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ACADEMIC WORKSHOP AND IT'S IMPACT ON LEARNING

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ABSTRACT

Objectives: *Academic workshops have drawn much interest as a potential instrument to improve medical education and fill the knowledge gap between theory and practice. This study investigates how academic workshops affect the learning of medical graduates.*

Materials and Methods: *This institutional-based cross-sectional study was conducted in the Department of Medicine, Khyber Medical College/Khyber Teaching Hospital Peshawar. A workshop on "Artificial Intelligence (AI)" was organized on May 17, 2023. A total of 25 workshop participants took part in this study. Ethical approval from the institute was granted for this study. The study duration was two months. Participants in our study comprised willing undergraduate medical students of Khyber Medical College (KMC), House officers (HO's) of Khyber Teaching Hospital (KTH) Peshawar, and Postgraduate (PG) trainees of KTH Peshawar. These participants have already enrolled themselves in this Artificial Intelligence workshop, organized as part of a prequel for the upcoming annual conference of the Pakistan Society of Physicians (PSP). Pre-test and post-test during this one-day workshop, and then an online evaluation after one month was conducted to determine the impact of this academic event; ANOVA and t-test were utilized for this purpose. All the pertinent data were recorded on R-Data analysis and were then analyzed accordingly.*

Results: *Out of 25 participants, there were 18 males and seven females. The baseline knowledge of medical undergraduates regarding artificial intelligence was better compared to that of HOs and PGs. This trend remained persistent in post-test evaluation. However, evaluation after one month showed a good learning impact on medical undergraduates and HO's. PG's documented a decline in their learning impact as evidenced by t-test, ANOVA, and posthoc analysis.*

Conclusion: *Academic workshops narrow the knowledge gap between practice and theory by integrating active learning methodologies, adhering to learning theories, and encouraging skill development. Motivation and practice are the key factors in this learning process.*

Key words: *Academic Workshop, Learning, Artificial Intelligence, Medical Professionals*

INTRODUCTION

Medical education is mandatory nowadays to produce competent and qualified healthcare practitioners who can fulfill the changing requirements of patients and society[1]. More interactive and learner-centered strategies have increasingly been implemented in traditional medical education learning, including didactic lectures and passive learning. Academic workshops are one of these cutting-edge strategies that have come to be recognized as effective venues for improving learning outcomes in medical graduates[2]. Academic workshops provide a unique opportunity for medical professionals to enhance their critical thinking skills, solidify their

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theoretical knowledge, and build practical skills[3].

Several essential elements included in effective academic workshops support positive learning results. Workshops should, first and foremost, have clearly defined learning objectives and outcomes that meet the individual needs of the participants. By explicitly outlining the workshop's goals, participants can better grasp what they are expected to accomplish and how the workshop content relates to their professional growth[4]. Another essential element of successful workshops is the application of active learning strategies, such as case-based discussions, small group activities, and hands-on practice[5]. Active learning enhances participant engagement and deep learning by enabling participants to develop their knowledge through problem-solving and critical-thinking exercises[6]. Additionally, the importance of learned and professional facilitators can be supported. To effectively guide participants through the learning process, the organizers must create a supportive learning environment and facilitate fruitful conversations and dynamic interactions[7]. Facilitators knowledgeable about the workshop topic and having excellent facilitation abilities are other essential prerequisites[2]. In academic workshops, timely and effective feedback is especially essential since it enables participants to evaluate their performance, pinpoint their areas of weakness, and improve their learning outcomes[8].

The usefulness of academic workshops in medical education can be understood theoretically by utilizing several learning theories. For instance, constructivism holds that students actively create their knowledge by building on earlier learning and interacting meaningfully with the learning environment[7]. Academic workshops align with constructivist learning ideas because they strongly emphasize active involvement, teamwork, and problem-solving.

Situated learning theory is another pertinent theory supporting the usefulness of academic workshops in medical education. According to the situated learning theory, learning is most effective when it takes place in real-world experiences that have significance to the learner[9]. Academic workshops frequently offer simulated settings that resemble actual clinical settings so that participants can use their knowledge and abilities in a safe environment. Participants learn how to apply their knowledge to clinical practice by working on authentic activities, which closes the gap between theory and practice[5]. Such situated learning opportunities aid in developing clinical judgment, clinical reasoning, and decision-making skills.

There are several advantages of academic workshops. Academic workshops have a variety of effects on how well medical graduates learn. Workshops allow participants to strengthen their practical, communicative, and therapeutic abilities[5]. Medical graduates can fill the gap between theoretical knowledge and its application in clinical practice by participating in practical exercises, simulations, and hands-on activities. Academic workshops' interactive and hands-on format encourages active participation and in-depth learning, which helps students learn and remember new information[4]. Academic workshops also promote teamwork and cross-disciplinary learning. Effective cooperation and communication skills are pivotal in modern healthcare to deliver high-quality patient care and maximize patient outcomes[3]. Academic workshops allow healthcare professionals from various disciplines to work together, exchange knowledge, and solidify their understanding of the value of inter-professional collaboration[1]. Participants learn from the experiences of other healthcare professionals through group activities and team-building exercises, creating respect for one another and promoting efficient interdisciplinary teamwork.

Academic workshops also aid in continuing professional development by informing medical graduates of their disciplines' most recent developments, discoveries, and best practices. Due to the evolution of medical knowledge and procedures, lifelong learning and constant development are required. Through workshops, medical graduates can renew their acquaintance, pick up new skills, and improve their professional competencies[3]. Medical graduates can provide their patients with the best care possible by networking with professionals in the healthcare system and staying current on new trends and research.

The role of workshops in medical education has been understudied, highlighting the novelty of our study, little to no local studies could be identified that focused on the impact of academic workshops on learning outcomes. With these considerations in view, we crafted this study to assess how an aca-

demic workshop influences the learning of medical students and graduates in a field highly relevant to healthcare professionals today. It's important to note that there is a scarcity of local research on this subject. Our approach here is quantitative, in contrast to the predominantly qualitative literature available on this topic.

MATERIALS AND METHODS

It is a cross-sectional study based on a workshop conducted in the Department of Medicine, Khyber Teaching Hospital Peshawar. A convenient purposive sampling technique was used, and this study was of two months, from May 01, 2023, to June 30, 2023. Pakistan Society of Physicians (PSP) arranged academic workshops for PSPCon 2023. A workshop on "Artificial Intelligence (AI)" was organized by the Department of Medicine MTI-KTH Peshawar on May 17, 2023. The facilitator of this event was a certified Professional in AI and an experienced medical educationist and clinician. The duration of this one-day workshop was 5 hours. Only 25 participants were enrolled on a first-come-serve basis from the advertised eligible healthcare professionals to interactively foster a good learning environment. Twenty-five participants were selected to ensure an engaging and interactive session; a greater number would've made it harder for the instructor to effectively pass on the information and would've constituted a large lecture format which was not the objective of the session.

Pre-workshop reading materials were dispersed in WhatsApp groups, including literature and small interactive videos. Pre-test evaluation was conducted at the start of the workshop, while post-test evaluation was conducted at the end. The contents of both assessments remained constant. However, the sequencing of questions was changed to minimize the recall bias and to maintain validation. A feedback evaluation was also carried out for the improvisation of future academic sessions. The WhatsApp group remained intact after the workshop. Then one month after the workshop, an online synchronized Zoom-linked evaluation was organized for these participants to find out the impact of learning from this academic event. Ethical approval was obtained from The Ethical Board of Khyber Medical College Peshawar (Ref# 388/DME/KMC; Dated 27-6-2023). Lynn criteria were utilized for the construct validity of questionnaires with a threshold of 0.80 by six subject experts. The collected data were analyzed through R Data analytic software (4.3.1; June 16, www.r-project.org). ANOVA test was applied to check for significant differences between the knowledge levels before, during, and after the test.

RESULT

Out of 25 participants, there were 18 males and seven females. The baseline knowledge of medical undergraduates regarding artificial intelligence was better than that of HOs and PGs. This trend remained persistent in post-test evaluation. However, evaluation after one month showed a good learning impact on medical undergraduates and HO's. At the same time, PGs documented a decline in their learning impact, as evidenced by t-test, ANOVA, and post hoc analysis. The three strata of medical undergraduates, HO's, and PG trainees are elaborated as the pre-test, post-test, and assessment one month after the workshop (Tables# 1, 2 and 3). The t-test result shows a t-value of -1.11 and a p-value of 0.044. The p-value is less than 0.05, suggesting a significant difference in the mean scores between these groups. ANOVA results show an F-value of 1.495 and a p-value of 0.246. This research is unable to reject the null hypothesis since the p-value is greater than 0.05. This indicates no significant difference in the mean scores between the groups. The post hoc analysis using Tukey's method documents significant differences between pairs of medical undergraduates and

Table 1: Pre-workshop Assessment

No of Participants	<50% marks	>50 % marks
Medical undergraduates	2	8
House Officers	**6**	2
PG Trainees	**6**	1

Table 2: Post-workshop Assessment

No of Participants	<50% marks	>50 % marks
Medical undergraduates	1	9
House Officers	**1**	7
PG Trainees	**2**	5

Table 3: Assessment One month After Workshop

No of Participants	<50% marks	>50 % marks
Medical undergraduates	1	9
House Officers	2	6
PG Trainees	4	3

HO'. However, p-values for pairwise comparisons of PG trainees are greater than 0.05, suggesting that the mean scores of this group are not significantly different.

The findings of this study conclude in terms of t-test, ANOVA, and post hoc analysis that there are significant differences in the mean scores between the Medical Undergraduates and House Officers across the pre-workshop, post-workshop, and assessment one month after the workshop. Still, this result must be documented in the PG trainees group for all these three assessments.

DISCUSSION

In recent years, medical education evolved immensely, turning away from the old didactic teaching methods and towards more active and learner-centered strategies. Academic workshops have distinguished themselves as useful learning environments for medical graduates among these novel techniques[10]. This study aims to clarify the effects of academic workshops on learning in medical graduates.

The following are the essential elements of academic workshops that are effective at maximizing learning outcomes. First and foremost, it is important to create clear learning objectives and outcomes to ensure that the workshop content aligns with the participant's needs. Case-based discussions, small group activities, and hands-on practice are examples of active learning strategies that encourage engagement and deep learning. Participants need to be guided through the learning process by facilitators with knowledge of the workshop topic and good facilitation abilities[11]. Academic workshops frequently mimic real-world experiences, allowing participants to use their knowledge and abilities in a supervised setting. This improves their capacity to apply what they have learnt to clinical practice[12].

Academic workshops have several beneficial impacts on the learning outcome of medical graduates. First and foremost, workshops offer participants a platform for skill development, enabling them to improve their clinical, communication, and procedural skills. Medical graduates may bridge the gap between academic comprehension and practical application by participating in hands-on activities and getting expert feedback[8]. Second, these educational programs encourage cooperation and inter-professional learning, fostering the excellent teamwork and communication abilities required for delivering high-quality patient care[13].

Although academic workshops provide multiple benefits, they also have some obstacles. The implementation of workshops on a broader scale can be hindered by a scarcity of resources, including finances, time, and faculty availability. Likewise, ensuring the standard and caliber of workshops across many institutions takes time and effort[12,13]. To overcome these challenges, educational institutions, governing authorities, and professional associations must collaborate to formulate policies, allocate funds, and assist with workshop implementation[14].

A higher level of learning can be achieved by introducing interactive learning techniques[15]. Workshops with group activities have a major role in improving knowledge among undergraduate students[16]. It has been observed that workshops positively affect self-directed learning[17]. This fact has been documented in our study. The old rote learning method in medical education is replacing more interactive ways[18]. To bring about this change, the workshop concept is implemented[19]. Workshops designed specifically for medical teachers have been very effective regarding their professional growth. Medical professionals can learn a lot and improve their skills through these workshops.

The results of our study align with similar research conducted both on a regional and international scale. Our study, focusing on medical undergraduates and postgraduates participating in academic workshops, demonstrates a significant improvement in participants' knowledge, as evidenced by their higher assessment scores.

Basal A documented in his study on "Impact of 'Workshop' on the Performances of first professional medical students in Physiology" the same learning trend as mentioned in our study. Both our study and that of Basal A have small sample sizes and problems of generalization and validation, thus requiring prospective national research. Basal A also highlights the importance of incorporating more student-centered learning activities in the curriculum to promote lifelong learning[15]. The findings of Basal A were that the workshop positively impacted acquiring knowledge and motivation towards self-directed learning. The

performance of these student batches was significantly higher in the pre-professional examination than in the semester examination[15].

Palma SP et al. in their studies on "Professionalism Workshop: Applying the Elements of Professionalism through Scenario Learning," highlight professionalism in medical education. This study is focused on a workshop that adds scenario learning to develop the challenging critical elements of professionalism among medical students. The drawbacks of this study are the potential limitations of scenario-based learning. Our study counteracted this drawback by applying Lynn criteria for the construct validity of questionnaires with a threshold of 0.80 by six subject experts. This paper by Palma SP et al. emphasizes the importance of incorporating professionalism in medical education through scenario learning, although the main findings need to be mentioned clearly[16].

Arumugam B's paper, "Workshop: an Alternative Learning Approach for Medical Graduates," contributes to the current body of knowledge by showcasing the efficacy of interactive and recurring workshops for medical students. This research underscores the significance of workshops in nurturing practical skills such as active listening, presentation, persuasion, and teamwork. However, it should be noted that this study, like ours, faces the challenge of generalization[17].

The paper on "The Learning Workshop" by Sams WM highlights the changing methods of education and the shift away from rote learning in medical education. It reveals the workshop as a tool for promoting creativity, independent thought, and patient-centered care in postgraduate education[18]. This paper describes the use of workshops as an alternative approach to traditional rote learning and highlights the incorporation of workshops with group activities and the shift towards interactive and experiential learning[18]. Just like our study, Sams WM also pointed out the effectiveness of workshops based on the specific context of the workshop and the facilitation skills of the instructors[18]. Sams WM emphasizes the shift in medical education towards more interactive and workshop-based learning methods. The workshops played a great role in enhancing interactivity, improving student performance, and promoting learning in dermatology and other specialties[18].

In Anderson J's paper titled "The Workshop as a Learning System in Medical Teacher Education," similar positive effects of workshops on learning were emphasized[19]. Such studies offer valuable insights into how workshops can effectively enhance the potential of both medical teachers and students[19,20].

The primary drawback of this study lies in its single-center, cross-sectional design with a small participant pool. This limitation hinders its ability to make broad generalizations and achieve significant validation. To enhance the research's reach and relevance, the need of the hour is to conduct multicenter prospective cohorts involving substantial sample sizes.

CONCLUSION

Academic workshops can significantly impact medical graduates' learning outcomes. Educational workshops in medical education have a bright future preceding them, with prospects for standardization, collaboration, and technological integration.

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