Within the latter group, only 4 students (0.8%) had rated "definitely decided to do" psychiatry.

Sociodemographic

The sociodemographic characteristics and correlates are presented in Table 1. The respondents had a mean age of 22.4 years (SD=3.1, range=16 to 35) and were mainly females (58.8%), Chinese (93.0%), those who were in an undergraduate medical course (76.3%), had a monthly household income of below $4,000 (37.1%) and were year 1 students (26.3%). Both age and the year of schooling were found to be factors associated with the likelihood of rejecting psychiatry.

Pre-Medical School Factors

Table 2 presents the pre-medical school factors associated with the likelihood of not specializing in psychiatry. Sources of influence that showed significant associations include having close contact with a trusted doctor or nurse, personal or family experience of a physical illness and of a mental illness. The lack of interest in psychiatry and the highest education level attained, both prior to admission, were also significant in predicting the rejection of psychiatry. Our analysis did not reveal significant association with any of the subjects listed in Appendix A.

Intra-Medical School Factors

Table 3 presents the intra-medical school factors associated with the likelihood of not specializing in psychiatry. Sources of influence that showed significant associations include academics and lectures, and junior clinicians during placement. Having attended an optional elective in psychiatry or joined a psychiatry/ mental health club was associated with choosing psychiatry as a career. Those who completed their clinical placement in psychiatry were less likely to specialise in psychiatry than those who did not. Weeks of psychiatry training received and level of responsibility in patient care were also significant factors for not choosing psychiatry. Our analysis did not reveal significant association with most subjects, except 'Neuroscience,' taken at medical school.

Career Prospects Associated with Psychiatry as a Career Choice

Of the 12 individual career prospects, bivariate analyses revealed that only those who perceived 'high status among medicine' as an important career aspect were more likely to be deterred from choosing psychiatry as a career (Table 4).

Attitude towards Psychiatry and Stigma against Mental Illness

Table 5 reveals that those who were unlikely to choose psychiatry had significantly lower ATP-18 score (greater negative attitudes towards psychiatry) and higher OMS-HC (greater stigma towards people with mental illness) score than their counterparts.

Personality

Among the self-rated personality traits, only agreeableness and neuroticism were found to be significant factors associated with psychiatry as a career on the mini-IPIP. Those who were unlikely to join psychiatry scored significantly lower in these two personality trait (Table 6).

Logistic Regression

The logistic regression was the final statistical analysis used to examine the joint effect of various factors upon likelihood of rejecting a career in psychiatry and nine factors remained significant (Table 7). Medical students who were unlikely to choose psychiatry as a career were significantly older (OR=1.18), had longer weeks of psychiatric training (OR=2.67 for those with $\leq$5 weeks and OR=2.60 for those with >5 weeks compared to those who did not receive any training), and were those who perceived a specialty which has 'high status in medicine' as important (OR=1.97), compared to those who were indifferent. Those who had close contact with a trusted doctor/nurse (OR=0.52), interest in psychiatry prior to admission (OR=0.05), postgraduate degree (OR=0.05; compared to pre-tertiary education) prior to admission, joined a psychiatry or mental health club (OR=0.24) were less likely to reject psychiatry as a career. Lastly, those who were unlikely to join psychiatry had significantly lower ATP-18 and neuroticism trait scores compared to their counterparts.

Discussion

The current study attempts to examine multiple factors identified from the literature as affecting psychiatry as a career choice. These factors include pre-and intra- medical school

influences, career aspects, attitude to psychiatry, stigma towards mental illness, and personality traits. While numerous studies have explored factors associated with choosing psychiatry as a career, none have looked into such extensive range of factors in a single study. A combination of student characteristics, values, needs, medical school experiences, and perception of specialties were found to influence the students' career decision in psychiatry in our sample.

Pre- and Intra- Medical School Factors

Both pre- and intra- medical school factors were found to influence students' choice of psychiatry as a career. Our study did reveal a considerable number of non-medical school factors such as pre-school influences, personality trait and importance of a high status specialty in medicine to be significant in affecting psychiatry as a career. Preference of specialty prior to medical school was also a strong predictor (OR=10.8) in the study by Farooq et al. [6] where 78% of those who expressed interest in psychiatry when entering medical school remained likely to choose psychiatry during their final year. No association was, however, found for students' qualification before medical school in Farooq's study. Our finding on higher neuroticism among those who were more likely to pursue a career in psychiatry was also supported by other studies that cited neuroticism or the presence of emotional disturbance as the central motivating factor in pursuing psychiatric practice [25, 26]. The underlying psychological conflict of these individuals who choose to become psychiatrists has been described as 'often severe but not necessarily of neurotic quality' and they may be searching for an answer to a strong inner drive that seeks to resolve the experienced conflict [27].

Manassis et al. [28] had identified the most influential career choice factors by psychiatry residents to be initial interest, clerkship experiences and enrichment activities. Similarly, we found enrichment activities such as joining a mental health/ psychiatry club (p=0.005) and attending optional courses/ modules/ electives (p=0.05) to be influential factors in our final logistic regression. Again, these were two of the six variables that remained significantly associated with students being likely to pursue psychiatry as a career in the regression model of Farooq's study. Studies have also emphasized developing and improving specific

enrichment activities such as electives or university psychiatry societies to further enhance recruitment to psychiatry [29-31].

With respect to clerkship experience, our study may imply that those who were exposed to a clinical placement were more likely to reject specializing in psychiatry although the result was not significant in the multivariable analysis. A study among local medical students revealed positive attitudinal change but worsening associative stigma towards psychiatry following a clinical rotation and suggested that stigma relating to psychiatry could be the main cause for a lack of consideration of psychiatry as a career [11]. Another study among local nursing students also revealed that those who did attend a psychiatric placement had higher stigmatizing attitudes towards people with mental illness than those who did not (Samari et al., 2017).

One possibility could be that the medical students undergoing clinical rotation in psychiatry in Singapore were generally exposed to sicker and more chronic patients which lead them to view psychiatry more negatively. Nonetheless, further qualitative research may be required to establish the underlying reasons.

Societal Stigma

Studies have generally found that medical students considering a career in psychiatry tend to be exposed to stigmatizing comments by others including family members and friends, or the general public on their career choice and therefore, alienating themselves from psychiatry as a career [9, 32]. However, our study did not find any significant influences due to parents' wishes, wider family and friends' advice, prestige among general public or even other students in the same course. Rather, our data has revealed factors such as the influence of junior clinicians (but not senior clinicians) during placements and having close contact with a trusted doctor/ nurse who could be a family member or close friend to be significant in influencing a career in psychiatry. This probably suggests that the medical students in our sample may be more potentially influenced by contact with healthcare professionals whom they have a stronger sense of connection with compared to those from their social networks.

Attitudes towards Psychiatry and Stigma towards Mental Illness

The ATP-18 explores academic and clinical domains as well as perceptions of psychiatrists and psychiatric patients [22] while the OMS-HC assesses stigma and behavioural discrimination towards people with mental illness among healthcare workers [23]. Our study showed that those who were likely to reject psychiatry as a career were those who had lower ATP-18 score and higher OMS-HC score at bivariate analyses. Multivariate analysis, however, revealed that only ATP-18 score were significant in predicting the likelihood of not choosing psychiatry as a career. This may suggest that medical students in our sample were more likely to reject psychiatry as a career mainly due to their dissatisfaction with psychiatric practice but not because they had a stigmatizing attitude towards patients with mental illness or mental illness itself. Our data on ATP-18 was consistent with past research [6, 33, 34] showing that those who were likely to specialize in psychiatry had a higher score or positive attitude towards psychiatry. While strategies on teaching practices such as the exposure to and taking responsibility for patients who are motivated and recovering, as well as co-taught seminars by both patients and professionals to improve medical students' attitudes towards psychiatry have been proposed [26, 35], studies also found that changes in education environment may not necessarily lead to significant increase in number of students wanting to pursue psychiatry [11, 36].

Limitations

The current study is cross-sectional, and is therefore unable to establish causal relationship between the various factors and likelihood of rejecting psychiatry as a career. For instance, it may be possible that those who were interested in or had decided on choosing psychiatry as a career had also joined the mental health or psychiatry club in their school due to their interest. The lack of qualitative data may have also limited our understanding of how these students were being influenced by their contact with junior clinicians and trusted doctor/nurse, along with the larger-scale cultural issues that might affect their decision to specialize in psychiatry.

Conclusion

Our study has revealed a low interest among medical students wanting to specialize in psychiatry. However, there is a pool of 8.6% of students who would seriously consider psychiatry as a career and this may be the group that could possibly be targeted at to

encourage recruitment into the field. While it may not be feasible to change aspects of pre-medical school influences, medical schools and psychiatry institutes could play a more critical role by improving clerkship experience or enhancing enrichment activities to bring about a more positive attitudinal change towards psychiatry in this group of students.

Contributors

LSES wrote the first draft of the article and conducted statistical analyses. BYC, HLO, ES and CBY made substantial contribution to the acquisition of data and provided intellectual input. RM, SV, SAC and MS had contributed to the conception and design and provided intellectual input. All authors have given final approval of the version to be published.

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Competing interests

The authors declare that they have no competing interests.

Ethics approval and consent to participate

The study was approved by the ethics committee of the Domain Specific Review Board of the National Healthcare Group, Singapore. All student participants have provided online consent to the study.

Provenance and peer review

Not commissioned; externally peer reviewed.

Data sharing statement

For access to data, please approach Associate Professor Mythily Subramaniam via mythily@imh.com.sg.

Table 1: Socio-demographic profile (n=502)

		Total		Likely		Unlikely		p-value
		Mean	S.D.	Mean	S.D.	Mean	S.D.	
Age in years		22.44	3.06	21.81	3.07	22.93	2.96	<0.001
		N	%	N	%	N	%	
Gender	Male	207	41.2	85	41.1	122	58.9	0.263
	Female	295	58.8	136	46.1	159	53.9	
Education	Undergraduate	383	76.3	177	46.2	206	53.8	0.076
	Postgraduate	119	23.7	44	37.0	75	63.0	
Monthly Household income	Below 4,000	186	37.1	91	48.9	95	51.1	0.193
	4,000-9,999	177	35.3	70	39.5	107	60.5	
	10,000 & above	139	27.7	60	43.2	79	56.8	
Year of schooling	1st year	132	26.3	77	58.3	55	41.7	<0.001
	2nd year	116	23.1	57	49.1	59	50.9	
	3rd year	71	14.1	31	43.7	40	56.3	
	4th year	87	17.3	32	36.8	55	63.2	
	5th year	96	19.1	24	25.0	72	75.0	

Table 2: Pre-medical school influences in choosing psychiatry

		Likely		Unlikely		p-value
		N	%	N	%	
Parents' wishes	Yes	11	42.3	15	57.7	0.856
	No	210	44.1	266	55.9	
Wider family & friends' advices	Yes	29	51.8	27	48.2	0.214
	No	192	43.0	254	57.0	
A trusted doctor/ nurse who has close contact with you	Yes	39	57.4	29	42.6	0.017
	No	182	41.9	252	58.1	
Portrayal of doctors/ nurses in books, television & the media	Yes	30	48.4	32	51.6	0.460
	No	191	43.4	249	56.6	
Personal/family experience of a physical illness	Yes	40	56.3	31	43.7	0.024
	No	181	42.0	250	58.0	
Personal/family experience of a mental illness	Yes	25	71.4	10	28.6	0.001
	No	196	42.0	271	58.0	
Prior work experience	Yes	51	48.6	54	51.4	0.291
	No	170	42.8	227	57.2	
Interest in psychiatry prior to admission	Yes	19	95.0	1	5.0	<0.001[a]
	No	202	41.9	280	58.1	
Highest education attained prior to admission	Pre-tertiary	177	46.2	206	53.8	0.033
	Undergraduate	35	33.7	69	66.3	
	Postgraduate	9	60.0	6	40.0	

[a] p-value determined by Fisher's Exact Test

Table 3: Intra-medical school influences in choosing psychiatry

			Likely		Unlikely		p-value
			N	%	N	%	
Academics or lectures		Yes	96	51.3	91	48.7	0.011
		No	125	39.7	190	60.3	
School advisors or tutors		Yes	81	42.9	108	57.1	0.682
		No	140	44.7	173	55.3	
Senior clinicians during placements		Yes	91	40.6	133	59.4	0.168
		No	130	46.8	148	53.2	
Junior clinicians during placements		Yes	55	36.4	96	63.6	0.024
		No	166	47.3	185	52.7	
Other students in the same course		Yes	30	46.2	35	53.8	0.711
		No	191	43.7	246	56.3	
Attended optional courses/ modules/ electives		Yes	32	58.2	23	41.8	0.025
		No	189	42.3	258	57.7	
Joined psychiatry/mental health club		Yes	22	73.3	8	26.7	0.001
		No	199	42.2	273	57.8	
Joined student wellness/mental health programme		Yes	79	44.6	98	55.4	0.839
		No	142	43.7	183	56.3	
Research experience in psychiatry		Yes	15	60.0	10	40.0	0.099
		No	206	43.2	271	56.8	
Volunteered with mentally-ill patients		Yes	15	38.5	24	61.5	0.466
		No	206	44.5	257	55.5	
Weeks of psychiatric training		0 week	153	55.2	125	44.8	<0.001
		≤5 weeks	24	29.6	57	70.4	
		>5 weeks	43	30.3	99	69.7	
Completed clinical placement in psychiatry		Yes	56	29.6	133	70.4	<0.001
		No	165	52.7	148	47.3	
Level of responsibility in patient care	No responsibility or asked opinion		176	51.9	163	48.1	<0.001
	Clerking/assess risk/ do therapy under supervision		45	27.6	118	72.4	
Took Neuroscience		Yes	154	41.0	222	59.0	0.017
		No	67	53.2	59	46.8	

Table 4: Importance of career aspects in choice of specialty

		Likely		Unlikely		
Factor	**Category**	**N**	**%**	**N**	**%**	**p-value**
Academic opportunities	Important	97	45.1	118	54.9	0.908
	Not important	32	42.7	43	57.3	
	Indifferent	92	43.4	120	56.6	
Research opportunities	Important	66	46.2	77	53.8	0.827
	Not important	54	43.5	70	56.5	
	Indifferent	101	43.0	134	57.0	
Competition for training places	Important	128	44.4	160	55.6	0.975
	Not important	19	43.2	25	56.8	
	Indifferent	74	43.5	96	56.5	
Flexible working	Important	155	44.0	197	56.0	0.723
	Not important	10	37.0	17	63.0	
	Indifferent	56	45.5	67	54.5	
Job prospects	Important	164	43.2	216	56.8	0.788
	Not important	8	47.1	9	52.9	
	Indifferent	49	46.7	56	53.3	
Emotional drain/ burnout	Important	176	43.9	225	56.1	0.633
	Not important	5	33.3	10	66.7	
	Indifferent	40	46.5	46	53.5	
Salary/ Pay	Important	82	39.6	125	60.4	0.212
	Not important	36	50.0	26	50.0	
	Indifferent	103	46.2	120	53.8	
Prestige among general public	Important	39	35.5	71	64.5	0.101
	Not important	74	48.4	79	51.6	
	Indifferent	108	45.2	131	54.8	
High status among medicine	Important	31	32.6	64	67.4	0.041
	Not important	79	45.4	95	54.6	
	Indifferent	111	47.6	122	52.4	
Work-life balance	Important	176	43.3	230	56.7	0.792
	Not important	8	50.0	8	50.0	
	Indifferent	37	46.3	43	53.8	
Perception of competency	Important	92	42.4	125	57.6	0.811
	Not important	32	45.7	38	54.3	
	Indifferent	97	45.1	118	54.9	
Job satisfaction	Important	186	42.2	253	57.6	0.053
	Not important	4	36.4	7	63.6	
	Indifferent	31	59.6	21	40.4	

Table 5: Attitudes towards psychiatry and stigma towards people with mental illness

	Likely	Unlikely	p-value
	Mean (S.D.)	Mean (S.D.)	
ATP-18	66.66 (5.49)	63.50 (6.08)	<0.001
OMS-HC	36.87 (6.59)	39.10 (6.69)	<0.001

Table 6: Personality traits and their relation to the unlikelihood of choosing psychiatry

	Likely		Unlikely		p-value
	Mean	S.D.	Mean	S.D.	
Extraversion	11.19	3.65	11.47	3.58	0.397
Agreeableness	16.35	2.26	15.63	2.38	0.001
Conscientiousness	13.50	3.28	14.08	3.24	0.050
Neuroticism	11.64	3.43	10.75	3.16	0.003
Intellect/ Imagination	14.57	3.02	14.69	3.09	0.662

Table 7: Logistic regression factors in rejecting psychiatry as a career*

Factor	Category	Odds Ratio	95% C.I. Lower	95% C.I. Lower	P-value
Age (in years)		1.18	1.02	1.36	0.029
A trusted doctor/ nurse who has close contact with you	Yes	0.52	0.28	0.94	0.030
	No	Ref.			
Interest in psychiatry prior to admission	Yes	0.05	0.01	0.38	0.004
	No	Ref.			
Highest education attained prior to admission	Postgraduate	0.05	0.01	0.34	0.002
	Pre-tertiary	Ref.			
Joined psychiatry/mental health club	Yes	0.24	0.09	0.64	0.005
	No	Ref.			
Weeks of psychiatric training	0 week	Ref.			
	≤5 weeks	2.67	1.21	5.91	0.015
	>5 weeks	2.60	1.44	4.70	0.002
High status among medicine	Important	1.97	1.10	3.51	0.022
	Indifferent	Ref.			
ATP-18 score		0.92	0.88	0.96	<0.001
Neuroticism		0.92	0.86	0.98	0.009

*Backwards selection procedure, variables entered initially (Step 1): age, stage of schooling, having close contact with a trusted doctor/nurse, personal/ family experience of a physical and mental illness, interest in psychiatry and highest education attained prior to admission, academic and lectures, junior clinicians during placement, optional courses and electives, mental health club membership, weeks of psychiatric training received, clinical placement, level of responsibility in psychiatric patient care, neuroscience module, high status among medicine, ATP-18 score, OMS-HC score, agreeableness and neuroticism.

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Appendix A

Which subjects have you been exposed to before entering your current school?

Economics	Psychology	Philosophy
Sociology	Modern Languages	History
Accounting/Finance/Business	Art/Design	Classical Languages
Chemistry	Geography	Information Technology
Technology	Physics	Music
Performing Arts	General Studies	Mathematics
Politics	Religious Studies	Biology
English	Sports Science	

Appendix B

Which of the following subjects/ courses have you been taught at your medical school?

Behavioral Sciences	Philosophy	Psychology
Ethics	Communication Skills	Sociology
Neuroscience	Other psychiatry and mental health related subjects	

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	5
Methods			
Study design	4	Present key elements of study design early in the paper	5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	5
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5-7
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5-7
Bias	9	Describe any efforts to address potential sources of bias	5
Study size	10	Explain how the study size was arrived at	NA
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6-7
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7
		(*b*) Describe any methods used to examine subgroups and interactions	7
		(*c*) Explain how missing data were addressed	NA
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	NA
		(*e*) Describe any sensitivity analyses	NA
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8
		(b) Indicate number of participants with missing data for each variable of interest	NA
Outcome data	15*	Report numbers of outcome events or summary measures	7
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	7
		(*b*) Report category boundaries when continuous variables were categorized	6-7
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	7-9
Discussion			
Key results	18	Summarise key results with reference to study objectives	9-10
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	12
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	12-13
Generalisability	21	Discuss the generalisability (external validity) of the study results	NA
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	13

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Psychiatry as a Career Choice among Medical Students: A Cross-Sectional Study Examining School-Related and Non-School Factors

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Psychiatry as a Career Choice among Medical Students: A Cross-Sectional Study Examining School-Related and Non-School Factors

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Abstract

Objectives: Given the low recruitment to psychiatry worldwide, the current study aimed to examine how pre- and intra- medical school factors, perception of career aspects, attitudes towards psychiatry, stigma towards mental illness, and personality traits may affect the likelihood of a choice in psychiatry as a career.

Design: Cross-sectional online study.

Participants: 502 medical students from two public medical institutions in Singapore.

Methods: We critically examined existing literature for factors identified to influence psychiatry as a career choice and explored their effects in a group of medical students in Singapore. To avoid overloading the regression model, this analysis only included variables shown to have significant association ($p<0.05$) with the outcome variable from the initial Chi-square tests and independent t-tests analyses.

Results: A considerable number of non-medical school factors such as pre-school influence and interests, personality trait and importance of a high status specialty in medicine were found to affect students' choice of psychiatry as a career. Among medical school factors, attending a psychiatry/ mental health club was the only influential factor. Negative attitudes towards psychiatry, but not stigma towards people with mental illness, significantly predicted the likelihood of not choosing psychiatry as a career.

Conclusions: Improving education environment or teaching practice in psychiatric training may aid in future recruitment trend for psychiatrists. While the changing of pre-medical school influences or personality factors may be infeasible, medical schools and psychiatry institutes could play a more critical role by enhancing enrichment activities or clerkship experience to bring about a more positive attitudinal change towards psychiatry among students who did consider a career in psychiatry.

Strength and limitation of this study

- Although studies have examined factors associated with choosing psychiatry as a career, none have looked into such extensive range of factors in a single study.

- There have been limited studies that explored psychiatry career among a sample of Asian medical students.
- Cross-sectional study design limits the ability to draw causal conclusions.
- The lack of qualitative data may also limit our understanding of how students were being influenced by certain factors in determining their career choice.

Introduction

An estimated 450 million people worldwide are believed to suffer from a mental or behavioral disorder, and one in four people will be affected by these conditions in some point of their life [1]. Despite the substantial disease disability and burden associated with mental disorders, there has been a shortage of psychiatrists in the field, sometimes termed as the "recruitment crisis" [2]. For instance, the number of medical graduates choosing to specialize in psychiatry within the United States has shown a distinct decline from a consistent annual rate of 7-10% during post-World War II period to approximately just 3-4% in 2002-2007 [3, 4]. Although recent data from the US indicates a reversal of trends, World Health Organization data indicates that up to 45% of the world population lived in a country that did not meet recommended ratio of one psychiatrist for every 100,000 people.

Many factors influence medical students' career specialty decisions which may be decided before, during or after their training in medical school. The extant literature has emphasized on pre- and intra-medical school factors associated with choosing psychiatry as a specialty. The former include gender, ethnicity and exposure to mental illness while the latter include teaching methods, clinical exposure and enrichment activities related to the specialty [5-7]. Common reasons for rejection of psychiatry as a career include low respect for psychiatry among the various medical specialties, low salary and negative comments by friends and family about choosing psychiatry [8, 9]. The attitudes of medical students towards psychiatry have also been one of the most commonly researched topics in the psychiatry career literature. Most studies have reported an overall positive attitude towards psychiatry or a positive attitudinal change following psychiatric clerkship [10-12] but despite this, psychiatry as a career choice remains unpopular among students [13, 14]. Stigma towards mental illness has been increasingly identified as a potential factor that influences medical students' attitudes towards psychiatry and deters them from choosing psychiatry as a career [15, 16]. The personality correlates of a career interest in psychiatry were also explored in a few studies [17-19].

The recruitment of medical students into the field of psychiatry is important to mental health educators and has also become an increasing priority of healthcare policy makers [20]. Given the multifactorial nature of a student's specialty choice, understanding these factors could aid in the recruitment and mentoring strategies to increase the uptake and quality of students choosing psychiatry [21]. The current study, therefore, seeks to identify

factors associated with a future choice of specialization in psychiatry among pre- and intra-medical school factors, perception of career aspects, attitudes towards psychiatry, stigma towards mental illness, and personality traits in a group of medical students from Singapore.

Methods

Study Participants

All students enrolled in two of the medical schools (one undergraduate and one graduate medical school) in Singapore were invited to take part in a web-based survey administered in the English language via school email. The only other undergraduate medical school in Singapore was excluded as it had been recently established. A total of 502 students were recruited with quota limits set to ensure adequate and representative sampling of students from each involved institution and across their academic years. Online informed consent was administered prior to the survey. The study was approved by the ethics committee of the Domain Specific Review Board of the National Healthcare Group, Singapore.

Patient and Public Involvement

No patient was involved in this study.

Instrument

The main online questionnaire in the current study was adapted from a cross-sectional survey that aimed to investigate mostly pre- and intra- medical school factors which influence psychiatric career choice among medical students across 20 countries [6]. We also included additional scales to measure personality and stigma towards mental illnesses. The survey collected sociodemographic data and the following information on:

Pre-Medical School Factors

These included pre-medical school influences in choosing medicine and psychiatry (e.g., parents' wishes, wider family and friends' advices, close contact with a trusted doctor/nurse who is a family member or a close friend, portrayal of doctor/nurses in books, television and the media, personal and family experience of a physical illness or mental illness, prior work

experience), pre-medical school career choice, highest academic qualifications and subjects exposed to prior to admission (refer to Appendix A for the full list of subjects).

Intra-Medical School Factors

These included intra-medical school influences (e.g., academics and lectures, school advisors or tutors, clinicians during placement, other students in the same course), psychiatry-related enrichment activities (e.g., optional electives, psychiatry/mental health club and program, research experience, volunteering with mentally-ill patients), weeks of psychiatric training attended, clinical exposure factors including reported highest responsibility for patient care during placement and subjects taught at medical schools (refer to Appendix B).

Importance of Career Aspects in Choice of Specialty

These included 12 individual factors namely academic opportunities, research opportunities, competition for training places, flexible working, job prospects, work-life balance, perception of competency, job satisfaction, likelihood of suffering emotional drain/burnout, pay, prestige among general public, high status among medicine, work-life balance, perception of competency, and job satisfaction. Participants were asked to rate whether each of these factors was important, not important, or indifferent in their choice of career.

Others

Two validated instruments- the Attitude to Psychiatry Scale (ATP-18) and the Opening Minds Stigma Scale for Healthcare Providers (OMS-HC) were also used to measure stigma towards psychiatry and mental illness respectively. A principal component analysis of the ATP-18 revealed a 3-factor structure which reflected 1) an unsympathetic view of psychiatry- its practitioners, patients and treatments, 2) dissatisfaction with the subject matter of psychiatry and 3) approval and interest in psychiatric skills and methods [22] while the OMS-HC favored a 3- factor structure which included 1) attitudes towards people with mental illness, 2) disclosure/ help-seeking and 3) social distance [23]. Finally, for the purpose of measuring the Big Five factors of personality (extraversion, agreeableness, conscientiousness, neuroticism and openness to experience) in our study, the Mini-International Personality Item Pool (mini-IPIP) [24] was included.

Coding of Outcome Variable

Participants were first asked to rate their likelihood of a career in various specialties—pediatrics, radiography, general practice/ primary care, clinical laboratory sciences, anaesthetics, obstetrics and gynaecology, accident and emergency medicine, surgery, psychiatry and general internal medicine—before proceeding to the remaining questionnaire. This variable was measured on a 5-point Likert-type scale (no way, unlikely, possible, seriously considering and definitely). As proposed by Farooq et al. [6], the use of this outcome as a continuous variable was not recommended given that it was a subjective ordinal variable and the distribution was also not normal. A preliminary analysis revealed a less than 10% response rate for students who had endorsed strong likelihood (seriously considering and definitely) for specializing in psychiatry and this would result in a low power for calculation. For the purpose of this study, we have therefore created a binary outcome, with students being "unlikely" to specialize in psychiatry (no way, unlikely) as the interest group versus students being "likely" to specialize in psychiatry (possible, seriously considering and definitely).

Statistical Analyses

Statistical analyses were performed using IBM Statistical Package for the Social Science (SPSS) version 23.0. Statistical significance was set at $p<0.05$ level. Descriptive statistics were tabulated for the overall sample. Frequency and percentage were calculated for categorical variables, while mean and standard deviation were calculated for all other continuous variables. Chi-square tests and Independent t-tests were performed to analyze the effects of separate categorical and continuous variables respectively. A final multiple logistic regression was then performed to examine the factors associated with 'not choosing' psychiatry as a career. To avoid overloading the regression model, this analysis only included variables shown to have significant association with the outcome variable from the initial bivariate analyses. A backwards selection procedure was employed to allow elimination of non-significant variables one at a time, based on the probability of the Wald statistic, until only the statistically significant variables remained.

Results

Likelihood of Rejecting Psychiatry as a Career

Only 4 students (0.8%) reported 'definitely decided to do', 43 (8.6%) reported 'seriously considering (i.e., top 3 choices), 174 (34.7%) reported 'possible, unsure yet', 199 (39.6%) reported 'unlikely' and 82 (16.3%) reported 'no way' with respect to psychiatry as a career choice. In terms of groupings, the majority (n=281, 56.0%) of the students were "unlikely" (no way, unlikely) to specialize in psychiatry while the rest were in the "likely" group (including those who reported 'definitely decided to do', 'seriously considering' and 'possible').

Sociodemographic

The sociodemographic characteristics and correlates are presented in Table 1. The respondents had a mean age of 22.4 years (SD=3.1, range=16 to 35) and were mainly females (58.8%), Chinese (93.0%), those who were in an undergraduate medical course (76.3%), had a monthly household income of below $4,000 (37.1%) and were year 1 students (26.3%). Both age and the year of schooling were found to be factors associated with the likelihood of rejecting psychiatry.

Pre-Medical School Factors

Table 2 presents the pre-medical school factors associated with the likelihood of not specializing in psychiatry. Sources of influence that showed significant associations include having close contact with a trusted doctor or nurse, personal or family experience of a physical illness and of a mental illness. The lack of interest in psychiatry and the highest education level attained, both prior to admission, were also significant in predicting the rejection of psychiatry. Our analyses did not reveal significant association with any of the subjects listed in Appendix A.

Intra-Medical School Factors

Table 3 presents the intra-medical school factors associated with the likelihood of not specializing in psychiatry. Sources of influence that showed significant associations include academics or lectures and junior clinicians during placement. Having attended an optional elective in psychiatry and joined a psychiatry/ mental health club were associated with

choosing psychiatry as a career. Those who completed their clinical placement in psychiatry were less likely to specialise in psychiatry than those who did not. Weeks of psychiatry training received and level of responsibility in patient care were also significant factors for not choosing psychiatry. Our analysis did not reveal significant association with most subjects, except 'Neuroscience,' taken at medical school.

Career Prospects Associated with Psychiatry as a Career Choice

Of the 12 individual career prospects, analyses revealed that only those who perceived 'high status among medicine' as an important career aspect were more likely to be deterred from choosing psychiatry as a career (Table 4).

Attitude towards Psychiatry and Stigma against Mental Illness

Table 5 reveals that those who were unlikely to choose psychiatry had significantly lower ATP-18 score (greater negative attitudes towards psychiatry) and higher OMS-HC (greater stigma towards people with mental illness) score than their counterparts.

Personality

Among the self-rated personality traits, only agreeableness and neuroticism were found to be significant factors associated with psychiatry as a career on the mini-IPIP. Those who were unlikely to choose psychiatry scored significantly lower in these two personality traits. (Table 6).

Regression Analyses

Logistic regression was used to examine the effect of various factors upon likelihood of rejecting a career in psychiatry and nine factors remained significant (Table 7). Medical students who were unlikely to choose psychiatry as a career were significantly older (OR=1.18), had longer weeks of psychiatric training (OR=2.67 for those with $\leq$5 weeks and OR=2.60 for those with >5 weeks compared to those who did not receive any training), and were those who perceived a specialty which has 'high status in medicine' as important (OR=1.97), compared to those who were indifferent. Those who had close contact with a trusted doctor/nurse (OR=0.52), interest in psychiatry prior to admission (OR=0.05), postgraduate degree (OR=0.05; compared to pre-tertiary education) prior to admission,

joined a psychiatry or mental health club (OR=0.24) were less likely to reject psychiatry as a career. Lastly, those who were unlikely to choose psychiatry had significantly lower ATP-18 and neuroticism trait scores compared to their counterparts.

Discussion

The current study attempts to examine the multiple factors identified from the literature that affect psychiatry as a career choice. These factors include pre-and intra- medical school influences, career aspects, attitude to psychiatry, stigma towards mental illness, and personality traits. While numerous studies have explored factors associated with choosing psychiatry as a career, none have looked into such extensive range of factors in a single study. A combination of student characteristics, values, needs, medical school experiences, and perception of specialties were found to influence the students' career decision in psychiatry in our sample.

Pre- and Intra- Medical School Factors

Both pre- and intra- medical school factors were found to influence students' choice of psychiatry as a career. Our study did reveal a considerable number of non-medical school factors such as pre-school influences, personality trait and importance of a high status specialty in medicine to be significant in affecting psychiatry as a career. Preference of specialty prior to medical school was also a strong predictor (OR=10.8) in the study by Farooq and colleagues, [6] where 78% of those who expressed interest in psychiatry when entering medical school remained likely to choose psychiatry during their final year. While we did find highest education attained prior to admission to be a factor, no association was found for students' qualification before medical school in Farooq's study. Our finding on higher neuroticism among those who were more likely to pursue a career in psychiatry was also supported by other studies that cited neuroticism or the presence of emotional disturbance as the central motivating factor in pursuing psychiatric practice [25, 26]. The underlying psychological conflict of these individuals who choose to become psychiatrists has been described as 'often severe but not necessarily of neurotic quality' and they may be searching for an answer to a strong inner drive that seeks to resolve the experienced conflict [27].

Manassis et al. [28] had identified the most influential career choice factors by psychiatry residents to be initial interest, clerkship experiences and enrichment activities. Similarly, we found enrichment activities such as joining a mental health/ psychiatry club (p=0.005) and attending optional courses/ modules/ electives (p=0.05) to be influential factors in our final logistic regression. Again, these were two of the six variables that remained significantly associated with students being likely to pursue psychiatry as a career in the regression model of Farooq's study. Studies have also emphasized developing and improving specific enrichment activities such as electives or university psychiatry societies to further enhance recruitment to psychiatry [29-31]. None of the pre-school subjects or modules/ courses taken at medical school were found to be associated with the decision to choose psychiatry as a career choice, although those who took neuroscience were more likely to not choose psychiatry at univariate analysis. Goldenberg and Krystal found that medical students with an undergraduate neuroscience majors preferred to specialize in neurology (21.5%), neurosurgery (13.1%) or internal medicine (11%) compared to only 2.3% who preferred psychiatry at matriculation [32].

With respect to clerkship experience, our study may imply that those who were exposed to a clinical placement were more likely to not choose psychiatry as a career choice although the result was not significant in the multivariable analysis. A study among local medical students revealed positive attitudinal change but worsening associative stigma towards psychiatry following a clinical rotation and suggested that stigma relating to psychiatry could be the main cause for a lack of consideration of psychiatry as a career [11]. One possibility could be that the medical students undergoing clinical rotation in psychiatry in Singapore were generally exposed to sicker and more chronic patients which led them to view psychiatry more negatively. Such negative experiences encountered during clinical exposure during the students' medical school years could lead them to narrow their medical specialty options. However, further qualitative research may be required to establish the underlying reasons.

Societal Stigma

Studies have generally found that medical students considering a career in psychiatry tend to be exposed to stigmatizing comments by others including family members and friends, or

the general public on their career choice and therefore, alienating themselves from psychiatry as a career [9, 33]. However, our study did not find any significant influences due to parents' wishes, wider family and friends' advice, prestige among general public or even other students in the same course. Rather, our data has revealed factors such as the influence of junior clinicians (but not senior clinicians) during placements and having close contact with a trusted doctor/ nurse who could be a family member or close friend to be significant in influencing a career in psychiatry. This probably suggests that the medical students in our sample may be more influenced potentially by contact with healthcare professionals whom they have a stronger sense of connection with compared to those from their social networks.

Attitudes towards Psychiatry and Stigma towards Mental Illness

The ATP-18 explores academic and clinical domains as well as perceptions of psychiatrists and psychiatric patients [22] while the OMS-HC assesses stigma and behavioural discrimination towards people with mental illness among healthcare workers [23]. Our study showed that those who were likely to reject psychiatry as a career were those who had lower ATP-18 score and higher OMS-HC score at univariate analyses. Multivariate analysis, however, revealed that only ATP-18 score were significant in predicting the likelihood of not choosing psychiatry as a career. This may suggest that medical students in our sample were more likely to reject psychiatry as a career mainly due to their dissatisfaction with psychiatric practice but not because they had a stigmatizing attitude towards patients with mental illness or mental illness itself. Our data on ATP-18 was consistent with past research [6, 34] showing that those who were likely to specialize in psychiatry had a higher ATP score or a more positive attitude towards psychiatry. While strategies on teaching practices such as the exposure to and taking responsibility for patients who are motivated and recovering, as well as co-taught seminars by both patients and professionals to improve medical students' attitudes towards psychiatry have been proposed [26, 35], studies also found that changes in education environment may not necessarily lead to significant increase in the number of students wanting to pursue psychiatry [11, 36].

Limitations

The current study is cross-sectional, and is therefore unable to establish causal relationship between the various factors and likelihood of rejecting psychiatry as a career. For instance, it may be possible that those who were interested in or had decided on choosing psychiatry as a career had also joined the mental health or psychiatry club in their school due to their interest. The lack of qualitative data may have also limited our understanding of how these students were being influenced by their contact with junior clinicians and trusted doctor/nurse, along with the larger-scale cultural issues that might affect their decision to specialize in psychiatry. We are unable to determine the response rate of the study as we do not know how many students had seen the email invitation but decided not to take part in the study. Furthermore, the current study only looked at medical students' likelihood of choosing psychiatry as career choice in the future and this may not reflect their actual decisions upon graduation. Nonetheless, one study had found the stability of psychiatry specialty choice from matriculation to graduation to be at slightly above 50%, which was greater than for any other specialties [37].

Conclusion

In Singapore, a graduating medical student would apply to a residency programme in accordance to his choice of medical speciality although there is a selection process where the candidate would be assessed through various ways for his or her suitability for that speciality. Our study has revealed a low interest among medical students wanting to specialize in psychiatry. However, there is a pool of 8.6% of students who would seriously consider psychiatry as a career and this may be the group that could possibly be targeted at to encourage recruitment into the field. While it may not be feasible to change aspects of pre-medical school influences, medical schools and psychiatry institutes could play a more critical role by improving clerkship experience or enhancing enrichment activities to bring about a more positive attitudinal change towards psychiatry in this group of students.

Contributors

LSES wrote the first draft of the article and conducted statistical analyses. BYC, HLO and ES made substantial contribution to the acquisition of data and provided intellectual input. RM, SV, SAC and MS had contributed to the conception and design and provided intellectual input. All authors have given final approval of the version to be published.

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Competing interests

The authors declare that they have no competing interests.

Ethics approval and consent to participate

The study was approved by the ethics committee of the Domain Specific Review Board of the National Healthcare Group, Singapore. All student participants have provided online consent to the study.

Provenance and peer review

Not commissioned; externally peer reviewed.

Data sharing statement

For access to data, please approach Associate Professor Mythily Subramaniam via mythily@imh.com.sg.

Table 1: Socio-demographic profile (n=502)

		Total		Likely		Unlikely		p-value
		Mean	S.D.	Mean	S.D.	Mean	S.D.	
Age in years		22.44	3.06	21.81	3.07	22.93	2.96	**<0.001**
		N	%	N	%	N	%	
Gender	Male	207	41.2	85	41.1	122	58.9	0.263
	Female	295	58.8	136	46.1	159	53.9	
Education	Undergraduate	383	76.3	177	46.2	206	53.8	0.076
	Postgraduate	119	23.7	44	37.0	75	63.0	
Monthly Household income	Below 4,000	186	37.1	91	48.9	95	51.1	0.193
	4,000-9,999	177	35.3	70	39.5	107	60.5	
	10,000 & above	139	27.7	60	43.2	79	56.8	
Year of schooling	1st year	132	26.3	77	58.3	55	41.7	**<0.001**
	2nd year	116	23.1	57	49.1	59	50.9	
	3rd year	71	14.1	31	43.7	40	56.3	
	4th year	87	17.3	32	36.8	55	63.2	
	5th year	96	19.1	24	25.0	72	75.0	

Table 2: Pre-medical school influences in affecting likelihood of choosing psychiatry

		Likely		Unlikely		p-value
		N	%	N	%	
Parents' wishes	Yes	11	42.3	15	57.7	0.856
	No	210	44.1	266	55.9	
Wider family & friends' advices	Yes	29	51.8	27	48.2	0.214
	No	192	43.0	254	57.0	
A trusted doctor/ nurse who has close contact with you	Yes	39	57.4	29	42.6	**0.017**
	No	182	41.9	252	58.1	
Portrayal of doctors/ nurses in books, television & the media	Yes	30	48.4	32	51.6	0.460
	No	191	43.4	249	56.6	
Personal/family experience of a physical illness	Yes	40	56.3	31	43.7	**0.024**
	No	181	42.0	250	58.0	
Personal/family experience of a mental illness	Yes	25	71.4	10	28.6	**0.001**
	No	196	42.0	271	58.0	
Prior work experience	Yes	51	48.6	54	51.4	0.291
	No	170	42.8	227	57.2	
Interest in psychiatry prior to	Yes	19	95.0	1	5.0	**<0.001**[a]

admission	No	202	41.9	280	58.1	
Highest education attained prior to admission	Pre-tertiary	177	46.2	206	53.8	**0.033**
	Undergraduate	35	33.7	69	66.3	
	Postgraduate	9	60.0	6	40.0	

[a] p-value determined by Fisher's Exact Test

Table 3: Intra-medical school influences in affecting likelihood of choosing psychiatry

		Likely		Unlikely		p-value
		N	%	N	%	
Academics or lectures	Yes	96	51.3	91	48.7	**0.011**
	No	125	39.7	190	60.3	
School advisors or tutors	Yes	81	42.9	108	57.1	0.682
	No	140	44.7	173	55.3	
Senior clinicians during placements	Yes	91	40.6	133	59.4	0.168
	No	130	46.8	148	53.2	
Junior clinicians during placements	Yes	55	36.4	96	63.6	**0.024**
	No	166	47.3	185	52.7	
Other students in the same course	Yes	30	46.2	35	53.8	0.711
	No	191	43.7	246	56.3	
Attended optional courses/ modules/ electives	Yes	32	58.2	23	41.8	**0.025**
	No	189	42.3	258	57.7	
Joined psychiatry/ mental health club	Yes	22	73.3	8	26.7	**0.001**
	No	199	42.2	273	57.8	
Joined student wellness/ mental health programme	Yes	79	44.6	98	55.4	0.839
	No	142	43.7	183	56.3	
Research experience in psychiatry	Yes	15	60.0	10	40.0	0.099
	No	206	43.2	271	56.8	
Volunteered with mentally-ill patients	Yes	15	38.5	24	61.5	0.466
	No	206	44.5	257	55.5	
Weeks of psychiatric training	0 week	153	55.2	125	44.8	**<0.001**
	≤5 weeks	24	29.6	57	70.4	
	>5 weeks	43	30.3	99	69.7	
Completed clinical placement in psychiatry	Yes	56	29.6	133	70.4	**<0.001**
	No	165	52.7	148	47.3	
Level of responsibility in patient care	No responsibility or asked opinion	176	51.9	163	48.1	**<0.001**
	Clerking/assess risk/ do therapy under supervision	45	27.6	118	72.4	
Took Neuroscience	Yes	154	41.0	222	59.0	**0.017**
	No	67	53.2	59	46.8	

Table 4: Importance of career aspects in affecting likelihood of choosing psychiatry

		Likely		Unlikely		
Factor	**Important?**	**N**	**%**	**N**	**%**	**p-value**
Academic opportunities	Yes	97	45.1	118	54.9	0.908
	No	32	42.7	43	57.3	
	Neutral	92	43.4	120	56.6	
Research opportunities	Yes	66	46.2	77	53.8	0.827
	No	54	43.5	70	56.5	
	Neutral	101	43.0	134	57.0	
Competition for training places	Yes	128	44.4	160	55.6	0.975
	No	19	43.2	25	56.8	
	Neutral	74	43.5	96	56.5	
Flexible working	Yes	155	44.0	197	56.0	0.723
	No	10	37.0	17	63.0	
	Neutral	56	45.5	67	54.5	
Job prospects	Yes	164	43.2	216	56.8	0.788
	No	8	47.1	9	52.9	
	Neutral	49	46.7	56	53.3	
Emotional drain/ burnout	Yes	176	43.9	225	56.1	0.633
	No	5	33.3	10	66.7	
	Neutral	40	46.5	46	53.5	
Salary/ Pay	Yes	82	39.6	125	60.4	0.212
	No	36	50.0	26	50.0	
	Neutral	103	46.2	120	53.8	
Prestige among general public	Yes	39	35.5	71	64.5	0.101
	No	74	48.4	79	51.6	
	Neutral	108	45.2	131	54.8	
High status among medicine	Yes	31	32.6	64	67.4	**0.041**
	No	79	45.4	95	54.6	
	Neutral	111	47.6	122	52.4	
Work-life balance	Yes	176	43.3	230	56.7	0.792
	No	8	50.0	8	50.0	
	Neutral	37	46.3	43	53.8	
Perception of competency	Yes	92	42.4	125	57.6	0.811
	No	32	45.7	38	54.3	
	Neutral	97	45.1	118	54.9	

Job satisfaction	Yes	186	42.2	253	57.6	0.053
	No	4	36.4	7	63.6	
	Neutral	31	59.6	21	40.4	

Table 5: Attitudes towards psychiatry and stigma towards people with mental illness in affecting likelihood of choosing psychiatry

	Likely	**Unlikely**	**p-value**
	Mean (S.D.)	**Mean (S.D.)**	
ATP-18 scores	66.66 (5.49)	63.50 (6.08)	**<0.001**
OMS-HC scores	36.87 (6.59)	39.10 (6.69)	**<0.001**

Table 6: Personality traits in affecting likelihood of choosing psychiatry

	Likely		**Unlikely**		**p-value**
	Mean	**S.D.**	**Mean**	**S.D.**	
Extraversion	11.19	3.65	11.47	3.58	0.397
Agreeableness	16.35	2.26	15.63	2.38	**0.001**
Conscientiousness	13.50	3.28	14.08	3.24	0.050
Neuroticism	11.64	3.43	10.75	3.16	**0.003**
Intellect/ Imagination	14.57	3.02	14.69	3.09	0.662

Table 7: Logistic regression examining factors with not choosing psychiatry as a career*

Factor	**Category**	**Odds Ratio**	**95% C.I.**	**95% C.I.**	**P-value**
			Lower	**Lower**	
Age (in years)		1.18	1.02	1.36	0.029
A trusted doctor/ nurse who has close contact with you	Yes	0.52	0.28	0.94	0.030
	No	Ref.	-	-	-
Interest in psychiatry prior to admission	Yes	0.05	0.01	0.38	0.004
	No	Ref.	-	-	-
Highest education attained prior to admission	Postgraduate	0.05	0.01	0.34	0.002
	Pre-tertiary	Ref.	-	-	-
Joined psychiatry/mental health club	Yes	0.24	0.09	0.64	0.005
	No	Ref.	-	-	-
Weeks of psychiatric training	0 week	Ref.	-	-	-
	≤5 weeks	2.67	1.21	5.91	0.015
	>5 weeks	2.60	1.44	4.70	0.002
High status among medicine	Important	1.97	1.10	3.51	0.022

	Indifferent	Ref.	-	-	-
ATP-18 score		0.92	0.88	0.96	<0.001
Neuroticism		0.92	0.86	0.98	0.009

*Backwards selection procedure, variables entered initially: age, stage of schooling, having close contact with a trusted doctor/nurse, personal/ family experience of a physical and mental illness, interest in psychiatry and highest education attained prior to admission, academic and lectures, junior clinicians during placement, optional courses and electives, mental health club membership, weeks of psychiatric training received, clinical placement, level of responsibility in psychiatric patient care, neuroscience module, high status among medicine, ATP-18 score, OMS-HC score, agreeableness and neuroticism.

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Appendix A

Which subjects have you been exposed to before entering your current school?

Economics	Psychology	Philosophy
Sociology	Modern Languages	History
Accounting/Finance/Business	Art/Design	Classical Languages
Chemistry	Geography	Information Technology
Technology	Physics	Music
Performing Arts	General Studies	Mathematics
Politics	Religious Studies	Biology
English	Sports Science	

Appendix B

Which of the following subjects/ courses have you been taught at your medical school?

Behavioral Sciences	Philosophy	Psychology
Ethics	Communication Skills	Sociology
Neuroscience	Other psychiatry and mental health related subjects	

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	5
Methods			
Study design	4	Present key elements of study design early in the paper	5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	5
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5-7
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5-7
Bias	9	Describe any efforts to address potential sources of bias	5
Study size	10	Explain how the study size was arrived at	NA
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6-7
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7
		(*b*) Describe any methods used to examine subgroups and interactions	7
		(*c*) Explain how missing data were addressed	NA
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	NA
		(*e*) Describe any sensitivity analyses	NA
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8
		(b) Indicate number of participants with missing data for each variable of interest	NA
Outcome data	15*	Report numbers of outcome events or summary measures	7
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	7
		(*b*) Report category boundaries when continuous variables were categorized	6-7
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	7-9
Discussion			
Key results	18	Summarise key results with reference to study objectives	9-10
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	12
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	12-13
Generalisability	21	Discuss the generalisability (external validity) of the study results	NA
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	13

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.