ORIGINAL ARTICLE
EXAMINING CORRELATES OF FIVE FACTOR MODEL PERSONALITY TRAITS OF FUTURE SPECIALISTS AND THEIR SPECIALTY PREFERENCES: A CROSS-SECTIONAL ANALYTICAL STUDY

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Background: Personality traits significantly influence medical students' and physicians' specialty choices. The Five Factor Model assesses extraversion, conscientiousness, openness, agreeableness, and neuroticism. Certain specialties attract individuals with specific traits, and recognizing these correlations enhances medical education and career planning. Objectives were to assess personality traits of medical students and house officers using Factor Five Model, identify their future specialty preferences and determine any correlation. **Methods:** This cross-sectional analytical study (n=230) was conducted among medical students from a private medical college and house officers at a tertiary care hospital in Rawalpindi, Pakistan, after ethical approval from March to August 2023. A self-administered questionnaire collected demographic data, specialty preferences, and personality traits assessed using the Big Five Inventory–2 Extra-Short Form with Cronbach's α = 0.74. Data were analyzed on SPSS v-23 ($p \leq 0.05$). **Results:** Out of 230 respondents, 64.8% were females, mean age 23±1.5 years. Agreeableness had highest mean score (10.97±2.26), Neuroticism was lowest (8.70±2.49), with females scoring higher in both. Significant higher Agreeableness was linked to post-graduate study plans ($p=0.028$). Surgery (n=75) and Internal Medicine (n=50) were most preferred. Extraversion was significantly higher in Surgery ($p=0.014$) and lower in Radiology ($p=0.027$). Paediatrics correlated with higher neuroticism ($p=0.028$), family medicine with lower neuroticism ($p=0.05$). Emergency Medicine ($p=0.018$) and Ophthalmology ($p=0.05$) were associated with higher agreeableness. **Conclusion:** These findings highlight personality patterns influencing specialty choices in medical professionals. Recognizing these associations aids medical training, career counselling, and workforce planning, ensuring balanced physician distribution. Tailored guidance may enhance job satisfaction, fulfilment, and healthcare efficiency.

Keywords: Big-Five Inventory; Medical students; Personality traits; Specialty preference; Healthcare workforce

INTRODUCTION

Personality is an undeniably core aspect of human nature, not only influencing it in all spheres of life but also a source of potential conflicts with one's surroundings in the face of incompatibility.[1] While certain individuals may appear to be "born" for a certain medical specialty, in most cases medical students' preference for a particular specialty is a complex and highly individualized process influenced by several factors ranging from personal interest to the length of training, workload, lifestyle-related factors, type of patient interactions and research opportunities.[2] Gender is another important factor that influences career choice. For example, many male students limit their specialty choices to surgery, internal medicine, and orthopaedics.[3] Women tend to prefer fields like neonatology (OR 9.15, 95% CI 3.02-45.46).[4] Research highlights that personality traits are crucial in shaping medical students' specialty choices and can evolve throughout their academic and clinical experiences.[2]

The Five-Factor Model (FFM) of personality, which includes extraversion, conscientiousness, openness to experience, agreeableness, and neuroticism, is widely used to study personality across cultures.[5] Studies indicate that individuals with higher agreeableness tend to prefer clinical medicine over basic medicine ($p=0.010$), while those with higher openness favour medical departments ($p=0.031$)[5]. Remarkably, medical residents score higher in agreeableness (mean score=47.4) compared to surgical residents (mean score=40.5), while surgical residents score higher in extraversion (52.4 vs. 45.4).[6,7]

Personality traits also influence the choice of specialty. A study found that 50% of participants

preferred surgery-oriented specialties, which were linked to higher extraversion, conscientiousness, and fewer negative emotions compared to those opting for medicine-oriented specialties.[8] Surgical fields are associated with higher conscientiousness, openness, extraversion, and lower neuroticism, with extraversion negatively correlated with burnout among surgical residents.[9]

In a study with an average participant age of 23.4 years, 46.6% of students expressed interest in General Practice (GP). Greater interest in GP was associated with higher levels of neuroticism and agreeableness, whereas lower interest was linked to higher openness and conscientiousness. Age was a significant predictor, with older students showing more interest in GP, while gender had no significant effect.[10]

This study aims to explore specialty preferences and personality traits among medical students using the FFM, hypothesizing a significant correlation between personality traits and specialty choices. Understanding these relationships is essential for optimizing medical education, aligning career paths with personal strengths, and promoting job satisfaction and patient care. This research is particularly valuable in the Pakistani context, where limited data on this topic exists, and can inform future policies in medical education.

MATERIAL AND METHODS

A cross-sectional analytical study was conducted among medical students of fourth and final year MBBS at private Medical College, Islamabad and house officers at a tertiary care teaching Hospital, Rawalpindi, from March to August 2023 over a period of six months. A sample of 237 was determined by using Rao soft Sample size calculator[11] with margin of error at 5%, confidence level at 95%, for a population size of 441 and expected response distribution of 50% and 15% adjustment for non-response. Out of three strata of Fourth year, Final year MBBS classes, and the house officers comprising of 149, 159 students and 142 house officers respectively, a proportionate random sample pf 80, 81 and 76 respondents were selected with consent. Both male and female medical students currently enrolled in Fourth and Final Year MBBS and House officers who were undergoing house-job training at the study hospital were included into the study. Students from basic sciences, Ist year to 3rd year were excluded having minimal clinical exposure. Medical students and house officers who were not present at the time of data collection were excluded from the study. In this study future specialists refer to currently enrolled 4th and final-year MBBS students and house officers

participating in the study. As defined by the American Psychological Association, personality comprises enduring characteristics and behaviours that influence an individual's unique adjustment to life, including traits, interests, values, and emotional patterns. Five Factor Model (FFM), a validated model categorizing personality into five major traits, Extraversion (Sociability, assertiveness, and activity), Agreeableness (Compassion, politeness, and trust), Conscientiousness (Organization, self-discipline, and reliability), Neuroticism (Emotional instability, anxiety, and mood swings), Openness to Experience (Imagination, intellect, and preference for novelty).[12]

A self-administered questionnaire with open and close-ended questions was used after obtaining approval from the institutional ethical review board [Ref. no. FF/FUMC/215-296 Phy/23, dated 20th March 2023]. Informed consent was taken, and purpose of study explained. Anonymity and confidentiality of participants were strictly maintained throughout the research. The questionnaire had three sections covering demographic information, future specialty preferences, and personality traits. The personality traits were assessed using the Big Five Inventory–2 Extra-Short Form (BFI-2-XS), which measures extraversion, conscientiousness, openness to experience, agreeableness, and neuroticism. A 15-item form, on a five-point Likert scale on scale 1–5 (strongly disagree to strongly agree), with six items with reverse coding and total 5 score for each item. Items which were corresponding to the five domains were Extraversion.[1,6,11] Agreeableness[2,7,12], Conscientiousness[3,8,13], Negative Emotionality[4,9] and Open-Mindedness[5,10,14]. Before data collection, face validity to ensure relevance, appropriateness of the tool was taken from five experts, two Public Health Specialists, two Clinicians and a Biostatistician. Feedback of a group of final year and 4th year MBBS students and a few House officers was taken for refining language and comprehension. The questionnaire's reliability was assessed using Cronbach's Alpha, yielding a value of 0.9, indicating excellent internal consistency. Data were analyzed using SPSS version 23. Descriptive statistics, including mean and standard deviation, were used to summarize personality trait scores. Tests for Normality revealed that the data was not normally distributed as p-value was less than 0.05. For Inferential statistical analysis, non-parametric tests Mann-Whitney and Kruskal-Wallis tests were applied to see the association between independent and dependent variables. Spearman rho Correlation test was applied to determine the correlation between Personality traits and specialty preferences. A p-value of ≤0.05 was taken as statistically significant.

RESULTS

The study included 237 participants, with a high response rate of 230 (97.05%). The dataset was gender diverse, with most participants in their 4th year of MBBS. The mean duration of house jobs for house officers was 3.31±5.05 months. A significant majority of respondents, 214 (93%), expressed an intent to pursue postgraduate specialization (Table-1). Clinical Sciences emerged as the most preferred career path, chosen by 204 (88.7%) respondents. Basic Sciences were less popular, with 15 (6.5%). Five (2.2%) respondents did not express a preference for any specialization. (Figure 1).

Among clinical specialties, Surgery (n=75), Internal Medicine or its subspecialties (n=50), and General/Family Medicine (n=42) were the most chosen (Table-2). Out of the 15 respondents, who expressed a preference for basic science specialties, Pathology 8(3.5%) was the most preferred and two each opted for medical education and Community Medicine whereas least preferred for Anatomy and Biochemistry.

Personality traits, as assessed by the Big Five Inventory, exhibited variability in Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience scores. The normality of the data was tested using the Kolmogorov-Smirnov test, which indicated that the data for all Big Five traits and preferences (career path, clinical, and basic specialties) deviated significantly from a normal distribution ($p<0.001$). Consequently, non-parametric tests were employed for subsequent analyses. Non-parametric tests revealed significant differences in Agreeableness ($p=0.000$) and Neuroticism ($p=0.009$) scores between genders. Mean ranks showed that females had higher scores in both Agreeableness (126.92 vs 94.50) and Neuroticism (123.86 vs 100.13). (Table-2.) Further analysis indicated varying personality trait scores based on respondents' career plans. A statistically significant difference was observed in Agreeableness scores ($p=0.028$) among the different specialty preferences. A statistically significant difference ($p=0.05$) in Neuroticism scores was found, with lower p vale scores for those preferring Family Medicine and significantly higher scores ($p=0.028$) for those preferring

Paediatrics. Similarly, significantly higher Extraversion scores were found among respondents preferring Surgery ($p=0.014$), while lower Extraversion scores were observed among those interested in Radiology ($p=0.027$). (Table-2). Additionally, higher Agreeableness was observed among those preferring Emergency Medicine ($p=0.018$), with a significant borderline difference for those opting for Ophthalmology ($p=0.05$).

Mann-Whitney tests revealed no statistically significant differences in the Big Five personality trait scores for respondents with preferences for the rest of the specialties, indicating that personality traits did not seem to be associated with these specialty choices.

The study found that Extraversion was significantly associated with a preference for Surgery ($p=0.014$), while Radiology had lower Extraversion scores ($p=0.027$). Kruskal Willis test showed a significant association with agreeableness trait and intention for post graduate specialization ($p=0.028$) while rest of the traits did not show any significant association. Preferences for Emergency Medicine ($p=0.018$) and Ophthalmology ($p=0.05$) were significantly correlated. These results support the alternate hypothesis (H_1), indicating a significant correlation between personality traits and specialty choices. However, no statistically significant association was found between Conscientiousness, Openness to Experience and specialty preferences ($p>0.05$), leading to the failure to reject the null hypothesis (H_0) for these traits. (Table-3)
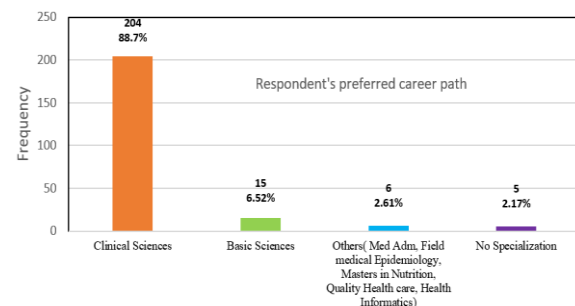

Figure 1: Future specialists preferred career Path n=230

Table-1: Distribution of Respondent's Demographic Characteristics. n= 230

Variables	Results
Age in years (Mean ± SD)	23±1.5
Gender Distribution, *n* (%)	
Male	81 (35.2%)
Female	149 (64.8%)
MBBS year wise distribution, *n* (%)	
4th year	80 (34.8%)
Final year	78 (33.9%)
House Officers	72 (31.3%)
Duration of House Job (Months) mean ±SD	3.31±5.05 months
Plans to pursue postgraduate Specialization n (%)	
Yes	214 (93%)
No	5 (2.2%)
Undecided	11 (4.8%)

Table-2: Relationship between big five inventory traits and choice of clinical specialty[22]

Clinical specialty**	n	Big Five Personality Traits									
		Extraversion		Agreeableness		Conscientiousness		Neuroticism		Openness to Experience	
		Mean±SD	p value	Mean±SD	p value	Mean±SD	p value	Mean±SD	p value	Mean±SD	p value
Family Medicine	**42**	9.71±2.66	0.503	11.36±2.36	0.156	9.67±2.10	0.262	8.05±2.73	**0.054***	10.33±1.83	0.367
Internal Medicine	**50**	10.24±2.71	0.241	11.30±2.15	0.176	10.06±2.63	0.949	8.88±2.74	0.519	10.82±2.33	0.255
Surgery	**75**	9.43±2.51	**0.014***	11.21±2.21	0.209	10.17±2.19	0.473	8.79±2.62	0.554	10.55±2.27	0.944
Pediatrics	21	10.38±2.44	0.545	11.43±2.20	0.388	9.86±2.44	0.753	9.76±2.49	**0.028***	10.86±2.50	0.334
Obstetrics and Gynecology	24	10.25±2.51	0.372	10.75±1.92	0.414	10.04±2.51	0.706	9.38±2.22	0.217	10.38±2.72	0.631
Psychiatry	18	10.00±2.09	0.828	10.83±2.55	0.606	9.33±2.09	0.183	8.78±2.73	0.576	10.83±2.66	0.299
Anesthesia	29	9.86±2.63	0.908	11.24±2.21	0.531	9.48±1.77	0.222	9.14±2.79	0.399	10.45±2.18	0.976
Emergency medicine	30	10.10±2.70	0.402	11.83±2.32	**0.018***	10.00±2.30	0.967	8.43±2.90	0.435	10.77±2.14	0.682
Dermatology	24	10.17±2.90	0.646	11.13±2.15	0.578	9.83±2.43	0.672	9.33±3.05	0.11	10.50±1.91	0.632
Orthopedic Surgery	10	9.80±2.82	0.992	11.60±1.35	0.371	10.40±2.76	0.514	8.90±1.91	0.679	11.00±0.94	0.423
Ophthalmology	20	9.70±2.36	0.626	11.95±2.16	**0.053***	9.95±2.24	0.948	8.80±3.07	0.967	10.90±1.86	0.459
Otorhinolaryngology	14	9.29±2.70	0.374	11.50±2.10	0.257	9.36±2.27	0.312	8.43±2.65	0.644	11.00±2.57	0.422
Urology	6	10.83±1.94	0.325	11.83±1.33	0.29	10.83±1.72	0.317	8.67±1.03	0.95	10.50±1.52	0.801
Radiology	15	8.80±2.01	**0.027***	11.33±1.18	0.547	9.67±1.99	0.62	8.80±2.51	0.907	10.67±1.50	0.985
Clinical specialty not aforementioned	15	10.00±2.30	0.882	11.53±1.96	0.342	10.60±2.95	0.586	8.67±2.66	0.961	11.07±2.19	0.157

n: number of respondents, **participants could choose up to 3 specialties, SD: standard deviation, *Sig: $p<0.05$

Table-3: Correlation of BFI Personality Trait Scores and preferred career paths. n=230

Spearman's rho		Respondent's preferred career path	BFI "Extraversion" score	BFI "Agreeableness" score	BFI "Conscientiousness" score	BFI "Neuroticism" score	BFI "Openness to Experience" score
Respondent's preferred career path	Correlation Coefficient	1.000	.076	-.025	-.020	-.038	.144*
	Sig. (2-tailed)	.	.251	.706	.768	.568	.029
BFI "Extraversion" score	Correlation Coefficient	.076	1.000	.117	.364**	-.150*	.195**
	Sig. (2-tailed)	.251	.	.076	**.000**	**.023**	**.003**
BFI "Agreeableness" score	Correlation Coefficient	-.025	.117	1.000	.199**	-.045	.228**
	Sig. (2-tailed)	.706	.076	.	**.002**	.494	**.000**
BFI "Conscientiousness" score	Correlation Coefficient	-.020	.364**	.199**	1.000	-.178**	.198**
	Sig. (2-tailed)	.768	**.000**	**.002**	.	**.007**	**.003**
BFI "Neuroticism" score	Correlation Coefficient	-.038	-.150*	-.045	-.178**	1.000	-.035
	Sig. (2-tailed)	.568	**.023**	.494	**.007**	.	.599
BFI "Openness to Experience" score	Correlation Coefficient	.144*	.195**	.228**	.198**	-.035	1.000
	Sig. (2-tailed)	**.029**	**.003**	**.000**	**.003**	.599	.
*. Correlation is significant at the 0.05 level (2-tailed).							
**. Correlation is significant at the 0.01 level (2-tailed).							

DISCUSSION

Personality traits play a crucial role in shaping the specialty preferences of healthcare professionals, and these preferences often evolve throughout academic and clinical experiences. Several studies have examined how certain medical specialties tend to attract individuals with specific personality traits. Internal medicine and surgery are commonly associated with differing personality characteristics, such as agreeableness and extraversion.

The study by Lin Kyaw *et al*. on personality differences between surgical and internal medicine residents and in an Asian population found that internal medicine residents showed higher scores in overall agreeableness.[8] This is aligned with our study, where we observed a higher percentage of students preferring surgery and internal medicine, a pattern consistent with previous research.[8,9] The findings suggest that individuals inclined towards internal medicine may possess traits of cooperation and empathy, making them more attuned to patient care and communication. On the other hand, surgical residents tend to display higher levels of extraversion, a trait associated with sociability and assertiveness, which facilitates teamwork and effective communication in high-pressure surgical environments.[9,14,15]

Nawaiseh *et al.'s* study, which explored the personality traits of medical students and fresh graduates in Jordan, highlighted that individuals with higher extraversion and conscientiousness scores were more likely to lean towards surgery.[9] This is resonated in our findings, where significant differences in extraversion scores were noted among those inclined towards surgery, supporting the idea that extraversion may indeed be a strong predictor for surgical career preferences. The extraverted nature of these individuals may be well-suited for the dynamic, team-based, and patient-interaction-heavy environment of surgery.

Conversely, our study found lower extraversion scores in individuals interested in radiology, indicating an inclination toward introverted, solitary tendencies. This aligns with Yielder et al.'s findings regarding radiation therapy students who favoured introversion, suggesting that fields like radiology may attract individuals who prefer more independent and less socially intense work environments.[16]

Interestingly, differences in neuroticism scores were observed in specialties like general practice and paediatrics. Our study showed a difference in neuroticism scores for those interested in general practice, a finding that aligns with prior research by Krauthausen *et al.*[10] Neuroticism is often linked with emotional sensitivity and vulnerability to stress, which may contribute to higher levels of burnout in primary care physicians.[17] The higher neuroticism scores among students preferring paediatrics, as indicated in our study, may reflect the emotional demands and challenges faced by paediatricians, which require strong emotional resilience and effective stress management strategies.

Agreeableness emerged as a significant personality trait for those preferring emergency medicine and ophthalmology, with higher scores observed in our study. The Accreditation Council for Graduate Medical Education also emphasized on empathy, cooperation, and interpersonal skills in the selection of candidates for these specialties, especially considering the high-stress scenarios that emergency medicine physicians frequently encounter.[18]

However, it is important to note the difference in the focus of our study compared to other research, such Rehmat SU study, which found personal interest to be the leading factor in specialty preferences.[19] In contrast, our study specifically examined how personality traits influenced career preferences, without considering personal interest or other factors. The difference in multifactorial nature of specialty choice was highlighted, where personality traits are only one piece of the puzzle, and underlines the importance of further research on various factors influencing career decisions.

CONCLUSION

This study highlights how personality traits such as agreeableness, neuroticism, and extraversion influence medical specialty preferences and how these traits vary across specialties. Gender differences were noted, with females showing higher agreeableness and neuroticism. These findings underscore the need for personalized counselling and a holistic approach to specialty selection and training. Career counselling and mentorship can help align individual personalities with suitable specialties, supporting informed and satisfying career choices. Understanding this relationship can guide medical education to develop competent and content healthcare professionals, improving fulfilment in chosen specialties.

Limitations of the study

This study is limited by its small sample size, cross-sectional design, and single-centre setting, which may affect generalizability. The reliance on self-reported data for both personality traits and career preferences introduces potential bias. Additionally, the study does not fully address other important factors influencing specialty choice, such as personal values, experiences, and external influences, which may also significantly shape decisions and may also play significant roles in shaping specialty preferences.

AUTHORS' CONTRIBUTION

FN: Conceptualization of the study design, literature search, data collection, data analysis, data interpretation, drafting, proof reading, critical review. TA: Conceptualization, supervision, study design, data analysis, interpretation, final draft review. MN: Literature search, data acquisition, drafting. AR: Data acquisition, results, drafting. MY, MA, AIG, AWC: Literature search, data acquisition, write-up.

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