

Original Article



Using Interactive Storytelling to Teach Foundational Concepts in Medical Education: A Novel Educational Intervention

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Teaching methods**Abstract****Background:** Storytelling is a powerful educational method that encourages reflection and deeper understanding of complex concepts. Storytelling as a learner is commonly used in other disciplines, yet its application in medical education is limited. This study sought to evaluate the use of storytelling as a pedagogical approach in a workshop with medical students and assess its impact on students' knowledge and attitudes towards core concepts of medical education.**Methods:** Interactive workshops were implemented using a storytelling approach based on a fictional diary of a dental student. Participants engaged in story-based discussions in a book-club format, followed by introduction of the main education by the facilitator. A pre-post questionnaire was used to assess students' knowledge and attitudes. Quantitative data were analyzed with paired t-tests, and Cronbach's alpha was used to assess internal consistency. Participants' open-ended feedback was reviewed thematically to better understand perceptions of students regarding the storytelling method.**Results:** Out of 80 participants, 76 finished the pre- and post-tests (95 percent response rate). Post-workshop scores showed notable improvements in knowledge (Mean \pm SD: 12.9 \pm 2.3 to 17.8 \pm 1.9; $P < 0.001$) and attitudes (Likert mean score: 3.4 \pm 0.6 to 4.2 \pm 0.5; $P < 0.001$). The internal consistency of the questionnaire was acceptable (Cronbach's $\alpha = 0.82$). Participants gave positive comments, and emphasized how memorable and captivating the workshops were.**Conclusion:** Storytelling is a powerful teaching method in medical education that can increase students' emotional and cognitive engagement. It encourages reflection, active learning, and higher levels of learner satisfaction.**Introduction**

Storytelling is a long-standing and effective pedagogical technique across many educational fields including economics, history, and the basic sciences. Since then, its role has been studied in greater depth in the field of health professions education.¹ While storytelling has demonstrated its power in engaging active learning and promoting critical reflection, storytelling remains to be neglected in medical education.² Stories have a remarkable ability to articulate complex, abstract ideas through relatable and emotional examples that are contextualized, which can encourage students to engage more deeply.³ When the theoretical content is linked to real or imagined personal experiences, storytelling can promote meaningful learning, enable identity formation,

and support students' understanding of their professional roles and responsibilities.^{4,5}

In medical education, storytelling is a powerful tool for fostering reflective thinking and teaching soft skills like empathy, ethical reasoning, and professionalism.^{6,7} When students dive into stories that mirror the real-world challenges of clinical and academic life, they get to explore different perspectives and tackle tough dilemmas in a safe, structured learning environment. Another advantage of storytelling is that it triggers deeper thinking and personal connection by encouraging learners to tap into their own emotions and experiences.⁸ The quick growth of medical knowledge and specialization has coincided with the development of educational approaches, highlighting the significance of preparing qualified

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teachers and practitioners who are both scientifically and educationally literate.⁹ Nonetheless, there have been relatively few attempts to introduce medical students to educational concepts, and they are frequently delivered using conventional, lecture-based methods that might not encourage interest in and interaction with the subject matter.

Here, we designed and implemented a series of interactive workshops for undergraduate students in medicine and other health sciences. These workshops aimed to introduce core concepts of medical education through a participatory storytelling format. Inspired by the format of a book club, participants read a fictionalized diary of a dental student, which comprised a number of narrative episodes highlighting real-life educational challenges. The students were facilitated to engage critically with the stories, share their own similar experiences, and collaboratively unpack educational concepts embedded in the stories. The purpose of this study was to assess the effectiveness of this storytelling-based intervention on students' understanding of medical education concepts.

Methods

Study design

This study used a quasi-experimental, single-group pretest-posttest design to assess the impact of an interactive storytelling-based educational intervention on medical students' knowledge and attitudes toward basic concepts in medical education. We used a mixed-methods approach that combined quantitative measures to check learning results and attitude shifts, along with qualitative analysis of students' comments. This gave us a full and complete look at how the program really made a difference.

Setting and participants

The study was conducted at Faculty of Medical Sciences, Islamic Azad University, Tabriz Branch, involving undergraduate students from various health science disciplines (medicine, dentistry, nursing, and allied health fields). We recruited participants using mailing lists and classroom announcements. The inclusion criteria were voluntary participation, and willingness to complete pre- and post-intervention questionnaires. The study included no exclusion criteria. Eighty students participated in the workshops, and 76 of them completed pre- and post-tests.

Intervention

The educational intervention consisted of structured, interactive workshops lasting approximately 3 hours, which was designed and facilitated by faculty members who had training in medical education. The workshops focused on foundational topics in medical education: Curriculum Design, Course Planning, Student Assessment, Program Evaluation, Teacher's Role, Reliability and Validity in

Assessment, Early Clinical Exposure, etc. Prior to the workshop, students received a fictional diary titled *The Reflections of a Dental Student*, which contained a series of 10 short, first-person narrative episodes. These stories described real-life challenges faced by a dental student navigating academic and clinical environments, subtly embedding themes related to educational concepts in medical education.

During the workshops, the students participated in small group discussions following a "Book Club" format, facilitated by a trained instructor. Students read selected diary entries aloud, reflected on the educational issues raised, shared personal experiences, and collaboratively identified the underlying medical education concepts. After each story, the facilitator provided a concise explanation of the relevant educational principles, linking narrative events to theoretical concepts.

Data collection instruments

Three types of data were collected to evaluate the intervention:

1. *Knowledge assessment*: A researcher-designed multiple-choice questionnaire (MCQ) consisting of 20 items was administered before and after the workshop to assess changes in students' knowledge. The questions were aligned with workshop content and reviewed for content validity by three experts in medical education.
2. *Attitude questionnaire*: A 10-item Likert-scale questionnaire was developed to measure students' attitudes toward the field of medical education and their perception of the storytelling method. Each item was scored from 1 (strongly disagree) to 5 (strongly agree).
3. *Qualitative feedback*: At the end of the session, students completed an open-ended feedback form with prompts such as: "What did you enjoy most about this workshop?", "What aspects could be improved?", and "Did the stories help you understand the educational concepts more effectively? Why or why not?"

Data analysis

Quantitative data were analyzed using SPSS version 26.0. Descriptive statistics were used to summarize the participants' demographic characteristics, including frequencies, percentages, means, and standard deviations.

To assess the effectiveness of the intervention, scores for knowledge and attitudes were compared by performing paired-samples t-tests on pre- and post-workshop scores after checking for normality using the Shapiro-Wilk test. Effect sizes were calculated using Cohen's d, which were defined as small (0.2), medium (0.5), and large (0.8).

Internal consistency of the questionnaire

The knowledge and attitude questionnaires were

developed by the research team based on the educational objectives and existing literature. To evaluate the internal consistency of items, Cronbach's alpha coefficient was calculated for both sections:

- Pre-workshop knowledge test: $\alpha = 0.78$
- Post-workshop knowledge test: $\alpha = 0.81$
- Pre-workshop attitude scale: $\alpha = 0.84$
- Post-workshop attitude scale: $\alpha = 0.87$

Cronbach's alpha values above 0.70 were considered acceptable, indicating good internal consistency. All statistical tests were two-tailed, and a p-value of < 0.05 was considered statistically significant.

Qualitative data analysis

Open-ended responses were collected via a post-workshop evaluation form and analyzed using thematic content analysis. Two independent researchers familiar with qualitative analysis independently coded the responses. The discrepancies in theme assignment were resolved via discussion and consensus. The credibility of qualitative findings was ensured via triangulation with quantitative results and representative quotes from participants.

Results

A total of 80 undergraduate students from various health sciences disciplines (medicine, dentistry, nursing, and allied health) participated in the interactive storytelling workshop. Of these, 76 students (response rate: 95%) completed both pre- and post-intervention assessments and were included in the final analysis. The participants included 48 (60%) females and 32 (40%) males. The majority (65%) were third- or fourth-year students. Representation by discipline was as follows: medicine (40%), midwifery (30%), nursing (20%), and allied health sciences (10%).

Quantitative findings

Knowledge assessment

Mean knowledge scores significantly increased following the intervention (Table 1). The pre-test mean score was 11.2 (SD=2.4) out of 20, while the post-test mean score rose to 16.8 (SD=1.9). This difference was statistically significant ($t(75)=15.87$, $P<0.001$), indicating a substantial improvement in students' understanding of key medical education concepts.

Attitudinal change

The participants reported more positive attitudes toward medical education and using storytelling as a teaching method following the workshop (Table 2). The overall mean attitude score increased from 34.5 (SD=5.6) to 41.3 (SD=4.8) out of a maximum score of 50 ($t(75)=9.64$, $p<0.001$). The most improved items were "Storytelling made abstract concepts easier to understand" and "I am more interested in the field of medical education after this session."

Table 1. Comparison of pre- and post-workshop knowledge scores (n = 76)

Measure	Mean (SD)	t-value	P value
Pre-test score	11.2 (2.4)		
Post-test score	16.8 (1.9)	15.87	<0.001

Qualitative feedback analysis

Thematic analysis of qualitative responses revealed three dominant themes:

1. Enhanced engagement and enjoyment: Many students described the workshop as "refreshing," "memorable," and "unlike any other educational session." The narrative approach was reported to reduce cognitive fatigue and promote active participation. A participant noted: *"It didn't feel like a lecture—I felt like I was part of a real story, and the learning came naturally."*
2. Improved conceptual understanding: Students stated that the stories provided relatable contexts that helped them understand abstract educational concepts such as curriculum planning and reliability in assessment. One student remarked: *"Before this, I had no idea what validity and reliability really meant. But now I get it, because of the examples in the diary."*
3. Personal reflection and identity formation: Several responses suggested that the stories encouraged students to reflect on their own learning experiences and future roles as professionals and educators. A student stated: *"I want to become a university professor in the future and teach these concepts to my students. I will also try to share my experiences with them."*

Overall satisfaction

When asked to rate their satisfaction with the workshop on a scale from 1 to 10, the mean score was 9.1 (SD=0.8), with 93% of participants rating it 8 or higher. Most participants expressed interest in attending similar workshops in the future and advocated using this method in teaching other subjects.

Discussion

This research assessed the effectiveness of storytelling as a pedagogical approach in introducing basic concepts of medical education to undergraduate health sciences students. The results showed a statistically significant increase in knowledge and attitudes after participating in the workshop. These results are consistent with previous research which suggests that narrative-based teaching methods increase cognitive and affective learning in medical education.¹⁰

The increase in knowledge scores indicated that storytelling is not only an engaging activity but also a cognitively effective method for teaching abstract or unfamiliar educational concepts. Similar studies reported that embedding medical education content within narratives facilitates retention, understanding,

Table 2. Changes in attitudes toward medical education and storytelling method (n=76)

Attitudinal measure	Pre-workshop Mean (SD)	Post-workshop Mean (SD)	t-value	P value
Overall Attitude Score (out of 50)	34.5 (5.6)	41.3 (4.8)	9.64	<0.001
"Storytelling helped me understand better"	3.4 (1.0)	4.5 (0.7)	8.52	<0.001
"I am more interested in medical education now"	3.2 (1.1)	4.3 (0.8)	7.89	<0.001

and application by contextualizing information in realistic, emotionally resonant scenarios.⁸ Furthermore, observed positive shift in attitudes toward medical education concepts supports the notion that storytelling can foster professional identity formation and critical reflection—two key components of transformative learning.¹¹ Participants expressed increased appreciation of educational planning and the teacher's role, suggesting an internalization of values that are typically hard to communicate through conventional didactic teaching. This result is consistent with other studies that have used situated storytelling to improve learners' capacity for reflection, empathy, and ethical sensitivity.^{6,12,13}

The workshop's format, which included a reflective "book club"-style discussion around a fictionalized student diary, likely contributed to the outcomes. This method allowed participants to critically analyze narrative content, relate it to their own experiences, and extract key pedagogical principles, an approach rooted in experiential and adult learning theories.⁴ The facilitated group discussions also encouraged social learning and peer exchange, reinforcing the learning process through multiple channels.

Despite its promising findings, this study had limitations. The lack of a control group prevents causal inference regarding the intervention's effectiveness. Moreover, knowledge and attitude were self-reported and evaluated immediately after the workshop, limiting our understanding of long-term retention and behavioral impact. Future research should employ controlled designs, longitudinal follow-up, and objective measures of performance to validate and extend these findings. Nonetheless, this study contributes further to the evidence supporting narrative-based methods in medical education. By demonstrating the effective use of storytelling, the study encourages educators to reconsider traditional lecture-based teaching methods in favor of more engaging approaches.

Conclusion

This study demonstrated that storytelling is a highly effective and engaging method for teaching foundational concepts in medical education. The results showed significant improvements in both the knowledge and attitudes of medical students following participation in the storytelling-based workshops. Through the integration of quantitative and qualitative results, we demonstrated that storytelling can be both cognitively efficacious and emotionally engaging. Furthermore, students' commentary

emphasized the memorable and motivating nature of this interactive approach, demonstrating storytelling's merit as a pedagogical tool in medical training. Storytelling can enhance students' academic performance and boost their engagement when incorporated into medical education, as a dynamic addition to conventional teaching methods. Further research should explore the long-term impact of storytelling on professional development and clinical practice.

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Authors' Contribution

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Competing Interests

The authors declared no conflicts of interest.

Ethical Approval

This study was approved by Islamic Azad University, Tabriz Branch. Informed consent was obtained from all participants before their involvement in the study. Participants were assured of the voluntary nature of their participation and that they could withdraw from the study at any time without consequence. Confidentiality was maintained throughout the study, and all data were anonymized to protect participants' privacy.

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