Research Article

Non-cognitive Skills in Medical Students: Insights into Empathy, Communication Skills, and Grit

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Abstract

Background: Achievement in academic and professional contexts is influenced by non-cognitive skills, particularly in the medical field. Despite their significance, research on non-cognitive skills among medical students in Pakistan is limited.

Objective: This study aimed to assess the non-cognitive skills of grit, empathy, and communication skills among medical students at a public university in Lahore, Pakistan, and to examine their association with gender.

Methodology: A cross-sectional study was conducted among 100 MBBS students from a public university in Lahore using a non-probability convenience sampling technique. Participants included first- to final-year students enrolled in 2024. Students who did not provide consent or failed to complete the questionnaire were excluded. The means and standard deviations were calculated for empathy, communication skills, and grit. Frequency and percentages were used to describe qualitative variables, such as demographic characteristics. Independent t-tests were applied to assess associations between gender and non-cognitive skills, with a significance level set at $p<0.05$. Pearson correlation analysis was conducted to determine the strength and direction of relationships among the non-cognitive skills, with $p<0.05$ considered statistically significant.

Results: The study included 50 male and 50 female participants. The mean empathy score was 48.54 ± 6.67 for females and 47.62 ± 5.50 for males, with no statistically significant difference ($p=0.454$). Grit scores indicated that 43% of participants demonstrated an average level of grit, with no significant gender difference ($p=0.896$). Similarly, no significant association was found between gender and communication skills ($p=0.392$ for positive attitudes, $p=0.843$ for negative attitudes). Pearson correlation analysis revealed a weak but significant positive correlation between empathy and positive attitudes in communication skills ($p=0.025$). Additionally, a positive correlation was observed between positive and negative attitudes in communication skills ($p<0.01$), while no significant correlations were found among the other non-cognitive skills.

Conclusion: Medical students demonstrated average levels of grit, empathy, and communication skills, with no significant gender differences. Given the critical role of these skills in medical practice, targeted interventions are necessary to enhance them. Strategies such as structured soft-skills training, awareness campaigns, and the implementation of Project P21 for skill development are recommended to improve the current situation.

Keywords | Non-cognitive skills, grit, empathy, communication skills

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Introduction

The term "non-cognitive skills" refers to a broad range of attitudes, behaviors, and strategies that contribute to success in academic and professional settings. These skills include empathy, communication abilities, and grit,

are considered "non-cognitive" because they are distinct from traditional cognitive abilities, which are typically assessed through exams. Research increasingly highlights the significance of non-cognitive skills, suggesting they may even surpass cognitive abilities, such as IQ, in determining academic and career success.[1] Among these skills, empathy plays a critical role in the medical profession, allowing healthcare providers to connect with patients emotionally, thereby improving patient satisfaction, diagnostic accuracy and treatment adherence.[2] In Pakistan, where healthcare disparities persist, fostering such skills is crucial for addressing the diverse needs of patient populations. Similarly, effective communication skills are essential for conveying complex medical information clearly and compassionately, ensuring that patients comprehend their treatment plans.[3] This is particularly relevant in Pakistan, where varying levels of health literacy present challenges to patient-doctor communication. Another key non-cognitive skill,, grit—defined as perseverance and passion for long-term goals—has emerged as a strong predictor of success in demanding fields like medicine.[4] Given the challenges of the healthcare system in Pakistan, such as high patient loads, inadequate resources and physician burnout resilience and determination are indispensable traits for medical professionals. Research indicates that non-cognitive skills are malleable and can be developed through self-regulation exercises, performance feedback, and motivation.[5] Parental influence plays a role in their development, with early childhood experiences shaping cognitive skills, while later influences contribute more significantly to non-cognitive abilities.[6] However, in Pakistan's medical education system, students face intense academic pressure, often prioritizing academic excellence at the expense of developing essential non-cognitive skills like empathy, communication, and self-regulation. The perfectionist culture in medical schools can create excessive stress, negatively impacting students' overall well-being and professional development.[7] Recognizing this, there is a growing interest in integrating non-cognitive skills training into medical education to promote holistic learning and improve patient care outcomes.[8]

To develop more effective curricula, medical educators must understand the psychological factors that shape these essential abilities.[9] traditionally, cognitive skills have dominated discussions on student success, often overshadowing the importance of non-cognitive skills. However, in recent years, research has increasingly emphasized their role in academic and professional achievement.[10] This shift is particularly relevant in Pakistan, where unique socio-cultural factors influence the perception and development of non-cognitive skills within educational and medical institutions.

While previous studies have examined individual skills—such as empathy—there is a lack of comprehensive research evaluating these skills collectively in the Pakistani context.[11]

As a collectivist society that also embraces individualistic values, Pakistan provides a unique setting for studying non- cognitive skills. The assessment of these skills among medical students is particularly important, given their role in enhancing patient-doctor relationships, which remain undervalued in the country.[12] Also, understanding gender differences in skill development is essential. Based on existing educational research, we hypothesize that female medical students may demonstrate stronger non-cognitive skills than their male counterparts, particularly in empathy and communication. This aligns with broader research indicating that females tend to outperform males in collaborative and communicative learning environments. This study aims to evaluate the current levels of non-cognitive skills among medical students at a public-sector university in Lahore, with a specific focus on gender differences in empathy, communication skills, and grit. The findings may inform policy recommendations and curricular reforms, integrating non-cognitive skills training into medical education to enhance professional competence and address the healthcare challenges in Pakistan.

Methodology

This cross-sectional study aimed to assess non-cognitive skills among MBBS students at a public-sector university in Lahore, including students from the first to the final year enrolled during the academic year 2023–2024. The required sample size was estimated using the standard formula, yielding a calculated sample size of 96; however, to enhance statistical robustness, 100 responses were recorded, with an equal distribution of male (n = 50) and female (n = 50) participants. A non-probability convenience sampling technique was employed based on accessibility, feasibility, homogeneity of the MBBS student population, and the willingness and availability of participants. Inclusion criteria comprised MBBS students enrolled from the first to the final year, while exclusion criteria included students who did not provide consent, those who failed to complete the questionnaire, and those with diagnosed psychiatric illnesses that could potentially influence responses. Data were collected using standardized, validated questionnaires via Google Forms, following informed consent. The survey instrument consisted of four sections: demographic information (age, year of study, and gender), empathy assessment using the Jefferson Scale of Empathy (JSE), communication skills assessment using the Communication Skills Survey Questionnaire by Javaher et al. (2014), and grit assessment using the Short Grit Scale (GRIT-S). Each tool demonstrated strong reliability, with Cronbach's alpha

ranging from 0.70 to 0.90 for JSE, 0.80 to 0.90 for the communication skills questionnaire, and 0.70 to 0.85 for GRIT-S. Prior to analysis, data underwent a rigorous review and cleaning process, and statistical analyses were performed using SPSS (version 29). Descriptive analysis included the calculation of frequencies and percentages for qualitative variables (e.g., gender, year of study) and means with standard deviations for quantitative variables (e.g., empathy, communication skills, and grit scores). Independent t-tests were conducted to examine gender-based differences in non-cognitive skills, while Pearson correlation analysis was applied to assess the strength and direction of relationships between these skills. A p-value of <0.05 was considered statistically significant for all analyses.

Results

The study included a total of 100 MBBS students, equally divided between males and females (50% each). Participants' ages ranged from 19 to 24 years, with a mean age of 21.63±0.90 years. The majority of students (85%) were enrolled in the fourth year of MBBS. The distribution of qualitative demographic variables is presented in Table 1.

Table 1: *Demographic Characteristics of Study Population*

Variable		Frequency (N)	Percentage (%)
Gender	Male	50	50%
	Female	50	50%
Year of Study	19 Years	2	2%
	20 Years	6	65%
	21 Years	35	35%
	22 Years	42	42%
	23 Years	14	14%
	24 Years	1	1%
	1st Year MBBS	1	1%
	2nd Year MBBS	1	1%
	3rd Year MBBS	7	7%
	4th Year MBBS	85	85%
	5th Year MBBS	6	6%

The overall mean empathy score was 48.08±6.11, with female students scoring slightly higher (48.54±6.68) than males (47.62±5.50); however, this difference was not statistically significant (p=0.454), suggesting comparable empathy levels between genders (Table 2).

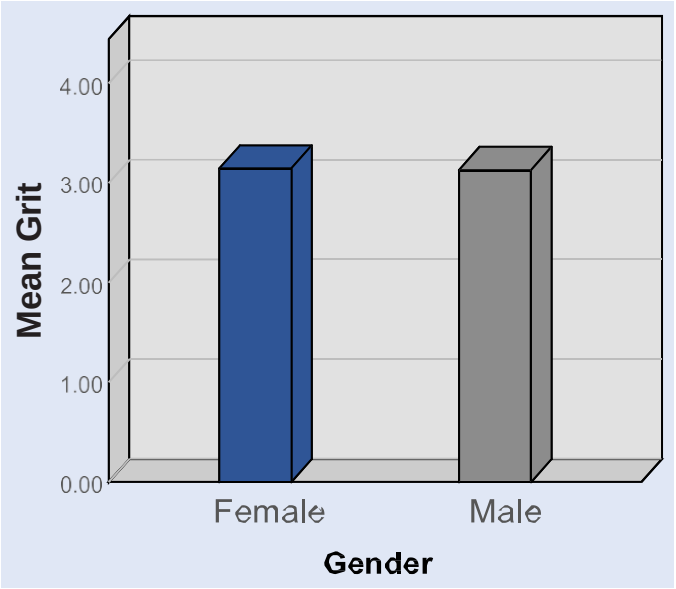
Table 2: *Overall Mean Scores of Non-Cognitive Skills with Standard Deviation*

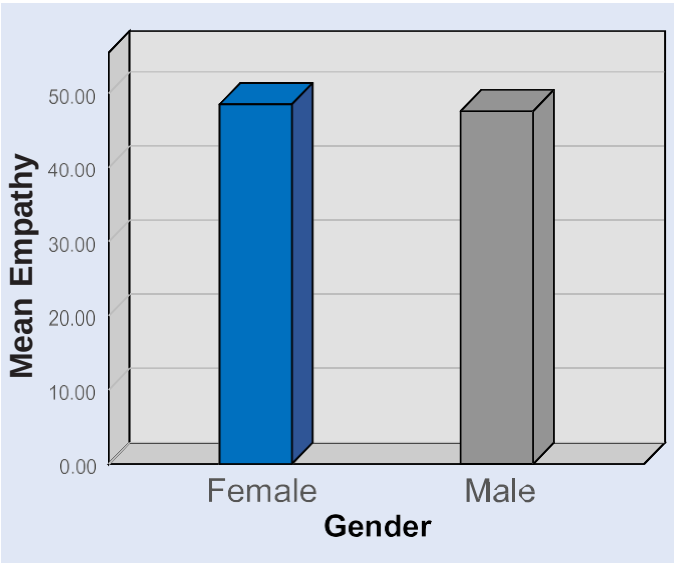
Non-Cognitive Skills	N	Mean	Standard Deviation	Confidence Interval (95%)
Empathy	100	48.08	6.10	46.89, 49.30
Communication Skills (Negative Attitudes)	100	3.04	0.40	2.96, 3.12
Communication Skills (Positive Attitudes)	100	3.45	0.45	3.39, 3.57
Grit	100	3.14	0.57	3.03, 3.25

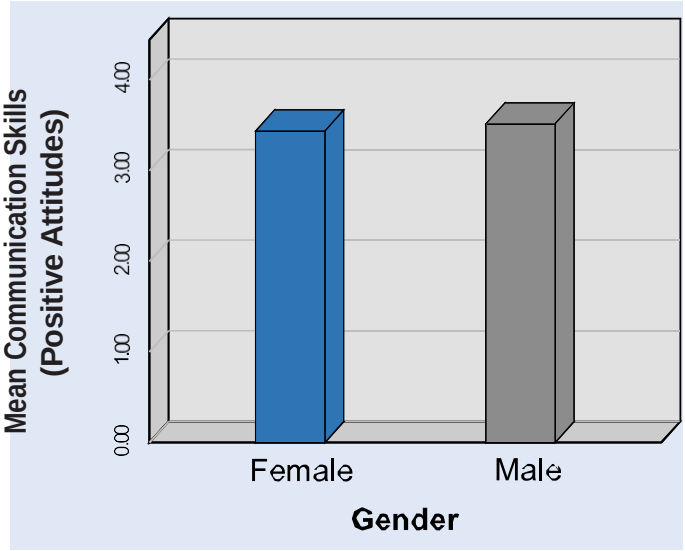
Communication skills were assessed in two subsets: negative and positive attitudes. The mean score for negative attitudes in communication skills was 3.04±0.40, with male students scoring 3.05±0.42 and females scoring 3.03±0.39. This difference was not statistically significant (p=0.843), indicating that gender does not significantly influence negative attitudes in communication (Table 3, Figure 1). Based on the grading of communication skills, 14% of participants demonstrated effective communication skills, 78% required improvement, and 8% exhibited destructive communication habits. The mean score for positive attitudes in communication skills was 3.48±0.45, higher than the negative attitudes score, indicating that participants generally exhibited more positive communication behaviors. Males scored slightly higher (3.52±0.46) than females (3.44±0.44), though this difference was not statistically significant (p=0.392, Table 3, Figure 1). According to grading, 19% of students had effective communication skills, 77% were satisfactory, and 4% had very poor communication skills (Figure 2).

Table 3: *Mean Scores of Non-Cognitive Skills according to Gender*

Non-Cognitive Skills	Gender	Frequency	Mean ± SD	p value	Confidence Interval (95%)
Empathy	Female	50	48.54 ± 6.67	0.454	-1.51, 3.35
	Male	50	47.62 ± 5.50		
Communication Skills (Negative Attitudes)	Female	50	3.03 ± 0.38	0.843	-0.18, 0.14
	Male	50	3.05 ± 0.42		
Communication Skills (Positive Attitudes)	Female	50	3.44 ± 0.44	0.392	-0.26, 0.10
	Male	50	3.52 ± 0.46		
Grit	Female	50	3.15 ± 0.59	0.896	-0.21, 0.24
	Male	50	3.13 ± 0.55		







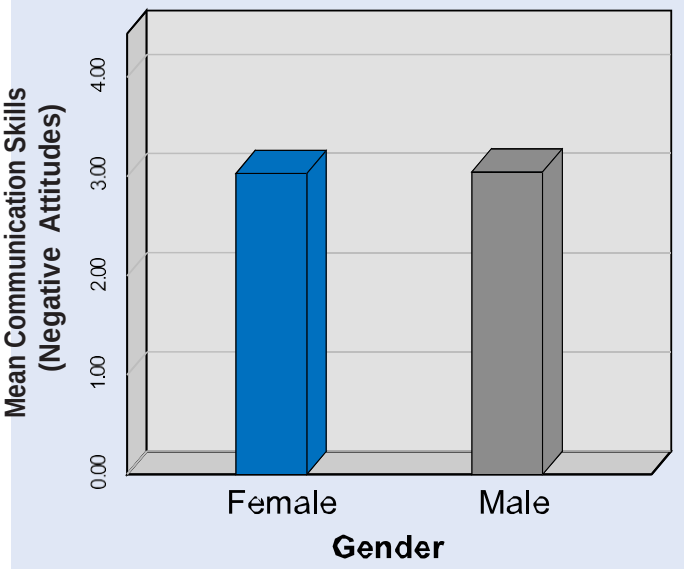


Figure 1: *Influence of Gender on Positive and Negative Attitudes in Communication*

The overall mean grit score was 3.14±0.57. Female students had a mean score of 3.15±0.60, slightly higher than males (3.13±0.55), but the difference was not statistically significant (p=0.896, Table 3, Figure 1). Grading for grit levels revealed that 23% of participants had high grit, 43% had average grit, and 34% had low grit (Figure 3). Pearson correlation analysis demonstrated a weak but statistically significant positive correlation between empathy and positive attitudes in communication skills (r=0.227, p=0.025, 95% CI=0.02, 0.39). Additionally, a moderate significant positive correlation was observed between negative and positive attitudes in communication skills (r=0.383, p<0.01, 95% CI=0.19, 0.56). However, no significant correlation was found between empathy and negative communication attitudes, nor between grit and any other measured skill (Table 4).

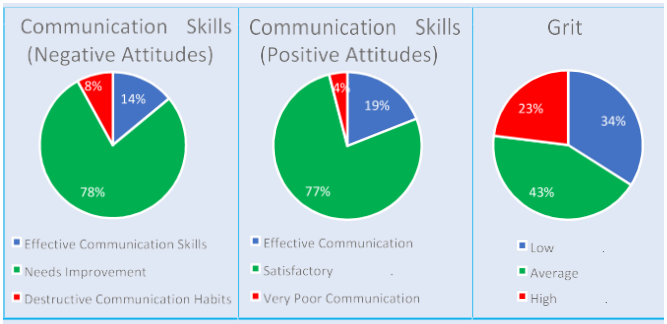


Figure 2: *Grading of Non- Cognitive Skills of the Participants*

Discussion

The results of the study suggest that levels of non-cognitive skills in medical students at a public sector university in Lahore are average and require improvement. Specifically, while the students exhibit **moderate empathy**, their **communication skills** need significant enhancement, and their **grit** levels are also average. Moreover, the data

suggests that these skills do not differ significantly between **male and female respondents.** The mean levels of empathy in this study were significantly lower than those reported in medical students from developed countries, which aligns with the findings of Imran et al. (2013), who also measured empathy and emotional intelligence in a similar context in Lahore, Pakistan.[8] The lack of significant gender differences in empathy (p = 0.454) contrasts with previous studies showing that **women** tend to score higher in empathy than men[16,17,18] The study also highlights the need for improvement in communication skills among Pakistani students, a finding consistent with previous research.[19,20] Although no correlation between gender and communication skills was observed (p=0.392 for positive attitudes, p=0.843 for negative attitudes), a study from a medical college in Islamabad reported that women outperformed men in communication skills,[21] a trend also observed in other studies.[22] Grit levels were found to be average in medical students, consistent with studies by Majeed et al. 2019 and Jehanghir et al. 2022 conducted in Pakistan.

Table 4: *Pearson Correlations between Non-Cognitive Skills*

Non-Cognitive Skills		Empathy	Communication Skills (Negative Attitudes)	Communication Skills (Positive Attitudes)	Grit
Empathy	Pearson Correlation (r)	1	0.96	0.227	0.025
	p-value		0.342	0.023*	0.808
	Confidence Interval (95%)	1, 1	-0.11, 0.30	0.02, 0.39	-0.20, 0.25
Communication Skills (Negative Attitudes)	Pearson Correlation (r)	0.096	1	0.383	-0.081
	p-value	0.342		<0.001*	0.423
	Confidence Interval (95%)	-0.11, 0.30	1, 1	0.19, 0.56	-0.29, 0.13
Communication Skills (Positive Attitudes)	Pearson Correlation (r)	0.227	0.383	1	0.061
	p-value	0.023*	<0.001*		0.545
	Confidence Interval (95%)	0.02, 0.39	0.19, 0.56	1, 1	-0.15, 0.25
Grit	Pearson Correlation (r)	0.025	-0.081	0.061	1
	p-value	0.808	0.423	0.545	
	Confidence Interval (95%)	-0.20, 0.25	-0.29, 0.13	-0.15, 0.25	1, 1

[15] The grit scores in this study (Mean = 3.14 ± 0.57) were slightly lower than those reported by Duckworth et al. (2009) in a high school sample in the United States (3.4 ± 0.8).14 Moreover, grit scores were found to be similar across genders (p = 0.896), a result that is in line with previous studies, although some research suggests a correlation between **female gender** and higher grit scores[23,24]

Statistically significant correlations were found between empathy and positive attitudes of communication skills, as well as between negative and positive attitudes of communication skills. These findings suggest complex interrelations among these non-cognitive skills and highlight their mutual influence..[1]

The findings of inadequate non-cognitive skills in Pakistani students are consistent with previous research. For instance, a comparison between Pakistani and English schoolchildren revealed that English children exhibited more advanced non-cognitive skills, including teamwork, social engagement, adaptability, problem-solving, and empathy.[25] This discrepancy has far-reaching implications for Pakistani students, especially those perspective may stem from outdated assumptions seeking to work internationally, as the global service sector increasingly values non-cognitive skills.[26] Additionally, these findings have significant consequences for healthcare provision, as these skills are critical in health-related professions. One study indicates a need for improved attitudes toward patient-centered care in Pakistan, which could be facilitated by enhancing the non-cognitive skills of doctors.[10] Furthermore, the results suggest that the current medical education system in Pakistan, which places disproportionate emphasis on memorization, contributes to the development of a more objective and less human-centered mindset among students, especially when engaging with patients.

The unsatisfactory levels of non-cognitive skills may be attributed to several factors. One likely explanation is the outdated curriculum in schools, which fails to incorporate the 21st-century skills necessary for holistic student development.[27] Another contributing factor could be the lack of emphasis from parents on fostering non-cognitive skills, as evidenced by a study showing that parents in Pakistan tend to prioritize cognitive skills over non-cognitive development.[7] This

that academic success is solely tied to cognitive ability. There were no significant gender differences in non-cognitive skills, which can be attributed to cultural

differences. It is well-documented that psychometric data from Western literature often does not apply directly to other cultures, such as Pakistan, due to unique cultural and gender dynamics.[28] Limitations of this study include a small sample size, limited to students from a particular institution in Lahore, which restricts the generalizability of the findings. Additionally, a self-reported questionnaire was used, which may have introduced bias due to students' potential inaccurate self-perceptions. Furthermore, the assessment of only three non-cognitive skills may not provide a comprehensive picture of these skills as a whole. Finally, other confounding variables could have influenced the results. To address the current gaps, soft-skills training should be incorporated into the routines of school-going children, as demonstrated by Haroon et al. (2022), who found that a soft-touch intervention significantly improved non-cognitive skills in students.[2] Additionally, independent organizations and the Higher Education Commission should organize regular workshops on soft skills in medical universities. These skills must be developed in an integrated manner, as suggested by Gutman (2013).[1] Moreover, parents should be educated about the importance of non-cognitive skills through awareness campaigns. The Partnership for 21st Century Learning (P21) initiative should also be implemented in Pakistan, as it has been in the United States, to foster skill learning.[26] Future studies should aim for a larger sample size from multiple medical universities in Lahore or across Pakistan to gain a broader and more accurate assessment of non-cognitive skills. Moreover, exploring the relationships between age, year of study, specialty interests, and academic performance in non-cognitive skills could provide valuable insights.

Conclusion

The non-cognitive skills of empathy, communication skills, and grit were assessed in a cross-sectional study involving 100 students of KEMU, Lahore, and the scores were evaluated and compared between males and females. Results revealed that students have average levels of these skills. This warrants improvement, particularly for medical students, who tend to have higher levels of these skills in developed countries owing to the importance of these skills in their profession. There were no significant differences between males and females, which could be due to the unique gender dynamics of Pakistan. Finally, soft-skills training, awareness campaigns and project ‘P21’ implementation are recommended for the future.

This cross-sectional study evaluated the non-cognitive skills—empathy, communication skills, and grit—among medical students in Lahore. The findings indicated that the students demonstrated average levels of these skills, suggesting a need for enhancement. This is particularly important for medical students, as such skills are typically more developed in their counterparts in developed countries, where they are integral to professional success. To address these deficiencies, it is recommended that soft-skills training be incorporated into the curriculum, awareness campaigns be launched, and the P21 initiative be promoted within the context of medical education in Pakistan.

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Authors Contribution:

FJ, RR: Involved in conceptualization of study

RR, MO, RR, RS, MNA: Involved in data collection

RR, MO, RR, RS, MNA, FJ: Involved in manuscript writing

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