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Enhancing clinical faculties' knowledge, attitudes, and performance in clinical supervision: a workplace-based faculty development program using proctor's model

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Abstract

Background Clinical supervision is crucial for developing medical trainees' independence. Faculty development programs can enhance faculty performance by changing their faculty attitudes and knowledge. This study examined the impact of such programs on pediatric faculty members' supervisory knowledge, attitudes, and performance.

Methods This was a quasi-experimental, pre-post, single-group study. The participants included 20 pediatric faculty members conveniently selected from the Isfahan University of Medical Sciences in Iran. The program's design used the Proctor model and ASSURE instructional design model. The 34-day program was delivered in a blended format (online and workplace) and included feedback. An observational checklist was used to assess faculty performance, and a self-report questionnaire was used to measure faculty members' knowledge and attitudes toward clinical supervision. Paired t-tests, independent t-tests, Spearman correlation coefficients, Cohen's -d values, and descriptive statistics were used.

Results The mean self-reported scores of knowledge (before: 5.55 ± 2.31, after: 8.25 ± 1.53) and attitudes (before: 4.07 ± 0.52, after: 4.28 ± 0.43) among faculty members increased significantly after the development program. Additionally, 90.63% of the faculty members applied the components of the Proctor model of clinical supervision.

Conclusion These results suggest that structured faculty development programs can improve faculty knowledge, attitudes, and performance in clinical supervision.

Keywords Faculty development program, Proctor's model, Knowledge and attitude, Workplace learning, And performance

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Background

Clinical supervision in medical education involves the provision of effective guidance and feedback on essential issues in a face-to-face and professional manner [1]. This type of supervision, specifically designed to meet the individual needs of learners and guided by assessment, enables learners to improve their competencies [2], bridges the gap between theoretical knowledge and practical application, and transforms students from novices to proficient practitioners [3]. The primary aim of clinical supervision in education is to improve and develop learners' professional skills, ensure patient safety [1], and optimize patient care. In general, clinical supervision not only enhances the quality of learning but also significantly promotes students' professional and personal growth [4]. Therefore, inadequate supervision can lead to learners not acquiring the necessary skills to provide high-quality care, resulting in substandard care [5]. Studies have shown that the effective clinical supervision of students significantly enhances their learning ability [6]. However, merely increasing exposure to patients is not enough to improve the diagnostic ability for common outpatient conditions. The crucial element in enhancing these skills lies in implementing effective clinical education strategies [7, 8, 9]. In recent decades, several efforts have been made to address the acknowledged deficiencies in clinical education through the use of supervision models [10].

The Proctor model is a highly popular and frequently referenced paradigm in the academic literature. This model provides a thorough framework that categorizes the responsibilities of a clinical supervisor into three functions: formative, restorative, and normative. The formative function emphasizes formative assessment and feedback provided to learners to enhance their learning and skill development. Its purpose is to support learners in improving their clinical practice and knowledge. The restorative function of clinical supervision emphasizes providing support and guidance to learners facing challenges in their clinical work. It aims to help learners overcome difficulties, build confidence, and enhance their professional growth. The normative function establishes standards and expectations for learners' performance in clinical practice. It involves setting norms, guidelines, and ethical principles to guide students in their professional conduct and decision-making processes. It places particular emphasis on the development of the supervisor [11, 12].

In the medical field, educational supervisors are responsible for determining the educational needs of learners, supervising their development, and ensuring the acquisition of critical clinical and educational competencies [11, 12, 13]. Therefore, the educational supervisor must oversee and guide the implementation of the educational program and its content, facilities, and learning environment [14]. Studies have shown that effective educational supervision occurs when supervisors assist learners in identifying their learning needs and accessing appropriate educational resources [11]. This support leads to increased motivation, abilities, and satisfaction among learners [15]. Despite the importance of educational supervisors in enhancing medical students' learning, many faculty members lack the necessary knowledge and skills to effectively fulfill this role. Moreover, the scarcity of specialized training in clinical supervision has resulted in few faculty members being able to meet the defined expectations of educational supervisors [4, 16, 17].

In Iran, the role of the clinical supervisor is undermined in clinical education [2, 18, 19, 20]. While most faculty members recognize the importance of clinical supervision, they often pay less attention to it because of the competing demands of teaching and clinical responsibilities [19, 20, 21, 22, 23]. As a result, clinical supervision in undergraduate medical education in Iran is inefficient. Faculty members often rely on their motivation and experiences to supervise students, leading to student confusion and a sense of being left behind [2, 19]. Therefore, implementing clinical supervision capacity-building workshops is essential for enhancing faculty understanding of the program's objectives and promoting quality and innovation in university education [4, 24, 25].

Faculty development refers to individual and group activities aimed at enhancing faculty members' knowledge, skills, and behaviors in various roles, including teaching and supervision. These programs range from short workshops to long-term capacity-building courses. A systematic review revealed that faculty development programs improve teaching skills [26]. Other studies have also shown positive effects of faculty development programs on improving feedback skills, learning, and the implementation of supervision [24, 27, 28, 29]. Additionally, these training programs have significantly increased supervisors' understanding of supervision needs, as well as their knowledge and attitudes toward students and clinical supervision [27, 30].

As guides to behavior, attitudes play a significant role in individuals' performance. Therefore, changing attitudes can predict changes in behavior. One way to change attitudes is by exposing individuals to content in various ways [31]. Clinical faculty, as educators and supervisors, are at the forefront of medical education. Thus, without ensuring faculty members' competence in supervision, the quality of the education they provide cannot be guaranteed [32]. Although most studies indicate that faculty development programs enhance clinical faculty learning, few studies have examined the impact of these programs, combined with on-the-job coaching and feedback, on

faculty members' knowledge, attitudes, and performance in clinical supervision.

Workplace learning theory focuses on the opportunities and learning resources available in the workplace and how learners interact with these opportunities and resources. In other words, this theory answers the questions of how learners engage in the workplace and what factors influence this process. Billett argues that learning solely through performing daily work tasks is insufficient and that individuals require guidance and support for professional growth [33]. By focusing on the individual needs and challenges of faculty members, workplace-based learning plays a significant role in enhancing their professional competencies [34]. These programs provide clinical faculty with opportunities for hands-on, goal-oriented learning experiences that enable them to apply their theoretical knowledge to practice. By offering opportunities for reflection and ongoing feedback during teaching activities, these programs facilitate deep and practical learning. Empowering medical faculty in real-world settings can markedly improve the quality of medical education by solidifying their command of innovative clinical teaching approaches and inducing enduring shifts in instructional performance [34, 35]. Iranian medical education faces significant challenges in clinical supervision, including trainee dissatisfaction with supervision quality, inadequate pediatric case management by graduates, low clinical competence exam scores, and suboptimal faculty-trainee relationships. These issues are compounded by limited time, a lack of practical guidelines and teacher training, and theory-focused teacher development without performance feedback. To address these critical needs, this study investigated the impact of a clinical supervision and workplace-based faculty development program on faculty members' knowledge, attitudes, and performance.

Method

Study design

This was a pre-post, quasi-experimental, single-group study. The study was performed at three university affiliated hospitals in Iran. The study was conducted in two phases: the instructional design and the implementation and evaluation of the intervention. During the design and implementation phase, the elements of Proctor's model and workplace-based learning were taken into account. Below, you will find separate descriptions of these two phases. This study was approved by the Ethics Committee of the "Alzahra Research Center" have accepted this product article. Under the ethical code IR, Isfahan University of Medical Sciences The approval reference number is IR.ARI.MUI.REC.1400.081.

Study context

In Iran, the 18-month medical internship, the final practical training experience during medical education program, is comprised of clinical rotations across inpatient, emergency, and outpatient settings. Medical Interns spend their clinical rotations in different hospital wards. Core rotations include internal medicine, surgery, obstetrics/gynecology, and pediatrics. The pediatrics is a three-month rotation which is spended in university hospitals under faculty members' supervision.

Instructional design

The Proctor model was used to create a clinical monitoring development program based on Ashour's instructional design model. The purpose of this course was to familiarize faculty members with the practical application of Proctor's model in clinical education and the successful implementation of clinical supervision. The department head and the head of clinical training for pediatric interns first met for an orientation session. This lecture covered the definition of clinical supervision, its meaning, the objectives, and the methodology of the research. After in-person and virtual meetings with the research team, a faculty development program focused on education was created that incorporated Proctor's model.

One of the most popular frameworks for instructional design, especially regarding learner engagement, is the ASSURE model. ASSURE is a reliable model that describes the essential steps for effective teaching and learning and recommends appropriate measures for each step involved [36]. This model consists of six steps: (1) analyze learner characteristics, (2) state objectives, (3) select media and materials, (4) utilize media and materials, (5) require learner participation, and (6) evaluate and revise [37]. The instructional design process for this study was conducted as follows:

1. Analyze learner characteristics: In this step, the pediatric department was consulted to assess the general characteristics of the learners, including demographic characteristics (number of learners, age, gender) and specific input characteristics of the learners (learners' knowledge and attitudes toward the subject matter, their familiarity with the course topic, and their competencies and abilities). Information was collected on the number of faculty members who participated in training and were classified by gender, academic status, and teaching experience. The relevant literature has been examined to determine learning preferences and styles [38]. In addition, expert opinions were sought from specialists in clinical training and medical education.

2. State objectives: Medical education experts and e-learning faculty were consulted to establish learning objectives based on expert opinion and a review of the literature in Step 1. The primary focus of this step was to establish objectives by focusing on the formative, restorative, and normative functions of Proctor's model (Table 1).
3. Select media and materials: The teaching sequence and content structure of the course were initially determined according to Proctor's model. Owing to the limited availability of faculty and the wide geographical distribution of the selected hospital research sites, training was conducted online. This approach would allow faculty members to participate in both training sessions and work-based learning at their respective institutions. In addition, to audience analysis and state objectives, the methods, media, and teaching materials were tailored to support the formative, restorative, and normative functions of the Proctor's model of clinical supervision. Specifically, the following approaches were used:
Instructional methods included lectures, discussions, group discussions, question-and-answer sessions, simulations, and workplace-based learning.
The media utilized for delivery were videos, written materials, cyberspace, and online learning platforms.
Instructional materials included films, scenarios, articles, books, and national and hospital guidelines and protocols.
4. Utilize media and materials: In this step, the teaching materials and activities were reviewed. Learners have been prepared, and the necessary equipment and facilities, such as the online learning environment, the delivery of online section content, and the answers to questions during theoretical and practical training, have been prepared and verified. The training activities should enable learners to apply the learned content in real clinical supervision environments (selected teaching hospitals).
5. Require learner participation: In this step, we determine how to utilize various methods, such as question-and-answer sessions, animations and scenario analyses, discussions, group discussions, and real actions in the workplace, to involve teachers in the teaching-learning process (Table 2).
6. Evaluation and Revise: A self-report questionnaire, including an assessment of faculty members' knowledge and attitudes toward clinical supervision, was developed to assess the impact of the faculty development program. In addition, a direct observation checklist was developed to evaluate the implementation of clinical supervision in real work settings.

Table 1 Learning objective

objectives	After taking this course, participants should be able to:
Cognitive	Formative, normative, and restorative functions: • Define clinical supervision in education. • Describe the basic principles of effective observation. • Describe the fundamental principles of implementing clinical training models • Explain the general framework of procedures training. • Describe how to provide appropriate feedback. • Describe how to ask appropriate questions. Formative function: • Explain the steps involved in providing comprehensive guidance for reflection. • To be able to criticize the presented scenarios about feedback and reflection. • suggest appropriate methods for providing clinical supervision in education.
Attitude	Normative function: • To be interested in applying clinical supervision in training interns in the general practice course. • To acquire the appropriate attitude about the importance and application of clinical supervision in education. • Understand the importance of the supervisor's role in clinical supervision and its difference from quantitative research.
Competency	Formative, normative, and restorative functions: • employ diverse observation strategies effectively. • Utilize feedback strategies. • Employ appropriate questioning techniques. • Employ strategies to guide learners toward critical reflection. • Direct and implement clinical supervision within the training of medicine interns. Formative function: • Apply principles of clinical education to leverage learned models. Restorative function: • Foster a stimulating and engaging learning environment. Normative function: • Adhere to hospital, medical, and educational regulations through disciplined observation

Data collection tools

Knowledge and attitude self-reporting questionnaire The questionnaire was a researcher-made instrument. Its content was developed based on library research and the results of a qualitative study conducted by two authors [19]. An expert panel consisting of 5 clinical experts from the pediatric department who did not participate in the study and 3 experts in medical education was assembled. To comply with ethical principles, the following statement was placed at the beginning of the questionnaire: Based on the stated objectives of the study and the oral explanations given by the project leader and colleagues, I am willing to take part in this study.

Table 2 Faculty development program

Row	period	Issue	educational strategies
First day	2.5 h	• Statement of objectives • Send the link to the self-report questionnaire on knowledge and attitude • Supervision • Effective observation	• lecture • question and answer • scenario • show movie
Second day	2.5 h	• Continue the topic of effective observation • Feedback • Teamwork	• lecture • question and answer • scenario • movie show
Third day	4 h	• Reflection • Send the link to the self-report questionnaire on knowledge and attitude • Summary of the workshop	• lecture • question and answer • scenario • shows animation • Discussion
Workplace	December 2022	Implementation of clinical supervision by faculty, Application of workshop-provided content in clinical supervision, A researcher being present at clinical rounds, Answering faculty questions about clinical supervision implementation, Providing feedback at the end of rounds and the end of the month, Completing the direct observation checklist of faculty performance	• lecture • question and answer • Providing training materials tailored to faculty requests

The questionnaire consisted of two parts. The first part included four demographic questions (gender, educational level, experience in medical education, and length of experience as academic staff) and ten knowledge questions about the provision of clinical supervision to medical interns. The respondents rated their knowledge on a scale from 1(no knowledge) to 10(complete mastery). This resulted in a minimum score of 10 and a maximum score of 100 for the knowledge area. The results were then averaged.

The second part, which was designed based on Proctor's model, examined faculty attitudes toward clinical supervision during training. This section included 24 phrases in three functions: Restorative(5 phrases), Normative(9 phrases), and Formative(10 phrases). A 5-point Likert scale was used for the rating (strongly disagree = 1, completely agree = 5). To ensure data accuracy, four reverse-scored statements were included. Scores in the restorative domains ranged from highest [25] to lowest [5]. Similarly, the values of the normative and formative functions were between 45 and 9 and between 50 and 10, respectively. The overall attitude score was between 24(minimum) and 120(maximum). The values were then averaged to produce a more meaningful result, with the highest and lowest average values being 5 and 1, respectively. Participants who had more than 50% of the questions in a section left unanswered were excluded. However, all the questionnaires met this criterion. Scores above 3 indicated a positive attitude toward clinical supervision, whereas scores below 2.99 indicated a negative attitude. Content validity (CVI = 0.93) and relative content validity (CVR = 0.85) were determined. Furthermore, the internal consistency reliability was high ($\alpha = 0.96$). To determine validity, eight medical education experts assessed the degree of association of each statement with clinical faculty members' knowledge or attitudes toward clinical supervision in training. They used scales of 'totally related,' 'related,' 'slightly related,' and 'unrelated.' The CVI and CVR were calculated based on these assessments.

Direct observation performance checklist The direct performance observation checklist included 26 statements in three functions: restorative (6 statements), normative (7 statements), and formative (13 statements) developed by the researcher. The terms of the checklist were compiled based on Proctor's model and the content presented in the online sections. A 3-point Likert scale (Yes, No, not applicable) was used for the rating. To ensure content validity, the prepared checklist was provided to five medical education experts. The experts' correction comments were included in the checklist. Cronbach's alpha was used for reliability ($\alpha = 0.86$). The evaluation of the checklist included awarding full marks (100) to all statements implemented by faculty during the observed clinical rounds. A score of zero was given for statements that were not implemented. The sentences marked 'does not apply' indicated situations where the statement was irrelevant due to the specific clinical case or ward conditions. Finally, the implementation of each statement was reported as a percentage based on the observed clinical rounds.

Intervention implementation and evaluation

This study involved 20 faculty members from the Department of Pediatrics at Isfahan Medical University. The inclusion criterion was at least one year of clinical teaching experience with medical trainees. The study used a convenience sampling method in which all faculty members teaching medical interns in the specified

departments of the selected hospitals were invited to participate in the study. The director of the Center for Educational Studies and Development extended a written invitation to the faculty members, who invited them to participate in the Faculty Development Program. The program's timetable was coordinated with the lecturers. A written invitation was personally delivered to participants two days before the commencement of the faculty development program. The study aims were comprehensively elucidated, and participants were assured of their right to withdraw at any time and the confidentiality of their data. Following the acquisition of initial verbal consent, a detailed explanation was provided regarding completing the written informed consent form within the pre-test questionnaire. In addition, faculty members received text messages the day before and the morning of the sessions to remind them of the start time and provide them with the link to join the online session.

At the beginning of the faculty development program, faculty members received a link via text messages to a self-report questionnaire designed to assess their knowledge and attitudes toward clinical supervision. The procedure for responding to the statement regarding informed consent in the questionnaire was re-explained to ensure that all participants fully understood their rights. The participants had 15 min to answer the questionnaire. The training program's content, which included effective observation, feedback, reflection, and implementation of the Proctor model of clinical supervision in clinical training, was subsequently delivered online over 9 h over three days (19, 20, and 22 December 2022) by the study team. Various teaching methods were used to present the content, including lectures, group discussions, presentations, handouts, multimedia, and animations. Throughout the program, participants received guidance and support through the virtual platform and were provided access to training materials.

After completing the online training, the participating faculty members were asked to apply their newly acquired clinical supervision skills in their clinical rotations for one month (23 December– 23 January). During the clinical rounds, independent clinical supervision experts evaluated the performance of faculty members. Two nurses, both holding Master of Science in Nursing degrees and selected in consultation with district nurse supervisors, underwent training in relevant medical modules. They received a two-hour training session focused on clinical supervision, feedback, reflection, and the use of observation checklists.

A pilot test during three clinical rounds validated training understanding and checklist reliability. In each round, the first author and trained nurses independently completed the checklist, then compared the completed checklists and reconciled any discrepancies. Data from these pilot rounds were excluded from the final analysis. A randomized schedule for daily observations was created using a lottery system, with the involvement of the pediatric internship training coordinator. Before participation in the clinical rounds, the consent was obtained from the relevant faculty member. Each faculty member's clinical rounds were observed for at least one day.

During the observations, the observers positioned themselves so as not to interfere with the clinical examinations or procedures. Furthermore, all observations were conducted without any explanation to the faculty member to ensure that the clinical monitoring process occurred naturally. During the clinical supervision process, an observation checklist was completed by the observer. At the end of the clinical rotation, faculty members received feedback on the strengths and weaknesses of implementing the clinical supervision model. Inquiries from faculty members regarding the procedural aspects of the Proctor model of clinical supervision were answered. In addition, academic staff asked questions in a virtual group and received answers from medical education experts. To ensure the completeness, accuracy, and reliability of the data recorded in the observation checklist, the completed checklist was reviewed by the observer within 10 min of the end of the clinical round. Any incomplete items were subsequently completed.

Following the faculty development program, a text message was sent to all the participating faculty members with a link to an electronic self-report questionnaire assessing their knowledge and attitudes toward clinical supervision. Faculty members were given 15 min to complete the questionnaire. One week after the study was completed, a summary report on faculty performance in clinical supervision was provided to all participants by the Center for Medical Education Studies and Development of Isfahan University of Medical Sciences. Data analysis was performed via SPSS 27.

Results

This research investigated the effects of a faculty development program and workplace-based learning on the self-reported supervisory knowledge, attitudes, and performance of pediatric faculty at Isfahan University of Medical Sciences. During the intervention design phase, the instructional design for the faculty development program, the workplace-based learning initiative, and the evaluation techniques were established (Table 2). The intervention was implemented, and the findings are presented as follows:

Twenty faculty members participated in the study. 50% of the participants were male. The participants were five pediatric specialists, fourteen superspecialists, and one fellow. The average teaching experience of the faculty was 12.5 years. The least and most experienced faculty

Table 3 Facultys knowledge: before- and after-faculty development program

Variable	Before		After		Paire t-test		Effect Size
	Mean	SD	Mean	SD	t	*p*-value	d
knowledge	5.55	2.31	8.25	1.53	4.68	0.00	1.046

Table 4 Faculty knowledge mean scores: before and after faculty development program

Row	Item	Before		After	
		Mean	SD	Mean	SD
1	Definition of clinical supervision	6.30	2.52	8.25	2.22
2	Clinical supervision types	5.10	3.06	8.20	2.04
3	Principles of reflection	4.70	2.58	8.20	1.51
4	Steps to reflect on performance	4.70	2.89	7.95	1.85
5	Clinical training methods	5.80	2.44	8.10	1.48
6	Practical question and answer method in clinical rounds	6.15	2.18	8.30	1.45
7	Principles and how to accurately observe interns while performing clinical skills	5.90	2.31	8.30	2.05
8	Principles of feedback	5.70	2.58	8.70	1.45
9	Steps to provide clear and effective feedback	5.25	2.59	8.40	1.63
10	How to evaluate intern performance	5.85	2.43	8.05	2.11

members had 1 and 28 years of experience teaching medical interns, respectively. None of the participants had a medical education degree. A paired t-test revealed a significant difference in the mean self-reported knowledge of clinical supervision among faculty members post-intervention compared with pre-intervention. Furthermore, Cohen's d effect size indicated a large effect of the development program on knowledge (Cohen's d = 1.046) (Table 3).

Furthermore, the findings demonstrated that before the study, the item definition of clinical supervision (M = 6.30, SD = 2.52) had the highest mean score, and the Principles of reflection item had the lowest mean score (SD = 1.45, M = 4.70). In addition, the item Principles of Feedback (M = 8.70, SD = 1.45) had the highest mean score in the post-study knowledge domain, whereas the item Steps of Performance Reflection (M = 7.95, SD = 1.85) had the lowest mean score (Table 4).

Furthermore, a significant difference ($p < 0.05$) was observed in the mean values of attitudes toward formative function before and after the study, according to a paired t-test. Additional findings revealed that, although not statistically significant, faculty mean scores regarding their attitudes toward the normative and restorative roles increased following their involvement in the development program. Additionally, the faculty development programs have a large effect size on formative functioning and overall attitudes, a medium effect size on normative functioning, and a small effect size on restorative functioning, according to Cohen's d effect size (Table 5).

Furthermore, the restorative function was associated with both the highest and lowest mean values before the study, encouraging interns in educational discussions (M = 4.40, SD = 0.55) and undermining interns' self-confidence (M = 3.55, SD = 1.10). In terms of its normative role, the highest and lowest average scores were linked to the statements essential for interns (M = 4.50, SD = 0.51) as well as the waste of the clinical supervisor's time (M = 3.55, SD = 0.94). The formative function's highest and lowest mean scores were associated with helping interns understand work processes in the care system (M = 3.90, SD = 0.79) and improving interns' clinical skills (M = 4.30, SD = 0.66) (Appendix). In addition, the restorative function was associated with both the highest and lowest average scores after the study, creating enthusiasm for learning in interns (M = 4.45, SD = 0.94) and undermining interns' self-confidence (M = 3.40, SD = 1.35). The highest and lowest mean scores for normative function were associated with wasting the clinical supervisor's time (M = 3.90, SD = 0.85) and maintaining discipline among interns (M = 4.50, SD = 0.51). Also, Providing additionally, providing opportunities to teach interns key points of clinical cases (M = 4.40, SD = 0.50) and helping interns understand work processes in the care system (M = 4.25, SD = 0.77) had the highest and lowest mean scores in the formative function, respectively.

The mean self-reported scores of faculties' attitudes and knowledge were not significantly correlated with faculties' rank or educational level, according to Spearman's correlation coefficient. Furthermore, according to the independent samples t-test, there was no discernible

Table 5 Faculty's attitudes (before– after Faculty Development Program) and performance

Function	Attitude							performance
	Before		After		Paired t-test		Effect Size	
	Mean	SD	Mean	SD	t	*p*-value	d	%
Restorative	3.89	0.58	3.97	0.72	0.54	0.59	0.121	87.77
Normative	4.09	0.49	4.25	0.48	1.55	0.14	0.347	87.11
formative	4.14	0.60	4.46	0.45	3.16	0.005	0.708	93.85
Total	4.07	0.52	4.28	0.43	2.42	0.03	0.541	90.63

difference between the two genders' average self-reported scores on attitudes and knowledge.

The faculty appropriately applied the clinical supervision principles taught in the development program 90.63% of the time, according to direct observations of clinical supervisors' performance in 30 clinical rotations in actual workplaces. In particular, the formative function had the highest percentage of correct application (93.85%), whereas the normative function had the lowest percentage (87.11%) (Table 5). The following behaviors showed the highest level of implementation: availability, tailoring instruction to needs, delegating responsibility, asking questions, providing opportunities for questions, respectful behavior, teaching clinical and diagnostic skills, and providing feedback (100%). The use of other individuals and professions to teach practical skills had the lowest implementation rate (56.6%).

Discussion

This study investigated the impact of a faculty empowerment program based on Proctor's model on the knowledge, attitudes, and supervisory performance of clinical medical faculty. Several Studies showed that faculty development programs emphasizing clinical teaching enhance faculty members' clinical supervision skills [24, 27, 28]. Similarly, this study's pre- and post-intervention questionnaires showed significant improvement in clinical faculty skills following a program combining theoretical knowledge and practice. In particular, there was a significant increase in mean self-reported scores for knowledge and attitudes (including formative function and the total score) related to clinical supervision. In addition, Naing et al. [39] found that a faculty development course promoting the application of course content in educational leadership, clinical communication, and learning psychology improved faculty attitudes and knowledge.

Faculty perceptions of the restorative role of clinical supervision were one of the functions examined in this study. In examining the Purpose of Clinical Supervision, faculty recognized the restorative function as essential to educational supervision [40]. Jackson et al. [41] studied supervisory relationships in medical education. They found that supervisors' assignment of supportive tasks is valuable. In the present study, faculties' mean scores on the restorative function increased after the intervention. However, this increase was not statistically significant. Nishiuchi et al. [42] however, reported improved faculty self-efficacy in recognizing student needs and emotions following a faculty development program. Short program duration in the current study may explain the discrepancy with Nishiuchi et al. study, so that, restorative functions, especially in the emotional area, require longer development. The effects on attitudes in this area develop over a relatively long period. Faculty support in clinical settings is also influenced by external factors like environment, sociocultural context, organizational policies, and educator workload [43, 44, 45]. The high patient enrollment due to the viral outbreak and increased air pollution at the time of the current study, may explain the study's different results. Therefore, to manage time, balance roles, and resolve conflicts, clinical supervisors may minimize their restorative function.

In addition, Hospitalized children experience stress from unfamiliar surroundings, people, and medical procedures. Their parents also experience guilt, disbelief, anger, and frustration. This may affect how teachers perceive and implement their restorative function in pediatric settings.

Additionally, although not statistically significant, faculty self-reported normative functioning attitudes increased after the intervention. The normative function emphasizes maintaining standards, ethics, and professional roles to ensure quality treatment and instruction. This includes process monitoring, rule adherence, and ethical conduct [46]. Unlike this study, Panibratets et al. found faculty prepared to supervise neonatal intensive care unit residents during procedures. Their educational programs trained highly qualified faculty, improving patient safety and illustrating the Proctor model's normative function [47]. The research setting could explain the nonsignificant results of the current study. Pediatric ward regulations gives priority to patients both in treatment and eucation. Since, before the empowerment program, managerial practices emphasized discipline, patient safety, patient rights, and appropriate social interactions.

In the present study, faculty members' mean self-reported attitudes toward clinical supervision in the formative role increased significantly after participation in the faculty development program, which is consistent with the results of other studies. Styles et al. [40], reported that faculty considered the formative role as a key element of educational supervision. Nair, Gilligan, and Jolly [28] demonstrated that a faculty development program enhanced both clinical supervisors' teaching skills (feedback, guidance, assessment) and faculty perspectives on teaching's role in learning management. This finding lends credence to the idea that attitudes act as hidden regulators of behavior, implying that one can predict people's actions by manipulating their attitudes [31]. The educational content offered in the current study is believed to be an effective step in changing the attitudes and knowledge of faculty members and improving their performance in providing clinical care to primary care learners, as an opportunity to change attitudes therein consists of familiarizing people with the content of the topic through verbal and nonverbal means.

The results of this study showed that workplace-based learning impacted faculty performance as clinical supervisors. Direct observation in the pediatric ward confirmed the training's positive effect on their use of the clinical supervision process. Consistent with this study, Manisa et al. [48] reported improved faculty knowledge and skills through on-the-job training. Booij et al. [49] further showed that a workplace-based program enabled faculty to apply new knowledge and skills to student instruction.

These and the present study show that workplace development programs using organized methods and feedback enhance clinical supervisors' performance through real-world experience. Furthermore, Bajwa et al. [50] found that a clinical supervisor development course improved faculty feedback and other clinical teaching skills. Nishiuchi et al. [42] showed that faculty development initiatives increased faculty self-efficacy in motivating student thinking. Stenfors-Hays et al. [13] also found that clinical faculty consider good supervisors those who impart knowledge and provide practical skills to students. The results of the current study are consistent with those of most studies examining how faculty development programs and workshops impact the diverse formative, restorative, and normative roles that clinical faculty members play in the training of residents.

This study examined an intervention's impact on pediatric faculty clinical supervision practices, providing relevant evidence. Unlike previous broad overviews, this study used direct workplace observation with immediate feedback, promoting deeper learning. Findings also revealed a need for enhanced faculty professional development in reflective practice and interprofessional expertise in practical skills, informing the design of a more effective training curricula. Effect sizes across Proctor supervision model domains (knowledge, attitudes, educational, managerial, and supportive facets) provided precise metrics of program impact and allowed for comparison with other interventions.

This study has several limitations, including participants workload, reliance on self-reported data, increased air pollution and viral disease prevalence during the study, and faculties reassignments. These limitations necessitated a short, blended learning program run in early morning to minimize disruption to learner education and patient care. It is recommended that future courses be longer, offered in face-to-face format along with minimal virtual sessions, and held regularly throughout the academic year to encourage faculty participation. Similar programs should also be implemented in other medical fields, supervising trainees and interns in general practice and other specialties. Finally, it is also suggested that performance assessment tools and direct/indirect observation be used to evaluate program impact on supervisor and student performance.

Conclusion

In Iran, faculty development programs have neglected the crucial role of clinical supervision. Faculty members have not received sufficient formal training in this area, and their role as educators is vague and confusing. The Proctor Model of Clinical Supervision could improve faculty members' understanding of clinical supervision as well as their attitudes toward it, which in turn leads to better clinical supervision performance. This model emphasizes the normative, restorative, and formative role of clinical supervision, which helps faculty members identify areas in which their students need improvement. This allows faculty members to develop targeted instructional interventions to increase student achievement. Faculty development programs should require the integration of theoretical knowledge with practical experience in the workplace. Such experiences help promote transformative changes in faculty attitudes and behaviors as well as consolidate and deepen theoretical understanding. Supporting teachers in their professional environment not only increases their commitment and motivation but also has a significant effect on the development of graduates who are responsive to societal needs.

Supplementary Information

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Supplementary Material 1

Supplementary Material 2

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Author contributions

M.S.M., A.O., N.Y., P.N, and S.A. provided the initial idea, and conceptualized and designed the study. M.S.M., N.Y., A.O., and S.A. questionnaire development. M.S.M., N.Y., A.O. checklist development. M.S.M., N.Y., and A.O. provided content in the empowerment workshop and data gathering. drafted the manuscript. M.S.M., N.Y., and A.O. participated in the interpretation of the data. All the authors read and approved the final manuscript.

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Data availability

All data files are accessible via: https://1drv.ms/u/s!ApQc6c-il91las0qPy5mB-V3Kws If the link is unavailable, the datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
All methods were conducted in compliance with relevant guidelines and regulations. The study aims, the participant's right to withdraw at any time, and the assurance regarding data confidentiality was explained to participants face-to-face before the study. Informed consent was initially obtained verbally, followed by written consent. Participants provided written consent by responding to the statement, 'Based on the stated objectives of the study and the oral explanations given by the project leader and colleagues, I am willing to take part in this study,' within the self-reported knowledge and attitude questionnaire completed by clinical faculty. The Research Ethics Committees of the "Alzahra Research Center" have accepted this research. Under the ethical code IR, Isfahan University of Medical Sciences on February 16, 2022. Approval No: IR.ARI.MUI.REC.1400.081. As this study is not a clinical trial, a clinical trial number is not applicable.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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