Section: Medical Education

Original Research Article

EFFECTS OF REFLECTIVE WRITING ON MEDICAL STUDENT WELL-BEING AND PROFESSIONAL IDENTITY FORMATION

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Received : 21/04/2026
Received in revised form : 11/07/2026
Accepted : 20/07/2026

Keywords:
Reflective writing; medical students; psychological well-being; professional identity; medical education.

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DOI: 10.47009/jamp.2026.8.4.123

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2026; 8 (4); 712-717

ABSTRACT

Background: The academic level of medical training can be quite stressful, and in many cases, it is accompanied by significant psychological strain, which can negatively affect the emotional condition of students and their professional growth. The concept of reflective writing as a facilitating educational tool is increasingly suggested but its positive effect on the well-being and professional identity of medical students has not been effectively investigated in a local context. The objective is to evaluate the effects of structured reflective writing on psychological well-being and professional identity formation (PIF) among undergraduate medical students. **Materials and Methods:** A quasi-experimental pre–post intervention study was conducted at Women Medical College, Abbottabad, Pakistan. A total of 120 MBBS students participated in a six-week structured reflective writing intervention. Stress, anxiety, depression, sleep quality, mental well-being, and PIF were assessed before and after the intervention using standardized validated instruments. Paired-samples t-tests, one-way analysis of variance, and independent-samples t-tests were used for data analysis. **Result:** The perceived stress, anxiety, depression, sleep quality, and overall mental well-being were significantly improved ($p < 0.001$). There was also significant improvement in professional identity areas such as reflective capacity, empathy, moral sensitivity and professional self-concept ($p < 0.001$). The levels of improvements were similar over compliance groups and the male students showed more reduction of stress compared to the females ($p = 0.013$). **Conclusion:** Structured reflective writing significantly improves psychological well-being and PIF among medical students and may serve as a practical, low-cost supportive strategy within UGME.

INTRODUCTION

Medical training is widely recognized as a discipline that involves a great deal of mental strain and emotional stress.[1] The students would have to adjust to heavy academic demands, continual assessment, and early exposure to the clinical environment that could cause psychological stress, emotional burnout, and a decline in motivation.[2] The persistent stress during the undergraduate studies has been associated with the decline in studies performance and depressed emotional states. These obstacles were further evidence of the significant importance of educational methods that should promote resilience, emotional intelligence, and effective coping strategies. As a result, the most effective pedagogical approaches that focus on supporting academic development and mental health are gaining more and more importance in modern medical program.[3]

Reflective writing is now one of the education strategies through which students would be able to conduct a conscious analysis of their experiences, thoughts, and feelings throughout the training.[4] The students are able to identify learning needs, emotional response, and professional responsibility through structure self-reflection. Reflective writing

improves critical thinking and further learning since the students are able to connect theoretical learning and clinical experience.[5] As a part of the teaching programs, it offers the safe environment in which the students can work through their stress and uncertainty and cultivate thoughtful and reflective learning process.[6]

Professional identity formation (PIF) refers to the internalization of the values, attitudes, and practices expected of a medical professional. Its development is shaped not only by formal teaching but also by how students interpret their experiences in academic and clinical settings.[7] Reflective writing supports this process by encouraging students to think more deeply about ethical issues, human interactions, and professional responsibilities. Continuous reflection also helps students recognize their personal values and professional responsibilities while reinforcing empathy, moral sensitivity, and professional self-concept as future physicians.[8]

Although reflective practice is recognized as an important educational approach, its systematic application remains limited within UGME in Pakistan. There is limited evidence locally that considers its effects on psychological well-being as well as the PIF. This lack of contextual data restricts informed curriculum development and student support planning. Therefore, the present study was undertaken to evaluate the effects of structured reflective writing on medical students' well-being and PIF within a UGME in Pakistan.

MATERIALS AND METHODS

This research was conducted as a quasi-experimental pre–post intervention framework to evaluate the impact of structured reflective writing on the psychological well-being and the PIF among undergraduate medical students. The study was conducted in the Department of Medical Education in Women Medical College, Abbottabad, Pakistan. Data collection was done during 3 months and the process started on 18th June 2025 till 18th September 2025. During this time, the students participated in regular reflective writing activities and their everyday school-related responsibilities.

All the subjects voluntarily participated and signed an informed consent form. They assured the students of confidentiality, anonymity and their right to withdraw from the study without any academic consequences.

The sample size was calculated using the formula for comparison of paired means: $n = (d / [\sigma (Z\alpha/2 + Z\beta)])^2$ Where $Z\alpha/2 = 1.96$ (95% confidence level), $Z\beta = 0.84$ (80% power), σ = estimated standard deviation of stress score (6.0 based a cross sectional study),[9] and d = minimum expected mean difference (1.5). The calculated minimum sample size was 104 participants. To compensate for possible non-response and incomplete data, 120 students were recruited.

The sample size consisted of undergraduate students (MBBS) in the first year to final year who were interested in participating. Those students who gave written consent and were present at pre-intervention and post-intervention assessment were eligible. Students who have known history of diagnosed psychiatric illness were excluded, students who are taking psychotropic medication were excluded, and students who have not taken either of the assessments.

The orientation session by the research team introduced the idea of reflective writing to the participants. Students were instructed on how to write structured reflections with emphasis on clinical experiences, emotional responses, professional challenges and personal learning points. Every respondent was expected to make one reflective entry on a weekly basis and a total of six weeks. Submissions were made in written format and reviewed for completeness, not for grading.

Adherence to reflective writing was followed up, and participants were divided into low, moderate, and high compliance groups according to the ratio of the number of reflections submitted during the period of intervention.

Well-being was established by using validated self-administered questionnaires involving Perceived Stress Scale (PSS), Generalized Anxiety Disorder-7 (GAD-7), Patient Health Questionnaire-9 (PHQ-9), Pittsburgh Sleep Quality Index (PSQI), and the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS). Standardized measures of PIF were assessed by the use of instruments that assessed reflective capacity, professional self-concept, empathy, moral sensitivity and a summative score on overall PIF.

All measurement instruments were utilized in their verified English forms. Prior to conducting the analysis, internal consistency was assessed, and the Cronbach's alpha coefficients for each scale were determined to exceed 0.80, signifying an acceptable level of reliability.

Baseline information was compiled before the onset of the reflective writing intervention. Data gathered subsequent to the intervention were retrieved promptly following the conclusion of the six-week reflective writing phase using the same instruments. All surveys were conducted and collected in person to ensure comprehensiveness.

The SPSS version 26 was used to enter and analyze data. Demographic variables were calculated by descriptive statistics. The independent variable was the comparison of pre and post-intervention of the well-being and professional identity scores using paired sample t-tests. ANOVA was used to test the differences in outcome improvements among compliance groups one way. Gender based differences in outcome improvements were tested using independent sample t-tests. When the p -value was less than 0.05, it was considered significant.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

RESULTS

The sample comprised of 120 medical students; the mean age of the students was 21.86 ± 1.90 years; slightly more women (51.7%), yet a significant proportion of students (62.5) were residing in hostels. The distribution was relatively even among different academic years, with the first-year students constituting the highest percentage (24.2%), and two-thirds of the participants (66.7) stated that they had never been exposed to reflective writing exercises. Most of the surveyed respondents had between 6 and 8 hours of nighttime sleep (54.2%), with 39.2 percent getting less than six hours, which highlights the presence of a significant proportional number of students who may be experiencing poor sleep.

Table 1: Demographic and Baseline Characteristics of Participants (n = 120)

Variable	Category	n (%) / Mean ± SD
Age (years)	Mean ± SD	21.86 ± 1.90
	Range	17.5 – 26.1
Gender	Male	58 (48.3%)
	Female	62 (51.7%)
Academic Year	1st year	29 (24.2%)
	2nd year	25 (20.8%)
	3rd year	25 (20.8%)
	4th year	24 (20.0%)
	Final year	17 (14.2%)
Residence	Home	45 (37.5%)
	Hostel	75 (62.5%)
Prior Reflective Writing Training	Yes	40 (33.3%)
	No	80 (66.7%)
Average Sleep Duration	<6 hours	47 (39.2%)
	6–8 hours	65 (54.2%)
	>8 hours	8 (6.7%)

Reflective writing has led to statistically significant positive changes in all measured well-being types, such as perceived stress, anxiety, depression, sleep quality, and overall mental health ($p < 0.001$ each). The significant impact was identified in the domain of general mental health (Cohen d = 0.91), which refers to a significant positive impact of the intervention. These findings demonstrate that systematic reflective writing is significantly helpful in enhancing psychological health among students in the medical profession.

Table 2: Comparison of Well-Being Scores Before and After Reflective Writing Intervention (n = 120)

Outcome Measure	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	p-value
Perceived Stress	22.59 ± 4.85	17.16 ± 4.26	<0.001
Anxiety (GAD-7)	9.18 ± 3.64	6.52 ± 2.93	<0.001
Depression (PHQ-9)	8.54 ± 4.23	6.04 ± 3.15	<0.001
Sleep Quality Score	6.01 ± 2.21	4.38 ± 2.15	<0.001
Mental Well-Being Score	41.71 ± 6.71	50.18 ± 6.47	<0.001

All variables in professional identity development showed significant statistical improvement after reflective writing intervention ($p < 0.001$ in all comparisons). The effect size was observed in the aggregate score of professional identity development (Cohen d = 0.93), which indicates a deep learning impact. These results imply that reflective writing can have a large role in promoting the professional self-concept, empathy, moral sensitivity, and reflective abilities of medical students.

Table 3: PIF Scores Before and After Reflective Writing Intervention (n = 120)

Domain	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	p-value
Reflective capacity	28.33 ± 6.14	34.11 ± 4.87	<0.001
Professional self-concept	31.43 ± 6.24	37.87 ± 5.78	<0.001
Empathy score	96.05 ± 10.80	105.35 ± 10.32	<0.001
Moral sensitivity	42.40 ± 7.38	48.18 ± 6.93	<0.001
Overall PIF score	133.61 ± 18.57	156.50 ± 17.83	<0.001

There was no statistically significant difference in mitigation of stress and or promotion of PIF among different levels of compliance ($p = 0.209$ and $p = 0.356$, respectively). The numerically significant decreases in stress were observed in moderate compliance, and the largest one showed an increase in PIF in low compliance, but none of these differences were statistically significant. It can be suggested that the beneficial impacts of reflective writing remained stable throughout the spectrum of the level of engagement of the participants.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Table 4: Association Between Reflective Writing Compliance and Outcome Improvement (n = 120)

Compliance Level	Mean Δ Stress ± SD	95% CI (Δ Stress)	Mean Δ PIF ± SD	95% CI (Δ PIF)
Low (≤50%)	4.12 ± 6.12	1.17 – 7.06	30.26 ± 19.35	20.93 – 39.58
Moderate (51–80%)	7.17 ± 5.23	5.18 – 9.15	20.62 ± 24.14	11.44 – 29.81
High (>80%)	5.08 ± 6.82	3.48 – 6.69	21.86 ± 25.84	15.79 – 27.93
ANOVA p-value	0.209	—	0.356	—

The level of stress was significantly decreased among male participants compared to their female students ($p = 0.013$), which is accompanied by a moderate effect size (Cohen $d = 0.46$). There were no statistically significant gender differences in terms of improvement in the development of professional identity or the general well-being. Those findings indicate that the stress-reducing benefits of reflective writing might be gender-specific, whereas the impact of reflective writing on the formation of the professional identity appears to be similar in both genders.

Table 5: Gender-Based Comparison of Outcome Improvements After Reflective Writing Intervention (n = 120)

Outcome	Male Mean ± SD	Female Mean ± SD	95% CI of Mean Difference	p-value
Δ Stress score	6.92 ± 6.97	4.04 ± 5.51	0.61 – 5.14	0.013
Δ PIF score	22.37 ± 24.35	23.38 ± 24.93	−9.92 – 7.91	0.824
Δ Well-being score	9.17 ± 9.81	7.82 ± 8.83	−2.03 – 4.71	0.431

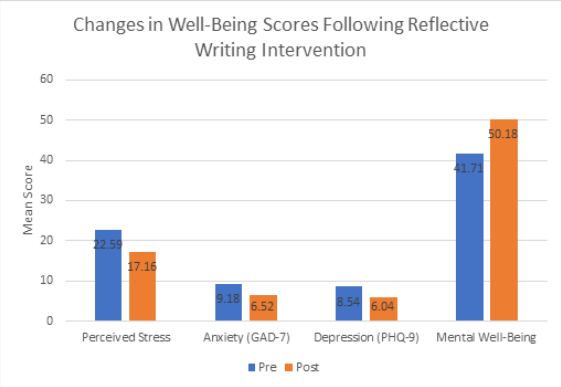

Figure 1: Changes in well-being scores following reflective writing intervention among medical students (n = 120).

The figure demonstrates significant reductions in perceived stress, anxiety, and depression scores, along with a marked increase in overall mental well-being after the intervention ($p < 0.001$ for all comparisons).

DISCUSSION

In this quasi-experimental pre–post study, reflective writing was associated with significant improvements in multiple well-being indicators (stress, anxiety, depression, sleep quality, and mental well-being) and key domains of PIF (reflective capacity, professional self-concept, empathy, and moral sensitivity). The extent of change in overall mental well-being and the composite PIF score is in line with the emerging global body of literature that frames structured reflection as a low-cost, easily accessible method of helping students adjust psychologically and develop identity in challenging training conditions. Similar results are found in recent research which characterizes reflective writing-based wellness programs and guided reflection programs which report that students view reflective writing as a valuable place to work through experiences,[10] normalize stress, and form adaptive coping strategies,[11] especially when reflection is designed and supported in the curriculum.[12]

The observed positive changes in empathy and other constructs of professional identity in the current study correspond with the evidence that reflective writing enhances professional development through fostering narrative sense-making and enhanced interpretation of clinical and learning encounters over time. Longitudinal and qualitative research has demonstrated that progressive maturation in perspective taking, values clarification and integration of professional roles can be indicated by written reflections, which substantiates the theoretical assumption that reflection improves identity coherence and professionalism.[13,14] The mechanism of education is probably multifactorial: reflective writing leads to metacognition, facilitates emotional processing, and offers a conceptualised chance to relate experiences with professional values, which could justify why several PIF domains improved simultaneously in the present sample.[15,16]

The current results can also be related to the emerging local evidence in the context of Pakistan and the broader region, which indicates that reflective writing may be used to improve the professional and personal growth of the learners. Pakistani studies have reported positive learner perceptions of reflective practice and have reported a benefit in terms of personal growth and learning organization and professional development,[17,18] while a cross-sectional study highlighted reflective writing as a promising approach for nurturing empathy when appropriately structured.[19] Taken together, these consistent outcomes reinforce the argument for embedding reflective writing within the undergraduate medical curriculum in Pakistan as an effective means to enhance both personal wellness and the PIF.

One of the significant findings was that there were no significant differences in improvement in compliance categories. This could be an indication of a minimum effective exposure phenomenon, where even small exposure can be helpful, especially in new

ISSN (O): 2687-5365; ISSN (P): 2753-6556

individuals who are just exposed to reflective practice. It is also possible that the compliance measure (number of submitted reflections) did not reflect the quality, depth or emotionality of reflection, which can be more predictive of outcomes compared to the frequency alone. Research evidence on educational intervention suggests that scaffolding (e.g., guiding questions) and feedback can have a significant impact on the quality of reflective writing, thus future research might be strengthened by quantifying the quality of reflection with a validated rubric and studying dose-response relationships with both a quantity and quality measure.[20]

The gender analysis demonstrated that the level of stress reduction was significantly higher among the male students, whereas changes in PIF and overall well-being did not differ in regard to the gender factor. This trend can be attributed by the variations in baseline stress appraisal, coping style, or readiness to lament distress in writing, as opposed to the disparity in educational value. According to international studies, psychosocial distress markers, as well as help-seeking behavior, may be context-dependent, demographically based, and medical education stressors tend to be intertwined with individual and cultural influences.[21] It is also plausible that reflective writing differentially resonates with students depending on prior reflective habits and comfort with emotional articulation, which warrants targeted qualitative exploration in future studies.

Despite the strengths of a complete sample (n=120) and the use of validated instruments, several limitations should be considered when interpreting these results . The lack of a parallel control group and pre-post design restricts causal inferences and fails to rule out the possibility of maturation or concurrent academic stress changes as possible causes of change. Results were based on self-reported measures, and these can be affected by social desirability or response shift bias once the students become knowledgeable about the state of their own well-being. Lastly, the research was carried out in one institution and this might not be generalizable to other medical colleges with varying curricular models or student support systems. However, the overall direction of effect of the various measures that have been validated along with the congruence with the current international and national literature justifies the usefulness of structured reflective writing as a supportive learning tool in students.[22]

CONCLUSION

Structured reflective writing was associated with significant improvements in medical students' psychological well-being and PIF across multiple validated domains. Compliance level was not significantly associated with the magnitude of improvement, suggesting that even modest engagement may confer benefit, while male students demonstrated greater stress reduction than females. Integrating guided reflective writing into undergraduate medical curricula may provide a feasible, low-cost approach to support student well-being and professional development within UGME in Pakistan.

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ISSN (O): 2687-5365; ISSN (P): 2753-6556

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