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Original Article

An educational model to teach at the bedside: A qualitative exploratory descriptive study

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Abstract
Background: Teaching medical students at the bedside to foster a spectrum of essential skills can only be acquired if an educational method is utilized in rounding practices regularly. Therefore, this study aimed to identify the best model for conducting bedside rounds from the perspectives of medical teachers and students in our context.
Methods: This qualitative exploratory descriptive study, using interviews and observations, was conducted at the Kerman University of Medical Sciences, Iran in 2020. We recruited skilled bedside teachers/role models (n = 6) and medical students (n = 8) based on snowball and purposive sampling techniques. Data were collected through (A) semi-structured individual interviews and (B) observation of clinical rounds. We used deductive content analysis to analyze data using MAXQDA software version 12. The trustworthiness of the data was evaluated based on four criteria: credibility, transferability, dependability, and confirmability.
Results: In total, this study involved 14 participants, which included 6 bedside role models and 8 medical students. The mean age of medical teachers and medical students was 50 and 29.6 years, respectively. The mean duration of the interviews for medical teachers, medical students, interns, and residents was 20, 25, 30, and 20 minutes, respectively. The findings revealed three cycles and twelve phases that contribute to the development of the optimal bedside teaching model. These include the preparation cycle (comprising preparation, planning, and orientation), the clinical exposure cycle (which involves introduction, interaction, instruction, reinforcement, supervision, and summarization), and the conclusion cycle (consisting of debriefing, feedback, and reflection).
Conclusion: An educational model can better facilitate the acquisition of the entire range of clinical skills and professional behaviors, which are indispensable components of learning. The experiences obtained from batches of participants in our context have been instrumental in developing an essential model that fosters both tangible and intangible skills, thereby producing competent doctors.

Introduction

Clinical teaching, a cornerstone of medical education, is a fundamental component of most medical curricula. It provides medical students at both undergraduate and postgraduate levels with extensive clinical exposure.

Furthermore, this setting provides opportunities for observation, hands-on experiences, feedback, communication, and a variety of essential skills.[1] It is in this environment that the professional development of medical students is nurtured, allowing them to acquire both tangible and intangible skills in medicine.[2] In Iran, as in many other countries, clinical teaching is an integral part of medical education. However, the practice and challenges of clinical teaching in Iran may differ from those in other contexts due to factors within the educational and healthcare systems. Currently, bedside rounds for teaching medical students are conducted based on clinical rotations. These rounds involve students of various levels and are led by a medical teacher. In this regard, the history and physical examination are presented, and the disease process is discussed in detail. Moreover, medical students learn about para-clinical findings, as well as clinical reasoning and decision-making.[3]

Evidence accentuates the importance of teaching medical students in a clinical environment. However, the question arises: how can a clinical teacher systematically optimize teaching and learning opportunities? Recent research on the structure of bedside teaching, which

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analyzed nearly 80 hours of video material from a total of 36 bedside teaching sessions, revealed that most of the bedside time was dedicated to plenary sessions, with less than one-third of the time spent at the patient's bedside. The primary activity was taking the patient's history at the bedside, while case presentations, clinical reasoning, and theoretical knowledge were predominantly taught outside the patient's presence. Clinical examinations were conducted both in the patient's room and in a separate theory room.[4] Despite its prevalence, evidence suggests that clinical teaching often lacks standardization.[5] The teaching methods range from opportunistic sessions to highly structured ones, with varying rounding practices.[6]

Numerous researchers have conducted various studies, contributing to the evolution of teaching models in clinical settings. For example, several models have been developed to optimize the teaching-learning environment for both clinical teachers and medical students. These include the Microskills of Teaching model,[7] the COX model,[8] the Mi PLAN model,[9] the Meeting to Meeting model,[10] and Harden's models of teaching in the clinical environment,[11] among others. Furthermore, In 2020, Dehghani et al proposed riveting and innovative methods for clinical teaching during emergencies, such as the COVID-19 pandemic, to facilitate the acquisition of knowledge and skills by medical students.[12] It is worth noting that the adaptation of these models can significantly enhance clinical teaching, making it more beneficial.[2] In this regard, a medical teacher truly realizes his/her role in the educational process and strategizes their teaching plans accordingly. Similarly, medical students will attend teaching sessions with clear objectives, understanding their roles and responsibilities, and knowing how to interact with patients.[13] As a result this aims to ensure a planned teaching within an amicable environment for all participants including the medical students, the patients, and the medical teachers.

To date, to the best of our knowledge, there is a paucity of research in our context to identify the most effective teaching models for rounding practices. Therefore, we initiated this study to come up with the most effective teaching model for medical students, focusing on identifying key factors and strategies that could be implemented during rounds. Given the aforementioned details, this study aimed to delve into the viewpoints of both medical educators and students concerning the topic under scrutiny. Our findings pave the way for future studies to assess the educational advantages of our model and establish its significance in medical education.

Methods

Study Design

This qualitative exploratory descriptive study, employing interviews and observations, was conducted at the Kerman University of Medical Sciences (KMU), Iran in 2020. We adopted an exploratory approach as the topic under investigation which has received little previous attention in our context. This approach assists researchers in summarizing and getting a better understanding of the real-world context as it is experienced by the participants.[14,15] The selected approach helped us not only in exploring the perspectives of medical teachers and medical students but also in observing bedside rounds to come up with the best model of teaching at the bedside.

Participants

Following ethics approval (a code of ethics (IR.MU.REC.1396.3.165) from Isfahan University of Medical Sciences was obtained), we recruited skilled bedside teachers (n = 6) and medical students (n = 8). In addition, teachers who had bedside rounds in major wards and medical students in different grades entered the study. First, we approached medical students as we thought their first-hand experience of bedside rounds could shed light on the rudiments of the best model of bedside teaching. Moreover, they introduced role models to be included in the study.

We used purposive sampling to recruit medical students. In addition, the snowball sampling technique was applied to include skilled bedside teachers (role models). Participants entered the study based on these criteria: (1) skilled bedside teachers who were selected by medical students; (2) Bedside teachers with at least 5 years of clinical work experience; (3) Bedside teachers with clinical planning responsibilities; and (4) Willingness to participate in the study. In addition, medical students in year 5, interns in year 7, and residents could enter the study. In total, 16 role models were introduced by medical students. Among them, 6 role models were named more than once and met the inclusion criteria. All selected role models agreed to participate in the study. Interviews were conducted (after obtaining a written consent form) based on the time and place preferences of the participants and at the beginning of each interview, the objectives of the study were stated. Participants were assured of the confidentially of data obtained and they were advised that at any time they could opt out of the research. All interviews were conducted in hospitals affiliated with the Kerman University of Medical Sciences. Characteristics of study participants are depicted in Table 1.

Data collection procedure

The primary means of data collection were through two sources. They included: (A) semi-structured individual interviews with medical students and medical teachers (n = 14) as well as (B) observation of clinical rounds (n = 6). Interviews and observations were performed

over a period of 2 months. A member of the research team who was familiar with qualitative research collected the data. After aggregating data (interviews and observation) and developing the best model of bedside teaching, we found out that by the end of the data collection, we were

Table 1. Demographic characteristics of participants at KMU in 2020 (n = 14)

No.	Batches	Gender	Age	Specialty/Year	Rank
1	Medical teachers	F	54	Endocrinology	Professor
2		F	49	Neonatology	Associate professor
3		M	47	Nephrology	Assistant professor
4		M	51	Surgery	Associate professor
5		M	49	Infectious disease	Assistant professor
6		M	50	Pediatrics	Associate professor
1	Medical students	F	25	Fifth year	Medical student
2		F	25	Fifth year	Medical Student
3		F	28	Seventh year	Intern
4		F	27	Seventh year	Intern
5		F	36	Second year	Resident
6		M	27	Seventh year	Intern
7		M	35	Third year	Resident
8		M	34	First year	Resident

not obtaining any new information. The phases involved in data collection are detailed below:

Phase 1: In the first phase, semi-structured individual interviews with medical students using an interview guide were conducted (interviews were audio recorded). We asked this batch of participants to consider an ideal bedside round and elaborate on it based on the questions put forward during the interview. At the end of each interview, participants were asked to introduce two role models from major wards that they had encountered during their medical education and considered excellent in conducting rounds. Therefore, we could have a handful of names for bedside role models to be approached.

Phase 2: In the second phase, based on the identification of role models, observation of bedside rounds was done and a checklist was completed for each clinical encounter. Apart from the checklist, detailed notes were recorded if necessary. Eligible medical teachers, willing to participate in semi-structured interviews, were invited for the third phase.

Phase 3: In the third phase, semi-structured individual interviews with bedside role models were conducted (interviews were audio recorded). We asked this batch of participants to consider one of their routine clinical rounds and elaborate on it based on the interview questions.

Routing questions

We developed the interview guide and it was revised after obtaining the suggestions of experts in the field of Medical Education (n = 5). The following interview questions were used when conducting interviews with medical teachers (questions 1-6) and medical students (questions 7-10). Furthermore, additional open-ended questions based on interviewees' responses as well as probing questions were asked during the interviews to expand responses.

1. How do you approach your teaching on a typical round?
2. What aspects of your teaching make it different from a usual day-to-day round?
3. What techniques or methods do you use when teaching?
4. How much interaction do you have with students?
5. How much hands-on learning do you provide to students?
6. How do you provide feedback?
7. How does your ideal medical teacher conduct the bedside round?
8. What aspects of his/her teaching make it different from other bedside rounds?
9. What are the characteristics of a typical bedside round?
10. What teaching principles do you look for in a bedside role model?

Observation of rounds

We approached bedside role models while they were conducting the daily clinical rounds or the routine inpatient teaching rounds with medical students. One member of the research team attended the rounds to observe and checkmark the pre-specified items on the checklist. Observations were not video recorded, but notes were taken to validate data obtained from the interviews.

Checklist

To develop the checklist for our investigation, we used: (A) the literature review and (B) the opinions of Medical Education experts. We conducted an unsystematic literature search to identify articles in the field of medical education focusing on best practices and strategies used in bedside teaching/clinical rounds. It is important to mention that as we had identified the strategies of teaching in clinical rounds in a systematic review,[6] we developed the checklist based on the findings obtained from this research as a basis. We then made amendments by integrating the findings obtained from other studies and we used the consultation of our research team and the Medical Education experts and rectified it. Concerning its validity, we sought the opinions of 5 Medical Education experts, and necessary changes were made as required. Regarding its reliability, we used a test-retest, and a reliability of 0.78 was obtained. The items of the checklist specifically take into account the basics and principles that must be done when conducting a clinical round (Table 2). If all is taken into account by a medical teacher, the resultant would be an efficient round with all its properties.

Data analysis

In this study which was conducted as a naturalistic inquiry, we used deductive content analysis to analyze data. This method of data analysis is used when the structure of the analysis is done on the premise of previous knowledge (an earlier theory or model) and when the aim of the study is theory testing.[16] Based on the aim of the current study,

Table 2. Checklist items used in the observation of bedside rounds at KMU in 2020

No.	Item	Yes	No	NA
1	Introducing the team to the patient was done by the clinical teacher			
2	The patient was oriented to the purpose of the round			
3	The patient was respected and permission was obtained for observation and examination			
4	The patient was involved during history taking, physical examination or decision making			
5	Technical language or medical jargon was not used when communicating with the patient			
6	Further discussions or certain details were postponed or done away from the patient			
7	The patient's history was presented by the primary person caring for the patient			
8	Clarification on history points was provided to students by the bedside teacher			
9	Following oral presentation, feedback was provided to students by the bedside teacher			
10	Physical examination was led and modeled to students by the bedside teacher			
11	Opportunities to practice clinical examination skills were provided by the bedside teacher			
12	Clarification on physical examination was provided to students by the bedside teacher			
13	Following a physical exam, feedback was provided to students by the bedside teacher			
14	Students were led to establish a diagnostic and/or therapeutic plan			
15	Sufficient time was allocated to teaching during the round			
16	Students' needs and deficiencies were catered to by the bedside teacher			
17	Teaching was efficiently integrated with work			
18	Clinical teachers' thought processes were shared by students			
19	Good bedside manner was displayed during the round			
20	Passion and enthusiasm were demonstrated by the bedside teacher on round			
21	Succinct teaching points and clear explanations were provided by the bedside teacher			
22	All students were catered to teaching and were encouraged to participate			
23	Sufficient time was allocated for teaching on round			
24	Gaps in knowledge and how to approach problems were welcomed by the bedside teacher			
25	A degree of independence in decision-making was given to students			
26	A degree of independence in teaching responsibility was given to students			
27	Students were asked to share their thought processes with other team members			
28	Students were treated with respect			
29	Students were involved in the process of teaching and patient care			
30	Motivation was provided to make them feel important in the learning process			
31	A positive learning environment was created by the bedside teacher			
32	Enthusiasm was generated during the round			
33	A get-together was arranged to discuss/recap what was going on the round			
34	Debriefing was done to provide feedback on students' performance			

theories, and literature review[6,8,10,17] concerning the topic under investigation, we developed an unconstrained matrix to code data from the general to the specific and to keep the flexibility of creating different new categories. Each interview was transcribed and perused to identify units of analysis. After completing the initial coding, grouping and categorizing of data were performed. This involved organizing similar codes into broader categories based on their shared characteristics or meanings. We did this to create a hierarchical structure capturing the main themes and subthemes. Finally, reviewing and revising the codes and categories were performed to ensure that they accurately represent the content of the data. A member of the research team did the initial coding and the codes were validated by fellow researchers. In the case of the emergence of new categories, we used the principles of inductive content analysis. Data were analyzed by using MAXQDA software version 12.

Trustworthiness

The coding process was done by one of the members of the research team and checked by other members. In case of any discrepancies, a third person has negotiated accordingly. After the initial categorization and cross-checking the data, we developed the best model of bedside teaching. Then, we held several meetings with experts in Medical Education to achieve consensus and validate the model. Concerning the trustworthiness of data, we took

the four criteria of Guba and Lincoln namely credibility, transferability, dependability, and confirmability into consideration when coding the data.[18] Moreover, observations and teacher-student interactions at the bedside were done to increase the trustworthiness and credibility of the findings obtained from interviews.

Results

In total, 14 individuals participated in this study. Among the batches, half of the participants were females and half of them were males. The batch of medical teachers included 4 males (2 assistant professors and 2 associate professors; 66.6%) and 2 females (1 associate professor and 1 professor; 33.4%). Furthermore, the batch of medical students included 3 males (1 intern and 2 residents; 37.5%) and 5 females (2 medical students, 2 interns and 1 resident; 62.5%). The mean age of medical teachers and medical students was 50 and 29.6 years, respectively. The mean duration of the interviews for medical teachers was 20 minutes. In addition, the mean interview time for medical students, interns, and residents was 25, 30, and 20 minutes, respectively. Moreover, each bedside round was observed for its entire duration.

We identified 3 cycles and 12 phases contributing to the development and formation of the best model of teaching at the bedside (Figure 1). The results are presented according to each cycle and its phases.

The best model of teaching at the bedside

As shown in Table 3, the pre-round included the preparation cycle with three phases namely preparation phase, planning phase, and orientation phase. Themes and supporting quotes are provided in Table 3.

As shown in Table 4, the rounds included the clinical exposure cycle with six phases namely introduction phase, interaction phase, instruction phase, reinforcement phase, supervision phase, and summarization phase. Themes and supporting quotes are provided in Table 4.

As shown in Table 5, the post-round included the conclusion cycle with three phases namely the debriefing phase, feedback phase, and reflection phase. Themes and supporting quotes are provided in Table 5.

Discussion

This study led to the identification of the best model of teaching at the bedside by the adaptation of individual semi-structured interviews and observations. Findings revealed three important phases (pre-round, rounds, and post-round) in teaching at the bedside as indicated by our literature review. In addition, different cycles formed each phase namely, preparation cycle, encounter cycle, and conclusion cycle. Our model helps medical teachers in their teaching at the bedside to follow the steps to have an organized teaching so that medical students can make the most of learning during a clinical encounter.

Based on the identified model, the three phases of the preparation cycle lead to better preparation of bedside teachers and medical students before the initiation of rounds. In the preparation phase, the medical teacher should be confident in his/her teaching skills to impart knowledge and clinical skills to medical students. Therefore, faculty development programs based on the needs of medical teachers focusing on teaching methods and student evaluation are of utmost importance. This issue has been emphasized in different research.[6,19-21] In a similar line, medical teachers must allocate enough time for teaching and their commitment plays a pivotal role. The study undertaken by Buchel and Edwards is in line with the present research highlighting that enthusiasm to teach and providing a friendly environment are important factors in clinical teaching.[22] Last but not least, medical teachers should define the roles and responsibilities of students especially when different grades are present in clinical teaching. This finding is consistent with other studies.[23-25] In the planning phase, must-to-know topics of the curriculum or the milestones become the educational

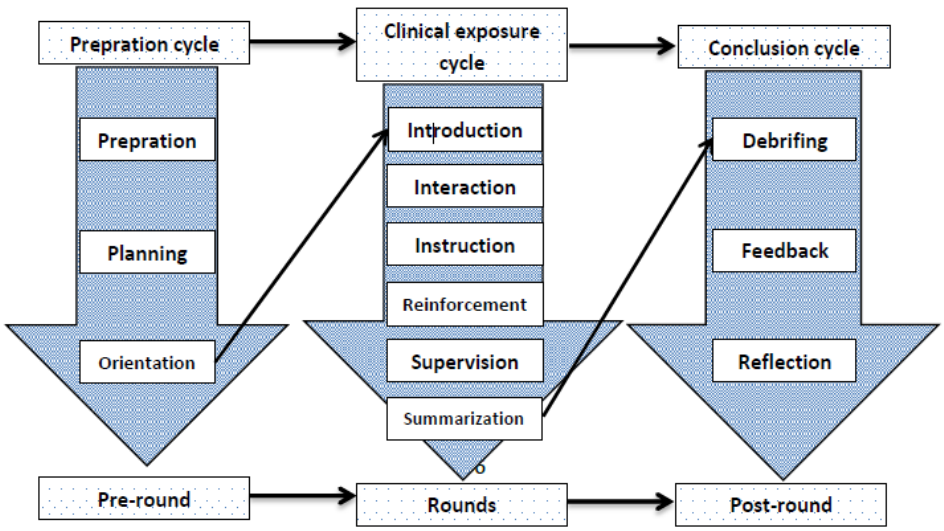

Figure 1. Cycles and phases of the best model of teaching at the bedside at KMU in 2020

Table 3. Preparation cycle and its phases of the best model of teaching at the bedside at KMU in 2020

Pre-rounds	
Preparation Cycle	
1) Preparation phase	• Have good knowledge of medical education • Have sufficient mastery of clinical skills • Responsibility and commitment • Enthusiasm to teach at the bedside • Faculty development issues
Participants' statements: - If we have the Medical Education knowledge and know how to conduct effective rounds, the resultant would be invaluable teaching on tangible and intangible skills (Female, Professor, 54 years). - We learn not only Medicine from our reference books but also from our clinical experience. This is where the role model's mastery over clinical skills plays a pivotal role in facilitating the learning process (Female, Intern, 28 years). - Medicine is all the commitment and responsibility towards patients apart from sagacity. Medical Knowledge is only a part of being a good doctor. The major part is the care provided with unpretentious behavior (Male, Associate Professor, 50 years). - Eagerness and tenacity are drives of teaching that medical teachers lack, especially young recruited teachers. The main culprit might be the priority of research to bedside teaching in terms of job promotion (Female, Professor, 54 years). - To augment the effectiveness and frequency of bedside teaching for the benefit of all stakeholders, especially students, ongoing faculty development programs should be a target. Such an issue must be embedded as an institutional culture and environment leading to the regular occurrence of bedside teaching (Male, Assistant Professor, 49 years).	
2) Planning phase	• Formulate goals for rounding practices • Choose the right patient(s) for teaching • Role allocation • Choose an appropriate teaching method • Consider various learning styles in planning • Choose the right place to conduct the round • Timing of the bedside round • Number of learners and patients
Participants' statements: - Having a road map is important before the initiation of rounding practices. It has to come with objectives and be relevant to groups of students and teaching must be based on the level of mastery expected (Female, Associate professor, 49 years). - Teaching interesting and common clinical cases is invaluable to medical students. In our rotations, the clinical teacher passes rare and complicated cases as they are more beneficial for residents (Female, Medical student, 25 years). - To make the most out of the teaching and learning processes at the bedside, ultimate and collective responsibility can be upon the medical teacher and different grades of students one at a time. Cascade teaching by assigning responsibility to students while supervising provides an aura of commitment leading to bedside rounds with a flourish (Male, Resident, 34 years). - Bedside rounds are inefficient and unfavorable in their current practices. We need different approaches such as scenarios, role-playing, simulations, and narratives to apply in our teaching (Male, Assistant Professor, 47 years). - Teaching at the bedside should not only cover the cognition and the psychomotor domains but also the affective domain. We are not taught communication skills or ethical issues and how to behave with patients on rounding practices (Female, Medical student, 25 years). - Where to conduct the clinical round is dependent on the educational content. It bores us when we gather around a patient in the ward and theoretical topics are discussed. Conversely, hands-on experiences are better grasped in a real face-to-face interaction with a patient (Female, Medical student, 25 years). - The majority of participants believed that the number of students must be reduced and there must be a balance between the number of students and the patients in the ward. In our visits at the bedside, the minimum number of 5 or 6 students suffice. In this regard, we can concentrate and more discussions are traded back and forth among the clinical team (Male, Resident, 35 years).	
3) Orientation phase	• Know the learners • Know the learners' needs and expectations • Orient learners with objectives of rotations • Orient learners with the rounding schedule • Orient learners with rules and regulations • Reduce learners' apprehension
Participants' statements: - Educational planning due to the presence of three grades of students in rounding practices is of utmost importance. I try to get as much information as I can about my students in rounds. In this regard, I assess their level of knowledge, their familiarity with the targeted topics, and their background knowledge (Male, Associate professor, 51 years). - Redefinition of educational needs was a theme repeated by participants. Most of what I teach can be better learned through net searching, but the point is that I have to inculcate a physician's correct behavior and demeanor in them (Female, Professor, 54 years). - Medical students believed that specialized training is not practical when basic tasks such as the management of common cold and diarrhea are the needs of a GP (Male, Intern, 27 years). - Explaining the objectives of rotations to students is essential as it paves the way by knowing the answers to questions: what, where, when, why, and who (Female, Associate professor, 49 years). - It is necessary for students to know about the rounding schedule to prepare in advance to participate in the round. I work more efficiently when I have a timetable. In some wards, the rounding schedule facilitates our learning and we do not stray away from the milestones (Male, Intern, 27 years). - Although rules and regulations of rounding practices seem strict to medical students, their implementation is vital. Medical students must be notified regarding issues such as dress code, etiquette, nail trimming, etc. before the initiation of bedside rounds (Male, Associate professor, 50 years). - I took hard on my students on discussions before rounding practices, but now I try to be more lenient as an amicable atmosphere facilitates learning and opens the door to two-sided discussions. At times, I goof to make them feel that nothing happens if they say something that is not correct (Female, Associate Professor, 49 years).	

Table 4. Clinical exposure cycle and its phases of the best model of teaching at the bedside at KMU in 2020

Rounds	
Clinical exposure cycle	
1) Introduction phase	• Introduce the care team to the patient • Express the patient history by a learner • Ask for permission to examine patient
Participants' statements: - Introducing medical students to patients by a medical teacher and justifying the patient concerning the teaching hospital were issues repeated by participants. A good medical teacher introduces the team to the patient first. Patients have the right to know why the students are present at his/her bedside. I introduce myself as the chief resident to patients (Female, Resident, 36 years). - When I take the patient's history in advance and gather some information about the illness I am more ready to present the case and learn in detail accordingly. I prefer to take the lead and have this responsibility, not the medical teacher (Female, Medical student, 25 years). - A good medical teacher asks for permission from the patient to explain to students. I remember a time when a patient was rejected and the medical teacher apologized. This is ethically important (Female, Intern, 27 years).	
2) Interaction phase	• Involve the patient in the process of teaching • Involve learners in the process of teaching • Apply appropriate communication skills • Respect the patient and his privacy • Respect the learners • Induce an amicable learning atmosphere • Augment learners' motivation in rounds
Participants' statements: - Involving the patient in the treatment process as much as possible can speed up their recovery. At the patient's bedside, respecting the patient is important. He/she has the right to know about the treatment process and the things the care team is deciding about him/her (Male, Intern, 27 years). - When students actively participate in rounding practices, the resultant would not only be an increase in their motivation but also their involvement in bedside activities increases. Involving students in rounding practices can reveal their strengths and weaknesses as well (Male, Assistant Professor, 49 years). Some medical teachers assign tasks and responsibilities to us. In this way, we are compelled to do them on time and we learn more (Female, Intern, 28 years). - The level of patients' satisfaction with medical services is highly related to the communication skills of medical teachers. There are several instances in which patients refrain from the orders of physicians. My experience conveys that when there is no trust due to inappropriate communication, patients disobey and do not follow orders (Female, Professor, 54 years). - It is highly important to comply with patients' rights and maintain the confidentiality of their information and privacy. There are things that the patient does not want anyone to know, and the medical teacher says them out loud while teaching us. At times, the nearby patients and companions hear them. Such instances are infringing the patient's privacy (Female, Intern, 27 years). Patients need respect and it is an ethical issue. In one of my rotations, I observed that the medical teacher asked with respect from the patient's companion to leave the patient's room as he wanted to talk about the patient in privacy with us. This means that the patient is important and we learn these things (Female, Intern, 28 years). - It is clear that we do not know some of the clinical information about a patient. I condemn those medical teachers who mock the students when they cannot answer some of the questions. Such instances cause the patients to consider us as illiterate doctors (Female, Medical student, 25 years). - An amicable learning atmosphere induces a positive learning environment within the framework of educational rules. They are now my students and tomorrow they will be my colleagues. We become friends and tell jokes. This intimacy should be in the form of respect (Male, Associate professor, 51 years). - Learning is premised upon motivation. I always tell my students to have enthusiasm and alacrity when dealing with patients. Not only do I involve my students in knowledge-based issues but also in emotional issues to contemplate and provide the best patient care possible (Female, Associate Professor, 49 years).	
3) Instruction phase	• Transparent explanation of topics • Teach critical thinking to learners • Teach clinical reasoning to learners • Teach medical terminology to learners • Consider the learners' pros and cons
Participants' statements: - The prioritization of educational content and its presentation were very important from the students' vantage point. Dr. X is a well-rounded physician due to his method of teaching. He knows what topics are core and teaches those must-to-know contents (Male, Resident, 34 years). - Medical students require the ability to think critically and use clinical reasoning in patient encounters. We as medical teachers should indulge students in critical-mindedness and social understanding to make intelligent judgments about medical issues. To instill and for better results, a part of our teaching at the bedside should be specifically allocated to these issues (Female, Professor, 54 years). - As intern students, we need to get familiar with medical terminology in rounds based on the content we are being taught. Some medical teachers teach us medical terminology, but it would be more practical if it became a must at the bedside and we could learn the medical terminology on the spot (Male, Intern, 27 years). - We have two kinds of students, those who want to learn (mastery-oriented students) and those who just want to pass (performance-oriented). We as clinical teachers must know the type and the extent of students' strengths and weaknesses. Some students have chosen medicine for other reasons apart from being a competent physician. We must improve their shortcomings (Female, Associate professor, 49 years).	
4) Reinforcement phase	• Strengthen the history-taking skills • Strengthen the physical exam skills • Improve diagnostic skills • Improve teamwork skills
Participants' statements: - Many skills ought to be taught in rounds. History taking and physical examinations are the two most salient ones. A bedside role model corrects the history as I read it step by step and these corrections help me remember the points that I have to take heed of (Female, Medical student, 25 years). - First, the medical teacher models the physical exam and then she asks me to follow suit. She rectifies my mistake in several steps (Female, Intern, 27 years). - We have to think like a physician from the first day. What we need is learning how to make a correct diagnosis. It is ideal if the medical teacher tells us what to do from A to Z. We have to go through a plan rule out some factors put forward differential diagnoses and discuss them with the medical teacher to reach a final diagnosis at last. They have to make us vigilant about these issues to learn better (Male, Resident, 35 years). - Teaching at the bedside if done in teamwork can be an asset. I believe that tasks in rounding practices should be divided among the medical team as medical students, interns, and residents are present at the bedside. I define their responsibilities and ask them to work and come back to me and report what they did. This scheme offers an ideal opportunity for medical students in all grades to get clinical training (Male, Associate Professor, 50 years).	

Table 4. Continued.

Rounds	
Clinical exposure cycle	
5) Supervision phase	• Clinical supervision on rounding practices • Monitor learners' practical skills • Monitor learners' communication skills • Accept learners' mistakes
Participants' statements: - When we are in bedside rounds, at times I see some students talk roughly and arrogantly to patients. This raises some red flags and need my presence right away to warn them and supervise them a little more closely (Male, Assistant Professor, 49 years). - It is advisable to observe and evaluate the core skills especially practical and procedural skills of the students over time to identify the skills that need improvement. A good medical teacher should monitor the student's clinical performance, commitment, and responsibility. Knowing just the content of resources is not the panacea (Female, Professor, 54 years). - Medical students expect medical teachers to accept their mistakes and deal with them wisely. It should be a culture to accept mistakes from students. We are not an exception too. The culture of admitting mistakes has a high value and is a sign of responsibility (Male, Assistant Professor, 47 years). - It is critically essential that medical students learn how to properly communicate with patients, the patient's family, and even the hospital personnel. A good medical teacher should be a role model in this respect (Male, Associate professor, 51 years).	
6) Summarization phase	• Provide a summary of the rounding topics • Avoid unnecessary discussions • Guide learners to self-directed learning
Participants' statements: - Summarization of rounding practices is effective in the learning process. We learn better when we get together during a post-round. We review all the things that we did at the bedside and additional tips are added (Female, Intern, 28 years). - Participants had an emphasis on preventing the teaching of unnecessary topics and discussions. I will not go into details that are not useful. For instance, I never teach students specialized topics when different grades of students are present at the bedside. I stray away from unrelated topics in discussions at the bedside (Male, Associate professor, 50 years). - Learning medicine is a lifelong process and its knowledge base changes so quickly. Therefore, medical students must learn how to be self-directed learners. When we make them autonomous learners they can find out their own learning needs, formulate learning goals, identify material resources for their learning, choose suitable learning strategies, and evaluate their learning. In this regard, they take responsibility for their learning (Female, Professor, 54 years).	

Table 5. Conclusion cycle and its phases of the best model of teaching at the bedside at KMU in 2020

Post-rounds	
Conclusion cycle	
1) Debriefing	• Provide clarification on rounding topics • Trade questions and answers back and forth
Participants' statements: - After the bedside round, the medical teacher in the post-round again sparks in our minds about the patients in rounding practice by asking some questions and providing additional explanations. For example, if this patient did not have these symptoms and had other symptoms, then what would you do? (Male, Intern, 27 years). - The majority of participants believed that after the clinical round, there should be an opportunity to ask questions and talk about unclear items after the bedside round. It is a good opportunity for every one of us to ask any questions in post rounds. Sometimes we get confused when we are at the bedside, but we can get together and have discussions (Female, Medical student, 25 years).	
2) Feedback	• Provide feedback on students' learning • Elaborate on the strengths and deficiencies
Participants' statements: - Providing feedback to students in different areas, including knowledge acquisition, clinical performance, and active participation should be taken into account. In post-rounds, feedback should be provided in areas of professional behavior, clinical performance, interpersonal skills, etc. to make students more competent (Male, Assistant Professor, 47 years). - Pinpointing students' weaknesses and strengths based on their elaboration is striking. We are encouraged to know about our performance during a bedside encounter. We need bedside teachers who are holistic and trustworthy as they will look at everything and share with you your pitfalls (Female, Resident, 36 years).	
3) Reflection	• Teacher-learner reflection • Plan for self-education based on reflection
Participants' statements: - It is important that the stakeholders of the rounding practices reflect on the whole bedside activities in terms of teaching and learning processes. Teachers should not only limit the teaching of correct thinking to students while the round is in progress but also after post-round to reflect on performance (Male, Assistant professor, 49 years). - There were some recommendations concerning self-education to improve the quality of teaching and learning on rounding practices. Medical students should become more proactive by following up on the case and taking action based on the feedback received (Male, Associate professor, 50 years). By the same token, medical teachers should reflect on their actions and plan for self-improvement. Medical students believe that teaching methods are necessary for medical teachers to learn to be ideal teachers (Female, Medical students, 25 years).	

priorities and drive the planning of teaching toward the needs of students. Unfortunately, this is an often neglected topic, and planning of teaching sessions is documented in the ivory tower where the needs of students are ignored. Despite choosing an appropriate place to teach, time is also important. It has been suggested that clinical teaching be planned for fewer students within a shorter time.[26] In the orientation phase, the rudiments of teaching concerning the rules and regulations, clinical procedures, and expectations are put forward. To make the most of it,

the medical teacher should consider a get-together session to discuss these issues with students. Research has shown that success in rounding practices depends on student orientation and how clinical encounters form by knowing the road map of teaching. This will enable medical students to perform at their best in clinical encounters.[27]

The most important cycle of our model is the clinical exposure cycle where the main interactions between students, the patient, and the medical teacher are formed at the bedside. In this regard, the number of students and which patient should be approached is important. Research emphasizes the number of 3 or 4 students as the ideal number when teaching.[28] In our context, usually, 12 to 15 medical students in different grades attend the teaching session. Thus, grouping students and a mentorship strategy can be a substitute. As the focus of teaching is on patients, factors such as new admissions, discharged patients, and patients with educational value can affect patient selection.[29] Medical teacher as role model has a salient role in increasing student participation in rounding practices. Rounding initiation starts with a team introduction and history of the patient as well as physical exam. Patient privacy in this phase is critically important and it has been accentuated in the literature.[30] In this cycle, the medical teacher should provide learning opportunities and give room for discussion concerning the history of the patient and physical exam. Such instances assist medical students in the essential competencies of medicine. This is in line with other studies done in this regard.[23] Medical students as future doctors need to be observed on rounds and learn differential diagnosis at the bedside by focusing on critical thinking and clinical reasoning. As patient interaction in terms of physical exam is allowed at the bedside, close observation and appropriate feedback by the medical teacher is essential.[10] In addition, providing a summary of the rounding event paves the way towards more interaction to ask and answer questions.

The final cycle of our model, the conclusion cycle, has three phases including debriefing, feedback, and reflection. This cycle recaps the whole process of bedside teaching and helps students know the strengths and weaknesses as well as opening the room for reflection. The team gets together and tips related to the round are stated. All members are welcome to ask questions. Feedback is a major task for teachers to rectify errors. In addition, the reflection of medical students and medical teachers on the performance to make improvements is an ideal task.[6]

Over the years, several models have been developed to guide medical teachers in conducting effective bedside teaching sessions. Two prominent models that have gained recognition are the COX Model[8] and the Garout Model.[10] Our model is somehow similar to the COX model of teaching at the bedside. COX model has 2 cycles namely the experience cycle and the explanation cycle. Each cycle consists of different actions that ensure an organized and effective teaching process. Our model has more cycles and phases compared to the COX model. In another model by Garout et al, clinical teaching occurs in 5 steps, offering a comprehensive approach to teaching at the bedside. This model has also similarities with our model. The results of these studies are consistent with the current research and confirm the validity of the model extracted in our study.

Our best model of teaching at the bedside, the COX model, and the Garout model have some similarities in their approach to teaching at the bedside. The models accentuate the importance of effective communication skills, patient-centered care, and the involvement of patients in the teaching process. They also recognize the significance of role allocation and the need for medical teachers to provide feedback and reflection opportunities for students. While the three models share similarities, they also have distinct features that set them apart. The COX Model focuses on cycles like our model, while the Garout Model consists of five steps. The COX Model provides a structured framework for medical teachers to follow during each cycle, whereas the Garout Model offers a more detailed step-by-step guide. Another difference lies in the role allocation during the patient encounter. The COX Model suggests three role allocation models (demonstrator, tutor, and observer), while the Garout Model and our model do not specifically define role allocation but underscore the importance of involving all students and the patient in the teaching process.

The identified model in the current study contributes to the development of the best model of teaching at the bedside by promoting active learning, enhancing learner engagement, and facilitating the acquisition of essential skills. By adopting a learner-centered approach, medical teachers can tailor their teaching to meet the individual needs of learners. Our model also encourages learners to take ownership of their education, develop clinical reasoning skills, and engage in self-directed learning. Our model has benefits for both medical teachers and students. In terms of medical teachers, our model provides a structured framework for teaching, making the teaching process more organized and efficient. It also encourages medical teachers to adopt a learner-centered approach, which can improve learner satisfaction and engagement. Concerning medical students, our model promotes active learning and allows them to actively participate in the learning process. Medical students can benefit from self-directed learning, as they are encouraged to identify areas for further exploration and engage in independent study.

This study has its limitations. First, more diverse opinions could be derived from participants if more role models from different medical universities were included in this study. Second, our model has not been validated and there is a lack of assessment of the practicality and outcomes of the model. Thus, we recommend a multi-center study to be conducted accordingly. In addition, obtaining expert opinions, and evaluating knowledge acquisition as well as practical skills by using our best

model of teaching at the bedside is beneficial. Future studies should assess the impact of our model on learner outcomes, patient outcomes, and overall educational experiences.

Conclusion

Clinical teaching is a fundamental component of medical education. It is through this process that medical students acquire a range of clinical skills, ultimately shaping them into proficient physicians Given the unpredictable nature and numerous challenges of the clinical environment, it is crucial to have a well-structured teaching plan and implement an educational model in this context. In our study, we identified the most effective bedside teaching model by examining the perspectives of both medical teachers and students at KMU. The identified model can assist medical teachers in conducting rounds more systematically and efficiently, thereby fostering active student participation in the teaching and learning process.

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Competing Interests

The authors declare no conflicts of interest.

Ethical Approval

This study was approved by the ethics committee of our institution (No: IR.MU.REC.1396.3.165). Participants gave informed consent to this work.

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