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VIRTUAL BEDSIDE TEACHING IN GENERAL SURGERY BLOCK – AN EXPERIENCE DURING THE COVID-19 PANDEMIC AT QASSIM UNIVERSITY, SAUDI ARABIA.Sajad Ahmad Salati¹, Hayfa Alolayan¹, Waleed Almiman², Leena Alqarawi²¹Associate Professor Of Surgery, Unaizah College Of Medicine, Qassim University, Kingdom Of Saudi Arabia²Medical Student, Unaizah College Of Medicine, Qassim University, Kingdom Of Saudi Arabia

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ABSTRACT

Background: Due to the circumstances of the Covid-19 pandemic, the bedside component of teaching during the undergraduate General Surgery block was switched to virtual online learning. Interactive case reports were created, and the utilization by the students was analyzed.

Material & Methods: A total of 10 common general surgical scenarios were discussed with virtual sessions distributed over the block with PowerPoint files containing ample images and videos depicting the clinical features of relevance. The impact was studied in a survey conducted to see the students' direct feedback, and the results were analyzed.

Results: The direct feedback and the students' evaluation results on the virtual bedside teaching were consistently positive. On average, 87.5% of the registered students participated in the activity, and the willingness to participate in the sessions was maintained. The clinical assessment showed an improvement compared to the previous three years, and the satisfaction level of students was high though many difficulties were expressed with the tool.

Conclusion: Virtual bedside teaching with the help of interactive history building, steps to examination, images, and videos is a successful addition to medical education tools. It has the potential to serve as an alternative teaching method when patient contact is not possible due to the Covid-19 pandemic-like situations and otherwise also if the variety of the available cases in the teaching hospital is low.

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INTRODUCTION

The sudden spread of the Covid-19 pandemic had a notable impact on teaching in medical schools globally [1,2], inspiring innovations and developing new internet-based teaching and assessment tools [3].

The teaching of the General Surgery block for the 4th Year medical students has also transformed into online education due to Covid-19 restrictions and infection control protocols which state that attendance at traditional lectures and real-life interactive, hands-on teaching sessions should be minimized as much as possible. This transformation posed a challenge as real-life practical training is essential in human medical studies to develop cognitive, psychomotor, and practical skills. Hence an effort was made to mitigate the deficiencies by running an online substitute for bedside teaching by creating case presentations with a plentiful number of images and videos. This study aimed to evaluate the outcome of this teaching tool and thereby define its future utility.

MATERIALS & METHODS

In order to switch the content of clinical teaching to education without a physical presence of 34 male students during the Surgery block of 4th Year medical students at the Department of Surgery, Unaizah College of Medicine, Unaizah, KSA, the PowerPoints with animations were created and ran as an asynchronous, interactive online session (via the learning platform, Blackboard). The contents included: Abdominal lumps, diabetic foot, breast disorders, acute cholecystitis, pseudocyst pancreas, abdominal aortic aneurysm, gut obstruction, peritonitis, skin ulcer, and obstructive

jaundice. The presentations were based upon the case reports from peer-reviewed journals searched in the Google search engine, emphasizing PubMed and Medline sites. The videos were searched and selected from YouTube. Students' attendance at each session was recorded. An online survey was conducted at the end of the block to assess the students' satisfaction level and the feasibility of this tool to augment bedside teaching, even after the pandemic. As shown in Table 1, a brief self-designed anonymous questionnaire was used for the survey. The students were encouraged to register their responses fairly, potentially defining the department's future policies.

Towards the end of the block, a few real-life, hands-on clinical training sessions on real and simulated patients were conducted while adhering strictly to the institution's infection-control protocols. The end-of-block clinical exams were conducted offline on simulated patients and models. Then, the results were analyzed and compared with the results of the previous three years. The data were recorded in Microsoft Excel-2016 and analyzed by Statistical Product and Service Solutions (SPSS Version 27). A p-value less than 0.05 was deemed as statistically significant. The study was approved for publication by the committee of Research Ethics, Qassim University (No: 20-06-03).

RESULTS

The attendance in the online clinical sessions ranged from 72% to 98% (mean 87.5%; SD 7), Figure 1. Nineteen students (56%) were highly satisfied, 12 (35%) were satisfied, and only three students (9%) were neutral or dissatisfied with the activity. No students were highly dissatisfied, Figure 2.

Students Survey about Virtual Bedside Teaching				
1. What is your satisfaction level with the way Virtual Bedside Teaching sessions were conducted?				
Highly satisfied	Satisfied	Neutral	Not satisfied	Highly dissatisfied
2. Would you like to have Virtual Bedside Teaching sessions as an additional teaching tool in other clinical blocks, even after the pandemic is over?				
Yes		Neutral	No	
3. Can Virtual Bedside Teaching sessions be a replacement for bedside teaching after Covid-19 pandemic is over?				
Yes		Neutral	No	
4. Can new clinical skills be learnt in Virtual Bedside Teaching sessions without any real patient encounters?				
Yes		Neutral	No	
5. What were the difficulties encountered during Virtual Bedside Teaching sessions? Please mention.				
6. Do you have suggestions for improvement of Virtual Bedside Teaching sessions? Please mention.				

Table 1: Self-designed Questionnaire used in survey about Virtual Bedside teaching.

In the clinical assessment, the grades obtained ranged from 14.83 to 19.67 out of 20 (mean 18.5; SD 1.08); in the years 2017, 2018, and 2019, the mean grades had been 15.7 (SD 1.57), 14.9 (SD 1.61) and 15.8 (SD 1.48) respectively as depicted in Figure 3. The grades in 2020 have shown significant improvement (p -value < .00001), even though there was no relaxation or change in the assessment methodology.

Regarding the inclusion of virtual clinical sessions in future courses even after the pandemic to complement and augment real-life bedside teaching, 31 out of 43 (91%) supported the idea. In contrast, only three students (9%) were either neutral or disapproving, as shown in Figure 4. However, all the students (100%) rejected the idea of replacing bedside teaching with virtual bedside sessions. Similarly, 91% ($n=31$) felt that clinical skills could not be

obtained without real patient encounters, whereas 9% ($n=3$) were neutral.

The majority of students (88%) had experienced difficulties during the sessions, as summarized in Table 2. The students expressed no suggestions for improvement except to increase the number of videos demonstrating useful clinical content.

DISCUSSION

Bedside teaching (BST) is a fundamental tool in creating a competent physician [4,5]. Sir William Osler (1849-1919), one of Canada's most renowned physicians, was the first to introduce BST to medical education in 1892. He had visualized medical education as an art that has to be taught at the bedside: "Medicine is learned by the bedside and not in the classroom" [6].

Nevertheless, in 2020 due to the spread of the Covid-19 pandemic, the infection control protocols and physical distancing measures

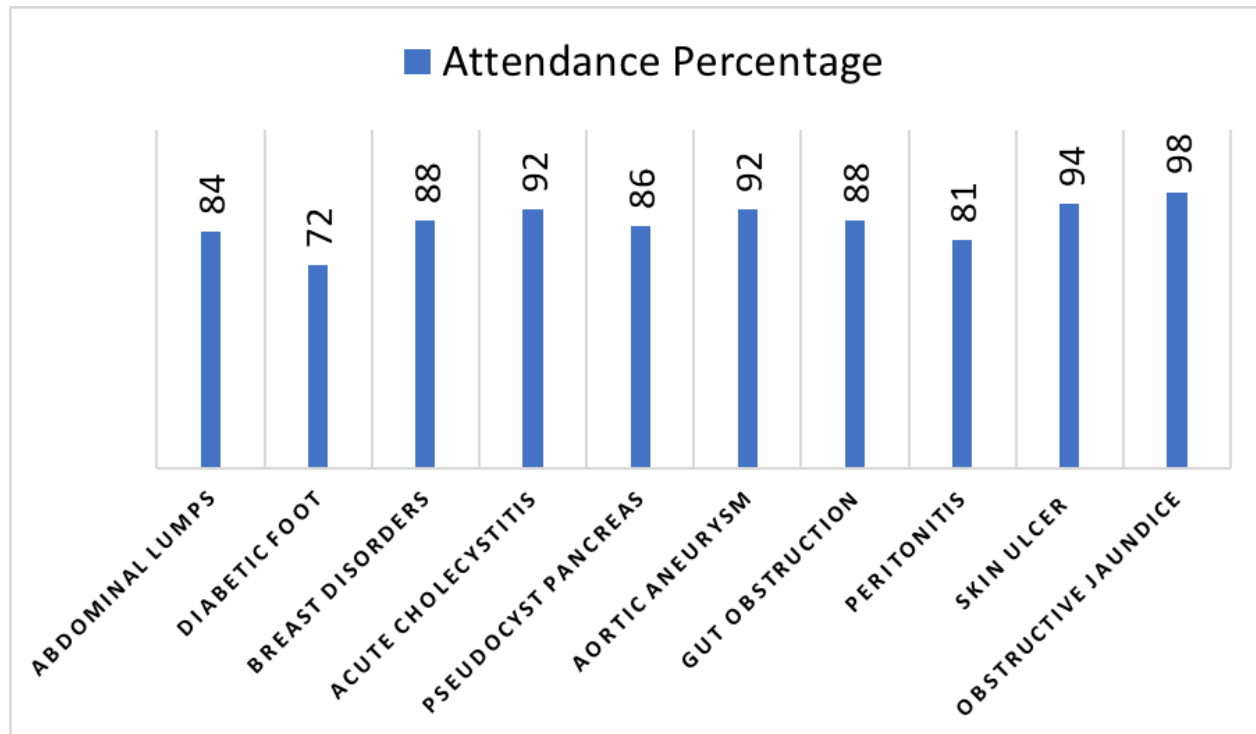


Figure 1: Attendance of students in the online clinical *sessions*

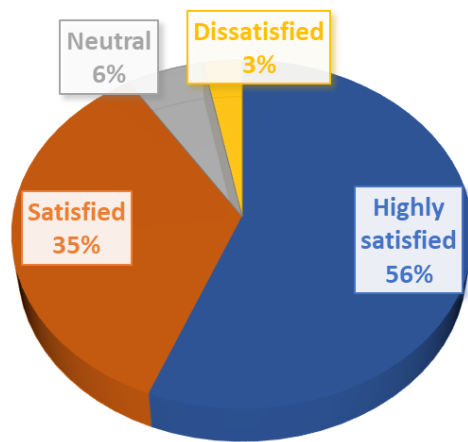


Figure 2: Level of satisfaction in the students

disrupted academic activities like bedside teaching that previously occurred face-to-face, thereby affecting medical schools globally [1,2]. To mitigate the negative

impact, recent advances in communication, video conferencing, social media platforms, and digital technologies were adopted and implemented to facilitate remote teaching, learning, assessment, research, and scientific discourse [3,7,8].

An interactive case-based learning session covering the most common surgical disorders otherwise discussed by the bedside was run online in our General Surgery block for 4th-year medical students, and the results were encouraging. The overall attendance of 87.5% was recorded, and the interest was maintained throughout the block, as depicted in Figure 1. Though our figures reflect the similar acceptance of online teaching by the students in the UK, as was found in a cross-sectional online national survey recently conducted by Dost et al. [9] and the

Difficulties experienced by the students	Number (N) & percentage
1. Technical issues, such as in audio and network	N – 6 (20%)
2. Apprehensions that proper clinical skills may not be acquired without real life encounters with patients	N- 22 (73%)
3. Hesitation in asking questions and clarifying doubts	N – 12 (40%)
4. Feeling of isolation and missing friends	N – 12 (40%)
5. Difficulty in maintaining concentration	N – 17 (57%)
6. Distraction at home due to family	N – 7 (23%)
7. Difficulty in creation of clear mental picture of the findings during virtual classes	N – 7 (23%)

Table 2: Difficulties experienced by the students during virtual bedside teaching.

systematic review by Wilcha [10]. However, in many other medical schools, the acceptance has not been encouraging. Vielsmeie et al. [11] reconstructed 16 patient cases of common otorhinolaryngological diseases and presented on an interactive platform in a weekly rotation but found that the frequency of utilization and the motivation for feedback was disappointing, with only 50.72% (average) of the registered students have taken part in the activity. Furthermore, over the course of the semester, the willingness to participate had decreased, even though the direct feedback and the students' evaluation results on the internship

and case presentations were consistently positive.

An important observation in our data was the significant positive impact on the scores, as depicted in Figure 3. This can be explained by the fact that, like most other medical schools, we have been facing difficulties before the Covid-19 pandemic that are mentioned in the literature [4,5], most prominently the non-availability of a wide range of patients for bedside teaching sessions due to their increased turn-over and shortened peri-operation stay. The online activity conducted this year provided the opportunity to teach in detail what was

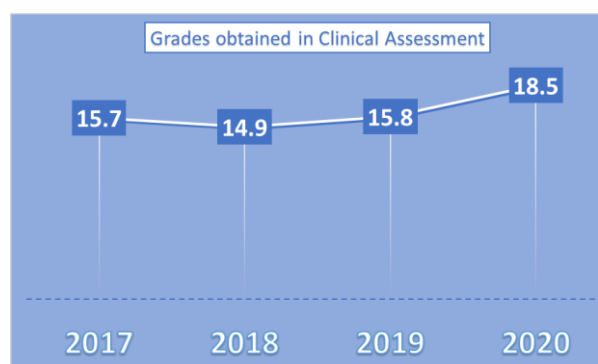


Figure 3: Mean scores out of 20 obtained in Clinical assessment.

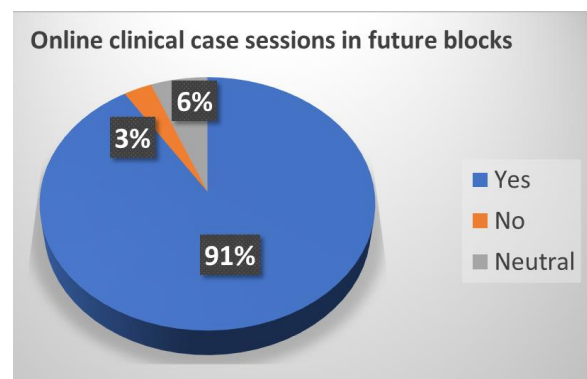


Figure 4: Opinion about the idea to complement bedside teaching with online sessions after the pandemic

probably not being dealt with in the earlier blocks due to the logistic deficiencies. This comparison of the current scores with pre-Covid scores has not been mentioned in other peer-reviewed studies. We have been using simulated patients in our surgery block before the Covid -19 pandemic. It is well established that even though simulations and actors provide a reasonable approximation of real diseased states, certain aspects of the physical examination and disease-specific aspects require experiences with real patients, such as learning the sensation of organomegaly, lump, ulcer, etc. [12,13]. Hence the bedside teaching was already in a state of compromise, and the virtual sessions appear to have filled the gaps. By continuing and improving the online virtual clinical sessions (with many images and videos), even after the Covid-19 pandemic, the benefits of real-life bedside teaching are expected to be enhanced. Most of the students (91%) support this opinion, as depicted in Figure 4, and favored the continuation of online virtual bedside teaching sessions even after the return of normalcy. It is in contrast with the results obtained in a cross-sectional survey was conducted with medical students from more than 13 medical schools in Libya by Alsoufi et al., where only 21.1% agreed that e-learning could be used for clinical aspects, as compared with 54.8% who rejected this statement and 24% who were neutral [14]. The difference in figures may be explained by the difference in utility as only 27.7% of the respondents were involved in online medical education programs, whereas our mean attendance was 87.5%.

The difficulties encountered by the students in our block are depicted in Table 2. These are concurring with the challenges faced by the students in other parts of the world. In a study by Dost et al., where 2721 medical students across 39 medical schools were enrolled, the commonly perceived barriers to using online teaching platforms included family distraction (26.76%), poor internet connection (21.53%), tutorial timing (17.31%), anxiety (11.08%) and lack of space (11.03%). Furthermore, 75.99% (n=1842) of the medical students had expressed the feeling that online teaching had not successfully replaced the clinical teaching they received via direct patient contact, and 82.17% (n=1986) felt that practical clinical skills could not be learned through online teaching. In our study, 73% of the students also expressed apprehensions that clinical skills may not be acquired fully with real-life encounters with patients. Hence, the trend shows that clinical skills remain a barrier to the virtual version of bedside teaching. Other issues like technical challenges, such as audio and network bandwidth, also exist, though they can improve with use and innovations. Ninety-one percent of the students in our study expressed that virtual bedside teaching is retained as a tool, in addition to real-life bedside teaching, to augment and complement the learning. If that is implemented after the pandemic, the results would be expected to enhance clinical knowledge. The tool would be analogous to a case-based study that has already been validated and found effective at various levels [15,16].

CONCLUSION

Virtual beside teaching is a successful addition to the medical education armamentarium. This has the potential to transfer knowledge in exceptional circumstances when patient contact is not possible, like the Covid-19 pandemic, and if there is a deficiency of cases in the teaching hospitals associated with medical schools. Skills transfer, however, requires real-life student-patient encounters.

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