Original Article

Comparison of Personality Types of Medical, Dental and Allied Health Students at a Private College in Pakistan using the Five-Factor Model

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Abstract

Background: The Five-Factor Model (FFM) describes personality across five domains and has been linked to academic performance, stress perception, and career selection. Given these associations, it is important to explore how personality traits differ across key demographic variables in medical and allied health student populations.

Objectives: To compare mean personality trait scores across gender, residential status, academic year, and degree program among medical, dental, and allied health students.

Methodology: A cross-sectional study was conducted at CMH Lahore Medical College & Institute of Dentistry from January-May 2023. A total of 384 students enrolled in MBBS, BDS, DPT, and MIT programs completed the Big Five Inventory (BFI-44). Independent sample t-tests were used to compare personality scores across gender and residential status, while one-way ANOVA was applied to evaluate differences across academic years and degree programs. Post hoc Dunnett tests were conducted where appropriate. A p-value < 0.05 was considered statistically significant.

Results: Significant differences were observed across gender and residential status. Males demonstrated higher emotional stability, surgency/extraversion, and imagination (p-value < 0.05). Day scholars scored higher in agreeableness (p-value = 0.006), whereas hostel boarders had higher emotional stability (p-value = 0.019). No significant differences were found across degree programs. Conscientiousness differed significantly across academic years (p-value = 0.015), with second-year students scoring higher than first-year students.

Conclusion: The findings indicate that personality traits vary with gender, living environment, and early academic transition, highlighting the importance of recognizing personality differences to better tailor mentoring and educational strategies within medical and allied health education.

Keywords: Personality, Students, Medical, Allied Health Personnel, Personality Inventory

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Introduction

The Five Factor Model is a suggested grouping or taxonomy of personality traits into five 'domains': extraversion, agreeableness, conscientiousness, emotional stability and intellect (or imagination). The model's five 'domains' have been found to represent

most personality traits and the model is found to be a comprehensive method of detailing an individual's personality traits.[1] These personality traits have been found to have strong correlations with an individual's academic abilities, among other parameters. For instance, a study conducted in 2022 reported that the combined effect of cognitive ability and personality traits accounted for 27.8% of the variance in academic performance. Notably, Conscientiousness (often referred to as Factor IV in Big Five models) demonstrated exceptional predictive power, maintaining its influence even when controlling for cognitive ability, and accounting for a significant 28% of the total explained variance in academic performance.[2]

Personality is also a significant factor in vocational decision-making, as reported by a recent study that specifically highlighted a systematic link between individual personality profiles and chosen academic majors, underscoring an early and strong connection between personality and career pathways.[3] Personality plays a significant role in shaping how individuals perceive and experience psychological stress.[4] When examining stress under different conceptual frameworks, only neuroticism, agreeableness, and conscientiousness were linked to increased exposure to stressors.[4] Moreover, associations between the Big Five personality traits and preferred learning approaches have been reported, particularly linking agreeableness and conscientiousness with collaborative and project-based learning preferences.[5] Additionally, strong associations have been reported between the five-factor model and emotional intelligence, with neuroticism emerging as the strongest individual predictor.[6]

In the field of healthcare, the role of personality has been highlighted in a study linking Big Five personality traits with clinical workplace performance among final-year medical students. The findings showed that extraversion and conscientiousness were positively associated with greater trainee autonomy, indicating a reduced need for supervision in clinical tasks.[7] A longitudinal study following medical students from Year 1 to Year 6 reported small changes in personality traits during training, with slight decreases in neuroticism and conscientiousness and an increase in agreeableness. Most of these changes were observed during the preclinical years (Years 1-3).[8] In addition, changes in residential status may influence personality, primarily through effects on emotional stability.[9] Furthermore, personality and cognitive intelligence have previously been used to predict career paths.[10] The objective of the current study was to compare mean personality trait scores across gender, residential status, academic year, and degree program among medical, dental, and allied health students. There are previous comparisons between fields, especially Bachelor of Dental Surgery (BDS) and Bachelor of Medicine Bachelor of Surgery (MBBS), which show a uniform mean variation of factors between the students of the two disciplines,[11] and this study intends to expand on these by including the Allied Health Sciences students of Medical Imaging Technology (MIT) and Doctor of Physiotherapy (DPT). We hypothesized that personality trait scores would differ significantly across gender and residential status, given documented biological and environmental influences on personality, while differences across degree programs were expected to be minimal given the shared institutional context.

Methodology

This was a cross-sectional analytical study, conducted at CMH Lahore Medical College and Institute of Dentistry, Lahore, Pakistan, a private medical institution. Data were collected over a period of five months, from January to May 2023. The sample size was calculated using the World Health Organization (WHO) formula for estimation of proportions in a finite population:

$$n = Z^2 \times p\,(1 - p) / d^2$$

where Z=1.96 at 95% confidence level, p=50% (assumed in the absence of prior local prevalence data), and d = 5% margin of error. The calculated sample size was adjusted using finite population correction based on the total number of eligible students enrolled in the institution. Sampling was performed using a non-probability convenience sampling technique. Students who met the eligibility criteria and consented to participate were included until the required sample size was achieved. A total of 384 completed responses were included in the final analysis, representing a response rate of approximately 91.0% (384 of approximately 422 students approached).

Ethical Consideration: Ethical approval was obtained from the Institutional Review Board (IRB) of CMH Lahore Medical College (Case No. 735/ERC/ CMH/ LMC, dated 26-01-2023). Informed written consent was obtained from all study participants prior to data collection. Confidentiality of participant information was ensured throughout the study; no identifying information was recorded, and data were used solely for

research purposes.

Inclusion Criteria: Students enrolled in MBBS, BDS, DPT, and MIT programs at CMH Lahore Medical College, who provided informed written consent and filled out the questionnaire.

Exclusion Criteria: House officers and graduates were not included. Moreover, students who did not provide consent and those with incomplete or improperly filled questionnaires were excluded.

Data were collected using a structured, self-administered questionnaire. The instrument consisted of two components. First a demographic section including age, gender, residential status, academic year, and degree program. Respondents were additionally asked whether the program they were currently enrolled in was their first choice. Second section included The Big Five Inventory (BFI-44), a standardized, open-access instrument developed by John, Donahue, and Kentle (1991).[12] It consists of 44 items assessed on a 5-point Likert scale and measures five personality domains: Extraversion (Surgency), Agreeableness, Conscientiousness, Emotional Stability (Neuroticism reversed), and Intellect/ Imagination (Openness). BFI-40 trait scores were computed by averaging item responses for each of the five domains after reverse-coding negatively keyed items, in accordance with standard scoring procedures. Resulting scale scores ranged from 1 to 5, with higher values indicating greater expression of the trait. For analytical purposes, trait scores were subsequently standardized (z-scored), yielding values centered around the sample mean, with negative scores indicating below-average levels relative to the study population. The instrument has demonstrated established internal consistency and construct validity across diverse populations.[12] Internal consistency of the BFI-44 in the present sample, assessed using Cronbach's alpha, yielded values ranging from 0.61 to 0.79 across the five subscales, consistent with prior validation studies.

Statistical Analysis

Data were entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 28 (IBM Corp., Armonk, NY, USA). Shapiro Wilk test was used to check the distribution of the data. Descriptive statistics were calculated for all demographic variables. Continuous variables were expressed as mean ± standard deviation (SD), while categorical variables were summarized as frequencies and percentages. Independent sample t-test was applied to compare mean personality trait scores between genders and between residential status groups (day scholars vs. hostel boarders). One-way Analysis of Variance (ANOVA) was used to compare mean personality scores across different academic years and degree programs. Post hoc Dunnett tests were applied where statistically appropriate. A p-value of less than 0.05 was considered statistically significant. Given that multiple traits were tested across several demographic groups, there is an inherent risk of Type I error; uncorrected p-values are reported alongside effect sizes to aid interpretation in this exploratory study.

Results

A total of 384 students participated in this study. Majority of the respondents were female (71.9%) and day scholars (59.9%). Most were enrolled in the MBBS degree program (56.5%), followed by the DPT program (17.2%), BDS (14.8%), and MIT (11.5%). The largest proportion of respondents were second-year students (29.7%), followed by third year (24.0%) and first-year (23.7%) students. A detailed frequency distribution is provided in Table I.

Independent samples t-tests were conducted to examine differences in the Five Factor personality trait scores between male and female students (Table II). Males scored significantly higher than females on emotional stability, surgency/extraversion, and intellect/ imagination. Males also recorded higher the mean scores on conscientiousness and agreeableness were also higher

Table 1: *Frequency Distribution of Respondents*

Variable	Category	Frequency	Percentage (%)
Degree Program	BDS	57	14.8
	DPT	66	17.2
	MBBS	217	56.5
	MIT	44	11.5
Year of Study	First Year	91	23.7
Year of Study	Second Year	114	29.7
	Third Year	92	24.0
	Fourth Year	39	10.2
	Final Year	48	12.5
Gender	Male	108	28.1
	Female	276	71.9
Residential Status	Day Scholar	230	59.9
	Hostelites / Boarder	154	40.1
Total		384	100.0

as compared to females; however, these differences did not reach statistical significance.

Independent samples t-tests were also used to compare Five Factor scores between day scholars and hostelites (Table III). Day scholars had a significantly higher mean agreeableness score, while hostelites had a significantly higher mean emotional stability score. No significant differences were found for surgency, conscientiousness, or intellect/imagination

No statistically significant differences were found for any of the five traits across the four healthcare degree programs as shown in Table IV. A one-way ANOVA was conducted to examine diffe-rences in personality trait scores across academic years (Table V). A significant difference was found for conscientiousness. Post hoc Dunnett's test revealed that

Table II: *Comparison of Personality Trait Scores by gender*

Trait	Male Mean±SD	Female Mean±SD	t	do	p-value
Surgency	-0.82±7.41	-2.67±6.94	2.296	382	0.022*
Agree-ableness	5.37 ± 4.67	4.54 ± 4.29	1.670	382	0.096
Conscien-tiousness	2.75 ± 5.17	2.39 ± 5.03	0.623	382	0.534
Emotional Stability	-17.41 ± 7.60	-21.59 ± 6.81	5.235	382	<0.001*
Intellect/ Imagination	17.82 ± 6.18	15.97 ± 5.14	2.767	168.018	0.006*

*p-value calculated by independent sample t test,*statistically significant at p-value < 0.05. SD: standard deviation. Levene's test for equality of variances was applied; ds=168.018 for Intellect/ Imagination indicates unequal variances assumed. Cohen's d: Surgency = 0.26; Agreeableness = 0.19; Conscien-tiousness = 0.07; Emotional Stability = 0.59; Intellect/ Imagination = 0.34.*

Table III: *Comparison of Personality Trait Scores by gender*

Trait	Day Scholars Mean ± SD	Hostelites Mean±SD	t	def.	p-value
Surgency	-2.09 ±7.14	-2.24±7.08	0.207	382	0.836
Agree-ableness	5.28 ± 4.34	4.01±4.42	2.778	382	0.006*
Conscien-tiousness	2.50 ± 5.34	2.47±4.66	0.057	382	0.954
Emotional Stability	-21.13 ± 7.54	-19.35 ± 6.75	-2.357	382	0.019*
Intellect/ Imagination	16.92 ± 5.35	15.86 ± 5.69	1.856	382	0.064

*p-value calculated by Independent Sample t-test, *Statistically significant at p-value < 0.05. SD: standard deviation. Cohen's d: Agreeableness = 0.29; Emotional Stability = 0.25.*

Table IV: *Personality Trait Scores across Degree Programs*

Trait	BDS Mean ± SD	DPT Mean ± SD	MBBS Mean ± SD	MIT Mean ± SD	F	p-value
Surgency	-1.47 ± 7.16	-2.73 ± 6.99	-2.07 ± 7.48	-2.52 ± 5.25	0.364	0.779
Agreeableness	4.67 ± 4.33	4.38 ± 3.87	5.09 ± 4.65	3.93 ± 4.05	1.088	0.354
Conscientiousness	1.98 ± 4.76	3.38 ± 4.89	2.62 ± 5.32	1.20 ± 4.16	1.869	0.134
Emotional Stability	-22.26 ± 7.89	-21.35 ± 6.70	-19.66 ± 7.40	-20.34 ± 6.24	2.395	0.068
Intellect/Imagination	15.60 ± 3.93	16.79 ± 4.96	16.94 ± 6.08	14.98 ± 4.70	2.187	0.089

F-statistics and p-values obtained using one-way ANOVA with df = (3,380).p-value < 0.05 considered statistically significant, SD: standard deviation. No statistically significant differences were observed across degree programs. Partial η^2 (effect size) was negligible: Surgency = 0.003; Agreeableness = 0.009; Conscientiousness = 0.015; Emotional Stability = 0.019; Intellect/Imagination = 0.017

Table V: *Comparison of Personality Trait Scores by Year of Study*

Trait	1st Year Mean ± SD	2nd Year Mean ± SD	3rd Year Mean ± SD	4th Year Mean ± SD	Final Year Mean ± SD	F	p-value
Surgency	-2.69 ± 6.85	-2.14 ± 6.52	-1.30 ± 7.38	-1.21 ± 7.89	-3.52 ± 7.70	1.077	0.368
Agreeableness	4.85 ± 4.04	4.20 ± 4.02	5.20 ± 4.73	5.64 ± 4.98	4.46 ± 4.83	1.135	0.340
Conscientiousness	3.52 ± 4.95	1.67 ± 4.80	2.11 ± 4.96	4.18 ± 4.95	1.88 ± 5.72	3.145	0.015*
Emotional Stability	-20.40 ± 6.66	-20.75 ± 7.13	-20.15 ± 7.30	-18.74 ± 6.04	-21.52 ± 9.38	0.879	0.477
Intellect/Imagination	16.25 ± 5.06	15.58 ± 5.12	16.95 ± 5.66	17.28 ± 5.89	17.60 ± 6.37	1.686	0.152

*Mean ± SD: Mean ± standard deviation .p-value calculated by One-way ANOVA. df; degree of freedom (Between Groups) = 4, df (Within Groups) = 379 for all traits.*significant p-value < 0.05. Post hoc Dunnett's test: Conscientiousness was significantly higher in 1st year compared to 2nd year students (p-value = 0.016). Partial η^2: Conscientiousness = 0.032 (small effect); all other traits < 0.02.*

first-year students had significantly higher conscientiousness scores than second-year students. No other pairwise comparison reached significance. No significant differences were found across years of study for surgency, agreeableness, emotional stability, or intellect/ imagination.

Discussion

This study compared personality trait scores across gender, residential status, academic year, and degree program among medical and allied health students using the Five-Factor Model. The findings revealed significant differences by gender and residential status, while degree program showed no significant variation. Firstly, the study results indicate significant gender differences in certain personality traits among medical students. Males demonstrated higher mean scores in emotional stability, surgency/extraversion, and imagination than their female counterparts. While the differences in conscientiousness and agreeableness were not statistically significant, the trend suggests potential variations in how males and females express specific personality dimensions within the medical student population. Some studies have reported similar trends, highlighting higher levels of emotional stability and extraversion among male medical students compared to females, and how higher extraversion and emotional stability in males have been associated with better academic outcomes.[13] However, other studies report that females score higher in conscientiousness and extraversion.[14] Additionally, in contrast to our results, previous studies showed that females tend to score higher on emotional stability measures compared to males, indicating greater emotional resilience and lower levels of neuroticism.[15] These inconsistencies across studies likely reflect differences in cultural context, sample characteristics, and measurement approaches, and caution against drawing broad gender-based generalizations.

Regarding residential status, hostel boarders scored higher in emotional stability while day scholars scored higher in agreeableness. The greater emotional stability among boarders may be associated with adaptation to communal living, where navigating shared spaces and peer relationships over time may build resilience. Individuals with higher emotional stability are less vulnerable to developing mood and anxiety disorders, highlighting the protective effects of emotional resilience.[16] Contrary to our study, some research has shown that hostelites are more vulnerable to emotional disturbances because of the multifaceted pressure presented by hostel life.[17] The higher agreeableness among day scholars may reflect the continued influence of family environment and home-based social norms. Agreeableness has been linked to more cooperative interpersonal behavior and stronger social support networks.[18,19]

No significant differences were found across degree programs, which was unexpected given that Shehzad et al. previously found higher agreeableness in BDS students and higher emotional instability in MBBS students in Khyber Pakhtunkhwa.[11] The absence of such differences in our sample may reflect institutional or regional factors and warrants further investigation. Conscientiousness scores were significantly higher among first-year students compared with second-year students. Although higher scores were also observed in fourth-year students, this difference was not statistically significant. This pattern may reflect strong initial motivation at entry into medical school and a possible re-emergence of goal-directed behavior in later years. Consistent with findings by Lievens F et al., the importance of conscientiousness may increase as students' progress through medical training, particularly in relation to academic and clinical performance.[20] Longitudinal studies tracking students across all years would help clarify whether this is a stable shift or a transient response to initial academic pressures. Strengths of this study include its relatively large sample size for a single-institution study, the inclusion of four distinct degree programs, use of the validated BFI-44 instrument, and the examination of personality differences among allied health students in a Pakistani medical college context, a population that remains understudied in the personality literature. These findings have practical implications for medical educators. Awareness of personality variation across gender, year of study, and living situation can inform more targeted mentoring, pastoral support, and teaching approaches. An environment that accommodates diverse personality profiles is likely to support both student wellbeing and professional development. Specifically, mentoring programs could be tailored to account for gender-based differences in emotional stability, and residential support services might leverage the higher agreeableness seen in day scholars. The observed decline in conscientiousness from first to second year warrants attention, and early identification of students who may be at risk of reduced academic self-regulation during this transition could help inform timely pastoral interventions.

Conclusion

This study demonstrates that personality traits among medical and allied health students vary significantly with gender, residential status, and academic progression. Males displayed higher emotional stability, surgency, and imagination, while day scholars were more agreeable and hostel boarders more emotionally stable. Although degree programs showed no major differences, the increase in conscientiousness from first to second year suggests early adaptation to academic demands. These findings highlight the value of recognizing diverse personality profiles within medical education to better tailor student support, mentorship, and learning strategies.

Limitations & Recommendations

This study has several limitations. Its cross-sectional design prevents assessment of causal relationships or personality changes over time. Personality data were collected through self-report measures, which are subject to response biases, including social desirability and inaccurate self-perception. Additionally, the study was conducted at a single private medical institution in Pakistan, which may limit the generalizability of findings to other regions or educational environments. Although the sample included multiple degree programs, unequal group sizes may have reduced the power to detect smaller between-group differences. The Five-Factor Model, while comprehensive, captures broad personality domains and may overlook finer nuances relevant to medical education. Furthermore, the use of non-probability convenience sampling introduces potential selection bias, as students who chose to participate may differ systematically from those who did not. With multiple personality traits tested across several demographic groups, there is an increased risk of Type I error; results should therefore be interpreted cautiously given the exploratory nature of this study. Future longitudinal, multi-institutional studies incorporating additional psychosocial variables, such as academic stress, family environment, and extracurricular involvement, may provide a more complete understanding of personality development across the medical training continuum.

Conflict of Interest: None

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Authors Contribution

All authors have read and approved the final manuscript and agree to be accountable for all aspects of the work.

ASJ, AA & MUR: Conceived the study idea, designed the study, conducted data acquisition, performed data analysis and interpretation, drafted the manuscript, and critically revised the manuscript for intellectual content.

MT & MRM: Contributed to manuscript drafting and critical revision of the manuscript.

HSK: Supervised the study, contributed to study design and manuscript revision, and provided final approval of the version to be published.