ORIGINAL ARTICLE

# EVALUATING THE IMPACT OF A TRAINING WORKSHOP ON PRESCRIPTION WRITING SKILLS: A PRE AND POST INTERVENTIONAL STUDY

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**Background:** Prescription writing is a critical facet of healthcare, where healthcare professionals provide precise instructions for patients' medications. These written directives, issued by physicians and other authorized practitioners, encompass essential details such as patient information, drug specifics, and dosage. Ensuring patient safety, preventing medication errors, and fostering overall healthcare quality are intrinsic to the significance of prescriptions. The research assessed the impact of a training workshop on prescription-writing competency of postgraduate residents. **Methods:** A pre-post interventional study was conducted in 2023. There were 30 PGRs of fellowship from different specialties, selected by stratified random sampling. In the first phase, participants' prescriptions were collected from their respective Outpatient Departments (OPDs). In the second phase, pre-workshop participants were asked to write a prescription for a common case in their specialty. Post-workshop prescriptions data were collected immediately and one month later from OPDs (real workplace environment). Prescriptions were analyzed as per the World Health Organization's Guide to Good Prescribing and mean scores were calculated. The pre- and post-workshop (controlled environment), and real environment data, were analyzed using a paired *t*-test in SPSS version-25. Learning gain was calculated in both environments. **Results:** The mean age of participants was 26±3 years, males were 24(80%) and females were 6 (20%). The findings revealed a significant improvement in prescription writing scores following a training workshop, in controlled and real environments. In controlled and real environment, the mean score increased from 9.29 to 11.18 ($p$<0.001) and 10.83 to 12.83 ($p$=0.001) respectively. Learning gain ratio was 0.33 and 0.48 in controlled and real environment, reflecting one third and nearly half of possible improvement respectively. These findings collectively suggest a positive impact on PGRs prescription writing skills. **Conclusion:** The Training workshop improved the prescription writing skills of the PGRs and a positive impact was demonstrated at on month longitudinally, suggesting a need for training and reinforcement.

**Keywords:** Postgraduates trainees; Prescription writing; Training

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## INTRODUCTION

Prescription writing is a critical facet of healthcare, where healthcare professionals provide precise instructions for patients' medications. These written directives, issued by physicians and other authorized practitioners, encompass essential details such as patient information, drug specifics, and dosage. Ensuring patient safety, preventing medication errors, and fostering overall healthcare quality are intrinsic to the significance of prescriptions.[1]

The act of prescribing is an important responsibility in finalizing plans for patient health improvement. Prescriptions play a pivotal role in averting medication interactions and side effects by incorporating the patient's medical history, allergies, and current medication regimen. They serve as indispensable tools in enhancing patient outcomes and contributing to the broader landscape of healthcare quality.[2]

The Latin origin of the term "prescription" reflects its essence as a directive written beforehand, underlining the proactive nature of this medical practice. With variations in regulatory standards worldwide, prescriptions are subject to distinct guidelines, such as those set by the World Health Organization (WHO), Food and Drug regulatory Authority (FDA), ensuring safe and standardized practices. The competence in prescription writing is intrinsically tied to critical

thinking, ethical responsibility, and the need for a balance between patient safety and treatment efficacy.[3]

Despite the pivotal role prescriptions play, there are identified gaps in prescription writing competencies, particularly among junior doctors and postgraduate trainees. Studies have reported factors such as lack of experience, high workload, and deficiencies in undergraduate education as contributors to poor prescribing skills. Recognizing this, it becomes imperative to address these shortcomings through comprehensive training programs, especially during undergraduate and postgraduate medical education.[4–6]

Studies have explored prescription writing and its impact on postgraduates, reporting effectiveness of educational interventions improved their abilities.[7,8] A study reported that participants expressed confidence in their prescribing skills, suggesting a need for strengthened training in prescription writing.[8] Research on community pharmacists' perspectives on poor prescription writing, advocated for solutions like electronic records and structured prescription forms[9]. Prescribers' opinions on including reason for use information on prescriptions underscored benefits to pharmacists, patients, and their own practices.[10]

Studies highlight gaps in guideline adherence, including missing identifiers and limited use of generic names, and emphasize the need for education on prescription practices. Patient-based teaching and workshops have improved prescribing skills among medical and midwifery students, while simulated interviews effectively enhanced medical students' drug prescription abilities.[11–15]

Assessment of interns' knowledge and practices highlighted errors in prescription writing, emphasizing the necessity of formal education.[15,16] Dental house officers were recommended workshops and constant supervision for proper drug prescription, identifying the need for continuous training and reinforcement.[17] Knowledge about prescription writing components was found to be better in interns than clinicians and second-year students, suggesting the importance of interventions like seminars and workshops.[18] The evidence suggests a need for continuous training and reinforcement of prescription writing skills for health care professionals at all levels to ensure patient safety and reduce prescribing errors. The objective of the study was to evaluate the impact of a training workshop on prescription writing competency of PGRs.

## MATERIAL AND METHODS

This study utilized a pre-post interventional design and was carried out from June to December 2023 at Saidu Group of Teaching Hospital Swat, involving data collection from 1st-year FCPS postgraduate trainees in General Medicine, Pediatrics, Gynecology and Obstetrics, General Surgery, and the Otolaryngology department. Ethical approval was obtained from the Ethical Review Board of Khyber Medical University Peshawar via ASRB002058/EP/IHPE. Informed written consent was secured from all participants. A total of 30 residents were included in this pre- and post-intervention study. This sample size was determined based on both methodological considerations and feasibility constraints. Given the within-subject (paired) design of the study, where each participant served as their own control, a sample of 30 was considered adequate to detect moderate effect size with sufficient statistical power (80%) at a 5% significance level using paired statistical tests. Moreover, 30 participants meet the general threshold set by the Central Limit Theorem, allowing the use of parametric analysis techniques. A sample size of thirty postgraduate residents was selected through stratified random sampling, considering the specialties. The first year PGRs were included, while those with prior prescription writing training were excluded. A pre-designed questionnaire was administered to assess students' understanding in prescription writing.[19] In the first phase, prescription-writing competency was assessed through the analysis of real environment prescriptions collected from participants' respective outpatient departments (OPDs) a month before training workshop. In the next phase, a training workshop was conducted. Pre-workshop participants were asked to write a prescription for a common illness within their specialty. Following this, a training workshop as per World Health Organization's (WHO) Guide to Good Prescribing was conducted and mean scores were calculated (Maximum score 15). The training focused on understanding components of prescription, and practical exercises about prescription writing. Immediately post-workshop participants were asked to write a prescription for a common illness within their specialty (Figure-1). In the third phase, after a month, prescription writing was assessed in real environment, collected from their respective OPDs. Descriptive statistics and paired t-tests were employed to analyze pre and post training scores, with a significance level set at $p \leq 0.05$. Learning gain was calculated in both environments.

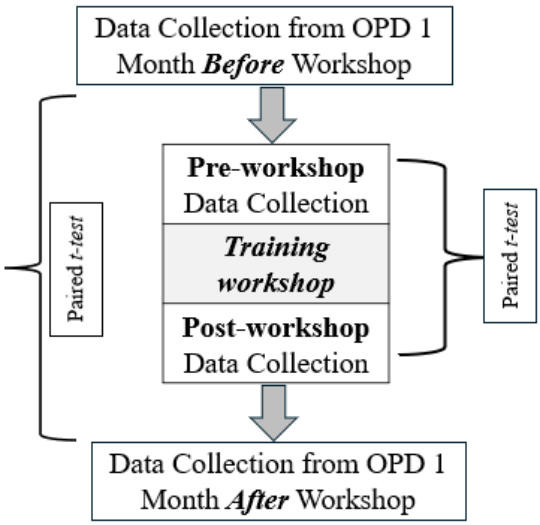


**Figure-1: Pre and post intervention study design**

## RESULTS

In this study, 30 1st-year FCPS postgraduate trainees from General Medicine, Pediatrics, Gynecology/obstetrics, General surgery, and the Otolaryngology department were randomly selected. The results indicate that 80% (n=24) of the participants have received prior education on prescription writing, while 20% (n=6) have not.

**Table-1: Characteristics of study of participants**

| Variable | Values |
|---|---|
| Number of participants | 30 |
| Females | 6 (20%) |
| Males | 24(80%) |
| Age range | 26±3 years |
| Year of training | First year |

The responses to 13 items questionnaire had the following findings. In the summative assessment of pharmacology examination at undergraduate level, 11 (36.6%) encountered questions related to prescription writing, while 19 (63.3%) did not. Regarding the perception of undergraduate training, a significant majority of 24 (80%) felt adequately prepared to prescribe, with 6 (20%) expressing otherwise. Clinician-led case discussions as a way of learning prescription writing were experienced by 9 (30%) of participants, 21 (70%) did not have such experience. However, of those who did engage in such discussions, 27 (90%) find them helpful in enhancing their efficiency in prescribing medications (Table-2).

A substantial 27(90%) of participants had previously written prescriptions for various illnesses, showcasing a high level of practical experience in this critical aspect of medical practice. The 21 (70%) of respondents preferred prescribing drugs by their trade names, while 9 (30%) opted for using generic names. In terms of prescribing for special populations, 24 (80%) of participants had prescribed medication for children, the elderly, and pregnant women. Similarly, 24 (80%) had actively provided patient education on medicines, emphasizing their role in fostering patient understanding and adherence to prescribed treatments. Additionally, 24 (80%) reported providing counseling about the use of medication at the time of discharge, contributing to comprehensive patient care. Collaboration with pharmacies or pharmacists is reported by 9(30%) of participants. Dispensing medication was experienced by 9 (30%) of participants, with 21 (70%) reported opposite (Table-2).

In the real environment, the mean prescription writing competency score increased from 10.83 to 12.83 after training ($p$=0.001) indicating a highly significant difference. The mean difference of 2 (CI:1.435-2.565) suggested an average increase of 2 units in prescription writing competency after training. In the control environment, the mean score increased from 9.29 to 11.18 ($p$=0.001) after training, indicating a significant difference. The mean difference of 1.882 (CI: 1.029-2.736) indicated an average increase of 1.882 units in prescription writing competency after the training in the control environment, as shown in table-3.

**Table-2: Prescription writing knowledge and experiences**

| Questions | Yes n (%) | No n (%) |
|---|---|---|
| 1. Have you learnt prescription writing previously? | 24 (80) | 6 (20) |
| 2. Were there any questions in your summative assessment of pharmacology regarding Prescription writing. | 11(36.6) | 19 (63.3) |
| 3. Do you feel that undergraduate training has prepared you to prescribe? | 24 (80) | 6 (20) |
| 4. Do clinicians discuss prescription writing as a part of case discussion? | 9(30) | 21 (70) |
| 5. Do such discussion and writing help in efficient prescribing? | 27 (90) | 3(10) |
| 6. Have you written a prescription previously for any illness? | 27 (90) | 3(10) |
| 8. Which name do you prefer while prescribing a drug? | Trade 21 (70) | Generic 9(30) |
| 9. Have you ever prescribed medication for special population like children, elderly, and pregnant women? | 24 (80) | 6 (20) |
| 10. Have you ever provided patient education on their medicines? | 24 (80) | 6 (20) |
| 11. Do you provide? discharge counseling on medication use? | 24 (80) | 6 (20) |
| 12. Have you ever worked in collaboration with a pharmacy/pharmacist? | 9 (30) | 21(70) |
| 13. Have you ever dispensed medication? | 9 (30) | 21(70) |

**Table-3: Comparison of Pre and Post workshop scores of prescription writing**

| Setting | Condition | Mean score | t-value | df | *p*-value |
|---|---|---|---|---|---|
| **Training workshop** | Pre-workshop | 9.29 | 7.19 | 29 | 0.001** |
| | Post-workshop | 11.17 | | | |
| **Real environment** | 1 month before workshop | 10.82 | 4.48 | 29 | 0.001** |
| | 1 month after workshop | 12.82 | | | |

**-Highly significant

**Table-4: Learning Gain from training**

| Setting | Pre-Training Mean Score | Post-Training Mean Score | Mean Difference (CI) (Learning Gain) | Learning Gain Ratio |
|---|---|---|---|---|
| Control Environment | 9.29 | 11.17 | 1.88 (1.029-2.736) | 0.33 |
| Real Environment | 10.82 | 12.82 | 2.00 (1.435- 2.565) | 0.48 |

The learning gain analysis reflects significant improvements in prescription writing competency in both controlled and real environments. In the control environment, learning gain ratio, normalized relative to the initial performance and a hypothetical maximum score of 15, was 0.33, indicating that participants achieved about one-third of the possible improvement. This suggests a moderate level of learning effectiveness in the control environment. In the real environment, the learning gain ratio in controlled environment was approximately 0.48, suggesting that participants achieved nearly half of the possible improvement. The real environment facilitated greater learning gains, indicating it may have been more effective in enhancing participants' performance compared to the controlled environment.

## DISCUSSION

Prescription writing is a crucial skill in medical practice, often learned informally throughout medical training. Despite its importance, structured education on prescription writing is lacking, leaving students to learn its nuances through clinical practice. These findings collectively suggest that the prescription writing training had a positive impact on postgraduate trainees' competency in both the controlled and real environments, demonstrating persistent impact after one month of intervention.

A repeated measures ANOVA revealed a significant difference in students' prescription scores both immediately after the education and four weeks following the workshops, across all four components of prescription principles ($p < 0.001$), validating the findings of the current study.[20]

The study revealed improvements in prescription quality following training and the impact was carried over longitudinally for a month. Training workshops have proven effective in improving prescription skills, reducing errors, and enhancing practitioner satisfaction.[21] Challenges identified in prescriptions, such as too many items and non-readability, were successfully addressed through training.[22] Comparatively few studies have explored prescription writing among dental students, with medical students receiving more attention in research. Understanding prescription practices is essential for reproductive and overall health.[23] The World Health Organization (WHO) emphasizes comprehensive prescriptions, including patient and prescriber details, drug information, and patient guidance (WHO, 1994). Errors in prescriptions can lead to inappropriate drug use, posing risks to patients and increasing healthcare expenses.[19]

Despite cumulative knowledge throughout undergraduate, gaps persist, especially in dosage and posology information.[24] The current study further strengthens the need for ongoing training by integrating clinical case discussions and problem-based learning, addressing deficiencies training. Intensive training in prescription writing skills is required with continuous monitoring.[13]

Despite these positive results, the learning gains are relatively weak (less than 4 units), which might be attributed to the limited time available for the intervention. Extending the training program may lead to greater learning gains by providing more comprehensive reinforcement of the skills. These findings collectively underscore the positive impact of the training program on enhancing prescription writing skills, with the real environment showing a slightly higher proportionate improvement.

A European study revealed deficient prescribing skills, marked by insufficient understanding of drug interactions and contraindications, leading to improper treatments and errors. Immediate measures are necessary to implement a standardized European core curriculum in CPT to ensure patient safety and proficient prescribing practices.[25] A study examined the behaviors leading to prescribing errors (PEs) among senior doctors using the Capability, Opportunity, Motivation - Behavior (COM-B) model. This approach offered a new angle for identifying the underlying causes of PEs. Future research could focus on matching these behavioral factors and errors with appropriate intervention strategies and policies to enhance intervention effectiveness.[26] Training interventions show promise in improving prescription quality, highlighting the necessity for enhanced education in medical training. The study's limitations, such as a

small sample size, should be considered when interpreting the results.

## CONCLUSION

This research gives valuable insights into prescription writing practices among PGRs and underscores the importance of targeted training interventions. The positive impact of prescription-writing training suggests its potential applicability in improving prescription practices among medicals professionals and hence striving for patient care and safety.

**Conflict of interest**

Authors declare no conflict of interest.

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## AUTHORS' CONTRIBUTION

Ubaidullah, UM: Conceptualization of study design, write-up, proof reading. HA, SR, IA: Data collection, data analysis, data interpretation.

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