ORIGINAL ARTICLE

Examining Dietetic Students' Feedback on Integrated Simulation-Based Education and Objective Structured Clinical Examination: A Mixed-Methods Approach

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Abstract

Background: Objective Structured Clinical Examination (OSCE) and simulated-based learning (SBL) are feasible models for assessing and improving students' clinical skills.

Objective: The primary objective of this study is to assess Saudi dietetic students' perceptions regarding the effectiveness of the implemented structured clinical education approaches, namely OSCE and SBL. The study also aims to evaluate the students' gained competencies and readiness for future clinical placements.

Method: The study employed a developed and validated electronic survey to evaluate the OSCE and SBL approaches in the dietetic program at King Abdulaziz University, Jeddah, Saudi Arabia. After completing the clinical education course in the 2018-2019 academic year, 37 dietetic seniors completed an online survey with both open-ended and closed-ended questions.

Statistical Analysis: Descriptive data were summarized using frequencies and percentages. Content analysis was utilized to evaluate the students' reflections and feedback.

Results: With an 182% response rate, 37 students were recruited, and 45 responses were received (some students completed the survey twice). The results (95.6%, n = 43) indicate that the implemented approaches effectively prepared students for the practical application of learned theories and concepts in managing inpatient cases. Students combined and contrasted information from different resources with confidence (86.5%, n = 32) and made evidence-based decisions in patient nutrition management. Eighty-nine percent of students were familiar with the abbreviation OSCE, with 88.9% (n = 40) stating that they found the OSCE stressful. However, 91% of the students felt well-prepared for future clinical placement, and an overwhelming 91% supported continuing the OSCE and SBL approaches in the next academic year.

Conclusion: Dietetic seniors' positive feedback highlights the significance of incorporating well-structured SBL sessions and OSCE exams in dietetic education in the academic year 2018–2019.

Keywords

Competencies, Dietetics, OSCE, Simulated-based, King Abdulaziz University

INTRODUCTION

Nutrition and dietetic programs have been proficient globally for less than a century. The profession took place in the USA in 1917. The UK acknowledged the profession in the Mid-30s[1]. Western dietitians established the profession in Saudi Arabia in the 18th Century[2].

Dietetic educational programs are primarily didactic programs wherever they integrate education and practice. In Saudi Arabia, these programs commonly fall under health faculties. Bachelor's degrees from dietetic backgrounds are classified as health specialists after completing a one-year obligatory supervised clinical practice or Internship program[3].

Educators and practitioners have different viewpoints about the clinical training process for students and the value of their early involvement in patient care. However, the responsibilities of academic educators and dietetic practitioners in Saudi programs simultaneously helped guide the training process for senior dietetic students and interns[4].

Applying the simulation-based learning (SBL) approach in health fields helps learners generate skills without exposure to patients in a clinical setting. It is a feasible companion to enhanced learning outcomes[5]. Clinical and practice educators involve learners practicing through simulated scenarios, followed by immediate operational feedback and quizzing. Learners' and educators' perceptions are used to evaluate the approach[6,7].

Dietitians largely supported the use of simulation in clinical education and training[8]. They aim to provide a safe learning environment for students to learn skills to handle patients before interfacing with actual patients and other healthcare providers[9]. Furthermore, dietetic professionals must increase SBL sessions, especially during emergencies like the COVID-19 pandemic, where dietetic students face declining contact time with actual patients[10].

Objective Structured Clinical Examination (OSCE) is an assessment tool for clinical competencies. In Saudi Arabia, OSCE has been fixed by the governing body, the "Saudi Commission for Health Specialties" and is regularly included in medical examinations and conducted to promote physician residency programs[11]. In practice education, it was used in fields such as pharmacy and nursing. It was even implemented electronically during emergency events such as the COVID-19 period and the conduct of E-OSCE in Saudi Arabia, including under-graduation programs[12,7]. With standard-setting examination stations, institutionalized standard patients, and qualified examiners, OSCE is a feasible model to assess and improve students' clinical and teaching skills[13].

Dietetic education is competency-based, and OSCE and SBL have become widely employed to assess clinical competence. They should be included in examinations of Saudi dietetics education programs. To the author's knowledge, the KAU dietetic program was the first to implement these approaches. Therefore, the present study aimed to explore dietetic students' feedback on incorporating SBL and OSCE approaches into practice education to improve competencies and prepare them for clinical placement using mixed methods for response evaluation.

MATERIALS AND METHODS

Study Design

This study employed a cross-sectional survey through Web-based Google Forms for data gathering. The study implemented mixed methods (qualitative and quantitative data) to show different aspects of evaluation for newly applied practice education approaches (SBL and OSCE) in Saudi dietetic Programs. The two approaches applied were on a two-level dietetic education course titled "Clinical Rotation in Medical Nutrition Therapy".

Study Setting

The study occurred at the Department of Clinical Nutrition of the Faculty of Medical Applied Sciences and the Simulation Centre at the University Hospital of King Abdulaziz University (KAU) in Jeddah, Saudi Arabia.

Study Population

Thirty-seven dietetic students of the undergraduate dietetic program completed the two levels of the practice education course in the academic year 2018-2019.

Study Tool

The study tool is a survey questionnaire completed by senior students of the KAU dietetic program and includes quantitative and qualitative responses.

Development of the Survey Questionnaire

To quantify and qualify dietetic students' perceptions of the implemented OSCE and SBLS approaches, the authors of this study developed a 40-item questionnaire survey. The existing literature[14,15] and the related OSCE and SBLS course objectives and outcomes (Figure 1) guided the development of the survey questions. Table 1 presents the study tool's development, validation, and testing steps.

Table 1 illustrates the Development, Validation, and Testing of the 40-item Questionnaire Survey.

Data Analysis

The Statistical Analysis of the data included descriptive data summarized using frequencies and percentages. Content Analysis was utilized to analyze the students' qualitative responses.

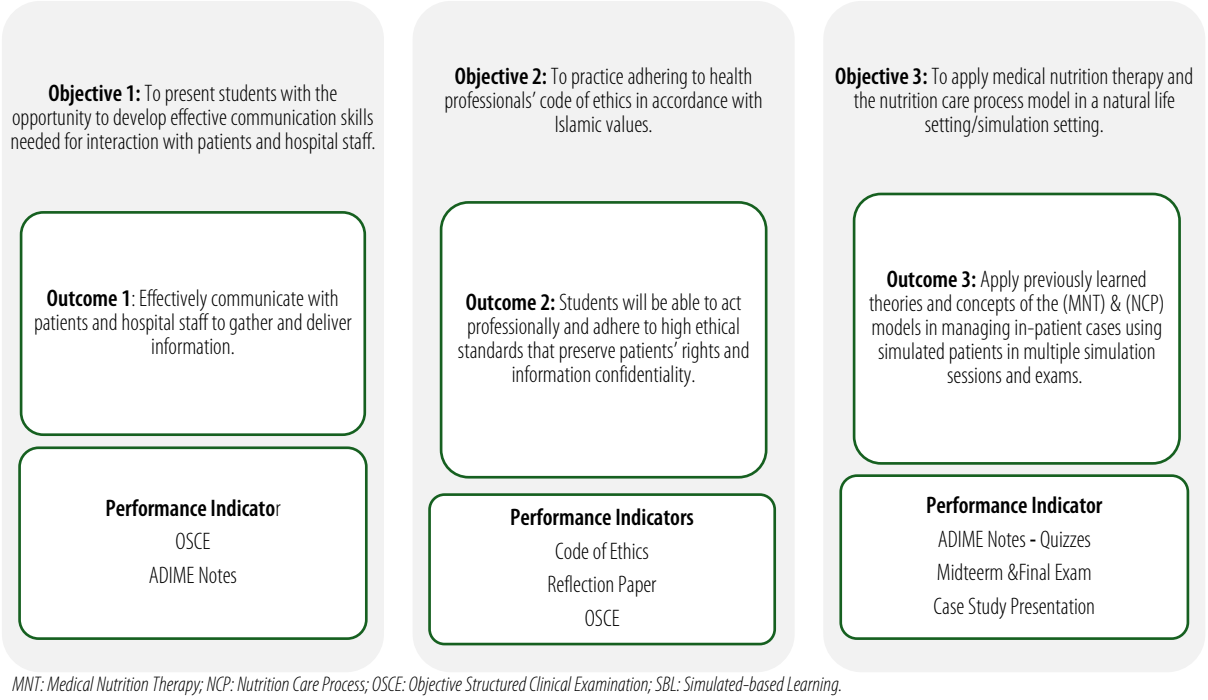
This cross-sectional study adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for comprehensive and transparent reporting[16].

RESULTS

Quantitative Responses to Students' Feedback Survey

Data were collected from 37 students, from whom we obtained 45 responses. Due to possible technical issues, some participating dietetic students completed the survey more than once. Accordingly, we received 45 responses instead of 37, with an over-response rate of 182%. Due to anonymity purposes, we could not tell which students did the questionnaire twice; hence, we kept all responses included in the study.

Regarding the students' general perceptions of the SBL sessions and OSCE, the responses indicated they believed they were well prepared for clinical placement (73.3%, n = 33). Students thought they were ready to perform their dietetic role in the future (84.4%, n = 38), as illustrated in Figure 2. Most students (95.6%. n

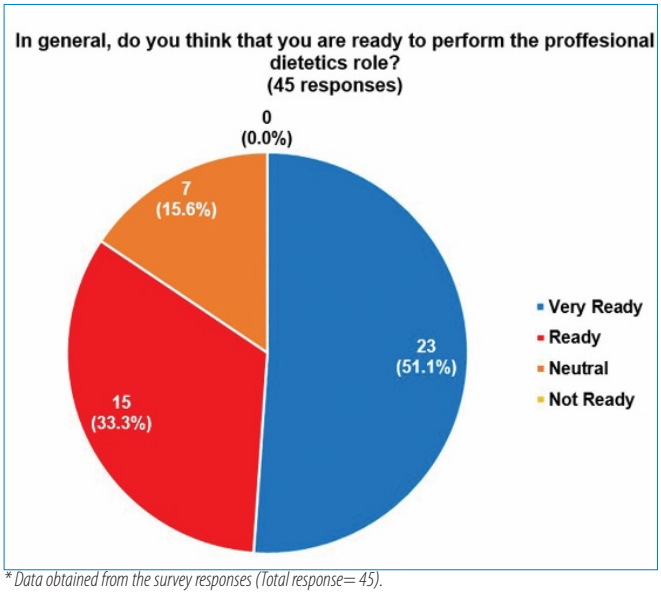


MNT: Medical Nutrition Therapy; NCP: Nutrition Care Process; OSCE: Objective Structured Clinical Examination; SBL: Simulated-based Learning.

Figure 1. Course objectives, outcomes, and performance indicators with relation to the SBLS and OSCE. The figure shows the course objectives, learning outcomes, and performance indicators related to the SBLS and OSCE that were delivered and used to plan methods for the present study.

Table 1. Development and validation of the survey tool

Survey Questions Development	Survey Questions Validation	Survey Tool Testing
For survey conceptualization, the type and aims for responses were defined. Type of responses • Close-ended dichotomous questions (yes/no categories) • Four-point scale questions. Questions Aim a. Quantitative Questions: -To ensure students' knowledge about the utilized simulation setting. -To express the perceived skills and competencies gained from the implemented SBL and OSCE approaches. -To evaluate competencies, e.g., • Readiness for clinical placement professional practice • Communications -To evaluate students' knowledge about the meaning of OSCE. b. Qualitative Questions: -To qualify the integrated SBL and OSCE • One open-ended question was included to allow for comments and suggestions for future modification of the OSCE.	For survey validation and testing, the author selected seven members of an expert panel who were in dietetics and medical education. • The expert panel members checked and reviewed the survey items by giving a score on a scale from 1 to 5 scores (1- not at all relevant, 2- not applicable, 3- neutral, 4- relevant, 5- very appropriate) • To evaluate each questionnaire item's relevance, precision, well-intonation, and comprehensibility. • If the score of any of the items scored less than or equal to 3, then reviewers will add a comment for authors in that item to amend and adjust accordingly. • As part of the survey process, three face validity questions were added at the end to verify that each item accurately measured its intended purpose: 1. The first question used to test the completeness of the content was, "Do you agree that the survey items contain the highly important attributes to evaluate DS' perceptions on the implemented OSCE and SBLS approaches? [Yes/No]"; "If "NO, which aspects would you integrate?". 2. The second question was to test comprehensibility, "Do you agree that this survey items are sufficiently and coherently worded? [Yes/No]"; "If "No, which items you do not agree with their comprehensibility?". 3. The third was to assess the time to complete the survey: "Is the time taken for filling in the questionnaire suitable? Use a scoring on a 0–10 scale to rate it, with 0 "far too long" and 10 "totally acceptable." 4. The validity results of the designed scores confirmed the items' relevance, precision, well-pronunciation, and comprehensibility. The items' content was all completed comprehensively or took acceptable time. Consequently, the expert panel granted the survey questionnaire.	To increase the study's accuracy, eight dietetic interns at the KAU hospital were interviewed before sharing the survey with participants. They answered the survey questions, and the author immediately reported their feedback on the clarity of the questions. The instrument was then designed and administered electronically and completed by students.



** Data obtained from the survey responses (Total response= 45).*

Figure 2. Students' perception of their readiness to perform their future dietetic role based on their experience with SBL & OSCE. The figure shows the response to the question, *"In general, do you think you are ready to perform the professional dietetics role?"* OSCE stands for Objective Structured Clinical Examination, and SBL stands for Simulated-based Learning.

= 43) believed the implemented approaches effectively equipped them to apply learned theories and concepts in handling in-patient cases, aligning with the course's third outcome. Most students (91%) also perceived that the approaches provided opportunities to cultivate critical thinking and decision-making skills for handling individual case studies. Students (77.8%, n = 35) reported gaining higher confidence in practicing NCP components such as nutrition diagnosis and nutrition-focused physical examination.

The students (91%, n = 41) reported receiving instructions before simulation-based exams and OSCE and outside the allocated exam stations. All 37 students (82.2%, n = 37) had the chance to read the instructions before exams.

As presented in Table 2 and Figure 3, the responses demonstrated general positive thoughts towards the SBL and its use in the evaluation process, as reported by the students. Responses to SBL included thoughts

Table 2. Dietetic students' perceptions and responses of experience with SBLS and OSCE

Questions/Perceptions	*Responses n (%)			
KAUH' Simulation Centre				
The KAUH Simulation Centre is well-designed for clinical nutrition students to practice their profession before dealing with real patients in actual hospital wards.	38 (84.4%)			
SBL Sessions: Dietetic Practice[1]				
Considering patient referral, SBL training sessions and evaluation process helped me to;				
• Gain skills in making decisions to refer patients to other professionals and services and follow up with patients in the outpatient clinic.	38 (84.4%)			
• Gain skills in being familiar with the roles of other health professions and how they interact with responsibilities.	42 (93.3%)			
Application of NCP through SBLS helped me;				
• To work hard on my skills in obtaining diet history from patients and I became;	**Very confident**	**Confident**	**Neutral**	**Unconfident**
	19 (42.2%)	18 (40.0%)	8 (17.8%)	0 (0.0%)
• To work hard on my skills in defining the nutrition diagnosis of patients, I became;	**Very confident**	**Confident**	**Neutral**	**Unconfident**
	19 (42.2%)	16 (35.6%)	8 (17.8%)	2 (4.4%)
• To work hard on my skills in performing nutrition-focused physical examination techniques, and I became;	**Very confident**	**Confident**	**Neutral**	**Unconfident**
	13 (28.9%)	17 (37.8%)	13 (28.9%)	2 (4.4%)
SBL Sessions: Communication Skill[s2]				
Considering communication and interaction with peers, course instructors, patients, and hospital staff, SBLS and the evaluation process helped me to;				
• Gain effective skills when communicating with peers and instructors of the course.	41 (91.1%)			
• Gain skills in demonstrating active participation, teamwork, and contribution in a group setting, such as with my colleagues and course instructors.	40 (88.9%)			
• Gain effective communication skills when gathering and delivering information to patients and hospital staff.	40 (88.9%)			
• Gain skills in delivering updated education and counseling skills to assist patients in their behavior change.	40 (88.9%)			
• Gain skills in delivering respectful, evidence-based answers to patient questions.	39 (86.7%)			
• Gain communication skills with other healthcare professionals, KAUH RDs, physicians, nurses, speech therapists, and social workers.	42 (93.3%)			
SBL Sessions: Professional role[3]				
Considering the professional roles, SBL sessions and evaluation process helped me;				
• In prioritizing patient care needs	44 (97.8%)			
• In using evidence-based guidelines in my practice	43 (95.6%)			
• To work hard on my skills in counseling patients appropriately on a range of health risks, including poor nutrition, and I became:	**Very confident**	**Confident**	**Neutral**	**Unconfident**
	14 (31.1%)	20 (44.4%)	9 (20%)	2 (4.4%)
• To make evidence-based decisions in managing patients	39 (86.7%)			

*Table 2 presents quantitative responses related to survey data. *Reported responses in n (%): frequencies and percentages, which are presenting either positive (i.e., Yes) or categorized to 4 scores. [1] Presents simulated-based learning sessions related to dietetic practice[2], present data related to gained communication skills, and[3] present the data related to professional skills.*

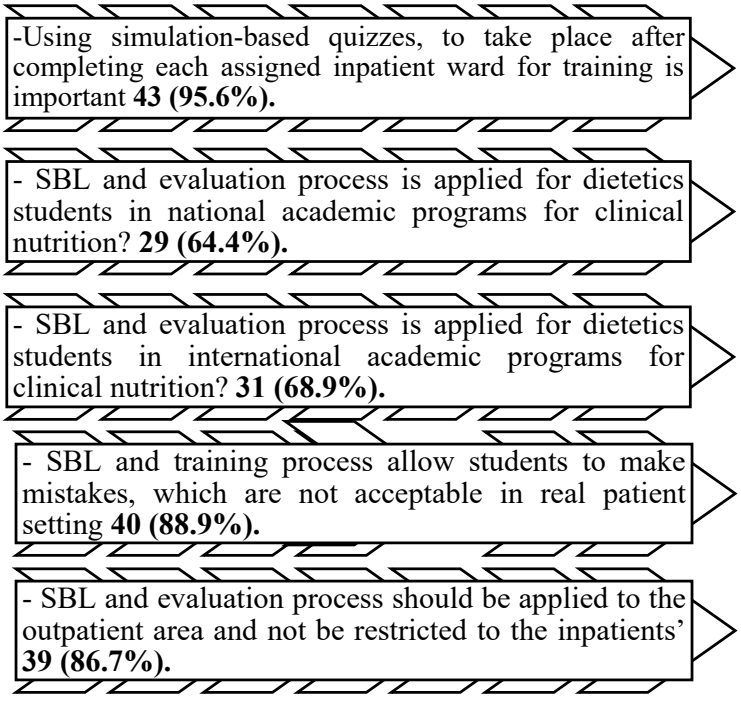


Figure 3. Dietetic students' general information and perceptions about Simulated-Based Learning (SBL). Data are related to the quantitative data of the survey. All reported responses are +VE (i.e., Yes). They reported responses in n (%): frequencies and percentages.

related to dietetic practice, communication skills, and professional roles. Furthermore, most students (97.8%, n = 44) recommended to continue considering the approach in the following academic year. The students also recommended using simulated-based quizzes to take place after completing each session. That part of grading marks should be allocated for simulation and the written exam (97.8%, n= 44). The students reported that they gained skills in developing personal goals and objectives when managing simulated cases using the MNT process (93.3%, n=42) and achieving a high level of confidence (77.8%, n=35) in practicing NCP components, including nutrition diagnosis and nutrition-focused physical examination (Please see the supplementary file 1 for all survey results)

Additionally, the students (73%, n=33) reported that SBL sessions had prepared them for clinical placement. While some (15.6%, n=7) of the Dietetic Students thought they could be ready, three believed it did not prepare them for clinical practice. Further, two students were curious to know if the SBLS impacted their practice readiness. See for detailed results related to SBLS in Table 2.

OSCE: Although students went through two final OSCE exams in addition to other exams (midterm and quizzes) and passed through different stations during these exams, only 88.9% know what the acronym OSCE stands for. They reported that OSCE was stressful for them. See Figure 4 for OSCE results.

Qualitative Responses to Students' Feedback Survey about OSCE and SBL Sessions

Qualitative data included the students' reactions to one open-ended question: "*What suggestions do you have regarding tailoring OSCE for dietetic students?*" Content analysis of the responses identified in Table 3.

DISCUSSION

Recent reviews have recommended that the dietetics profession employ sound and responsible methodologies to determine forceful evidence regarding the effectiveness of simulations in dietetic learning[17]. In this study, focused on preparing students for competencies and future clinical placements, we assessed the impact of two integrated approaches

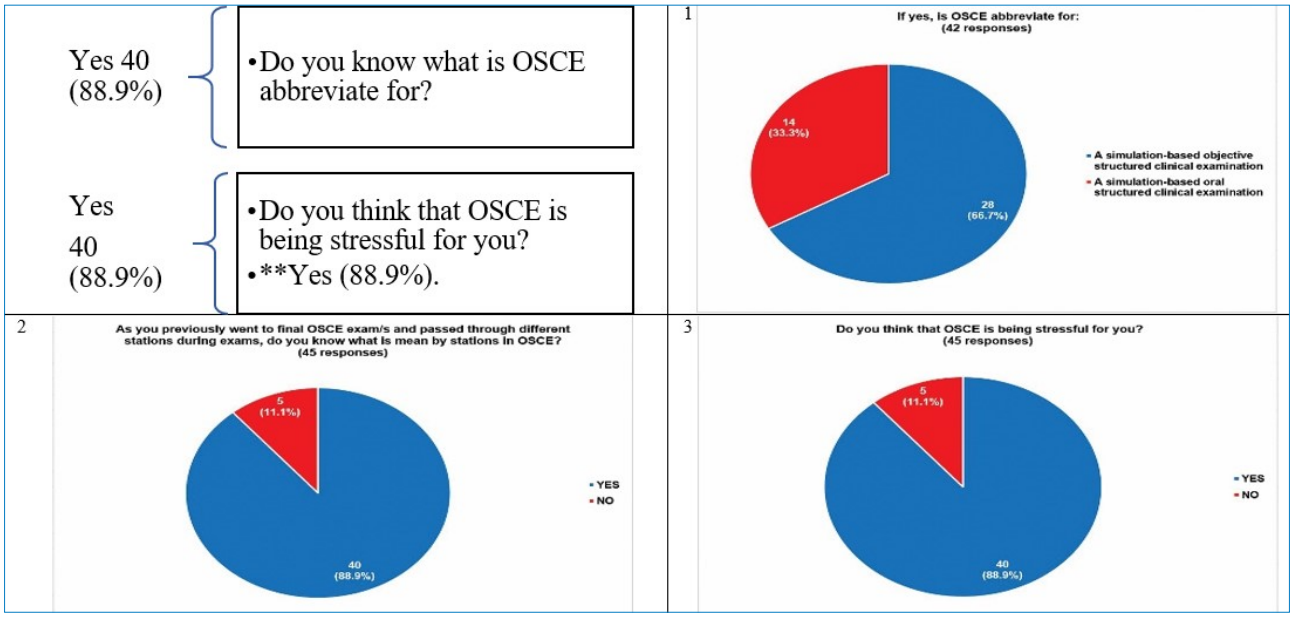


Figure 4. Dietetic students' general information and perceptions about OSCE Exam. Data are related to the quantitative data of the survey. All reported responses are positive (i.e., Yes). They reported responses in n (%): frequencies and percentages. OSCE: Objective Structured Clinical Examination. Question 1: shows the response to the question "If yes, is OSCE abbreviated for Question 2 shows the response to the question "If yes, is OSCE abbreviated for: Question 3 shows the response to the question *"Do you think that OSCE is being stressful for you?*

Table 3. Content of quoted students' comments and recommendations for SBLS and OSCE (Qualitative responses to students' feedback survey)

1	Dietetic Students received adequate information about the final OSCE before the start of the exam.
2	Clear instructions were provided before going through the OSCE exam time.
3	The time allocated for the final OSCE exam was limited and insufficient at each station.
4	Some students recommended an increase in time allocation for each exam station.
5	Dietetic Students further suggested increasing the allocated marks for the OSCE exam.
6	The request to make OSCE more interactive with other health professionals.
7	The conduct of OSCE has improved in the second semester.
8	OSCE is less stressful than traditional exams.
9	OSCE exam should include cases that need intervention with enteral feeding (NGT).
10	OSCE exam should include cases that need intervention with enteral feeding (NGT).
11	Other students recommended conducting the OSCE exams on two separate dates to minimize the long wait for the Dietetic Students to get examined.

** Data reports on students' feedback survey; * Data are related to students' feedback survey; ** Responses to the open-ended questions for comments and recommendations for the future use of the SBLS & OSCE when delivering the course; OSCE: Objective Structured Clinical Examination; SBL: Simulated-based Learning*

(SBLS and OSCE) within a two-level practice education course. The evaluation utilized mixed methods to collect data on students' feedback and perceptions regarding the integrated approaches.

The KAU dietetic program follows the National Qualifications Framework (NQF) approach when designing course learning outcomes for all courses[18]. The NQF for CLOs includes five domains: knowledge, cognitive skills, interpersonal skills and responsibility, communication, information technology, numerical, and psychomotor. The European Federation of the Associations of Dietitians (EFAD) advised connecting the learning outcomes to competencies when evaluating dietetic competencies[19]. The KAU clinical nutrition program was comparable to European Dietetic programs[3]. The study demonstrated the achievement of the three CLOs related to the two

applied approaches throughout the practice education period.

Response rate: Using an online post-test design for the students' survey was popular in educational research for several reasons: it consumes less time for completion and data analysis[20]. Additionally, the students are used to dealing with online feedback surveys, and they regularly complete surveys for all courses before or after the completion of final exams. Although online accessible surveys were evidenced to generate lower responses (11%–12%)[20,21] compared to other forms of surveys, the present study showed higher (182%, n = 45) response (over-response) than planned (n = 37) to the administered survey. The higher response rate to the administered online survey in this study could be explained by some reasons, including the well-defined population of senior dietetic students in the academic year 2018-2019, who were previously contacted by the course coordinator and informed about the importance of this feedback evaluation to evaluate the new implemented OSCE approach and the modification made to SBL sessions that included continuous training and assessment for competences related to the NCP and preparation to final OSCE. Moreover, a dietetic intern student volunteered to provide the link for an online survey to each student immediately after completing their final OSCE, and she was continuously sending a reminder in the form of e-mails, phone calls, or WhatsApp messages, which might lead participants to complete the survey more than once time. These all could have influenced the yielded higher response rates. Other evidenced factors could also be related to this study's high response rate. For example, the study is focused on learning and female student population, new practice education, and the use of other assessments such as the KAU student-feedback survey on the course and a general feedback report about all course events that were completed by students in concurrence with this study' online survey.

Reviews and studies related to dietetic SBLS and OSCE focused on outcomes and perceived improvement in communication and dietetic practice concerning counseling skills and readiness for professional practice and outcomes of clinical placement[17,22]. Students' responses to the survey of this study have generally shown positive thoughts of SBL and OSCE, counting attaining improvement in dietetic practice based on MNT and NCP, professional role, communication skills to promote interprofessional communication, and the improved capability to communicate with patients and their families. Students' communication skills are based on interaction with peers, course instructors, patients, and the hospital staff to promote their interprofessional communication and improve their communication capability with patients and their families. Compared to the international DS who realize the importance of communication skills in their dietetic practice, they have learned through simulations and OSCE approaches related to the specified, delivered courses[23]. Most surveyed students (90%) reported that SBLS and OSCE had improved their communication skills with their peers, course instructors, patients, and hospital staff. The present study respondents' DS perceived readiness for dietetic practice after going through the experience of SBLS and OSCE, which agrees with previous studies[15,24]. The present study's quantitative outcomes showed that because of SBL and OSCE, more than 80% of the students perceived their readiness to practice the professional role in their future clinical placements. Considering counseling skills, students of the present study perceived improved counseling skills. They gained confidence in counseling patients on a range of health risks, including poor nutrition, after experiencing SBLS and OSCE.

Previous studies considered the dietetic pre-placement OSCE a significant assessment of skills and competencies in preparation for future dietetic practice; the total marks for OSCE and the type of stations defined as active or passive significantly impact future placement outcomes[25].

Descriptive and qualitative data of the present study looked at students' attitudes on the OSCE progression, information delivered, examiners, the time allowed for the exam, and each activity; and results disclosed that students who experienced OSCE for the first time showed positive perceptions of OSCE concerning the enough delivered information before conducting the exam. However, explaining the meaning of the abbreviation OSCE might be helpful to some students. On the other hand, the qualitative outcomes showed that for some DS, for a few reasons including the inadequate allocated time for the exam and each station, marks, and examiners, the OSCE was stressful for them. Moreover, this agrees with other DS, where simulated-based OSCE significantly improved their readiness for dietetic practice[15,24].

Study Limitations

Data were collected from 37 students, from whom we obtained 45 responses. Some Dietetic Students, due to possible technical issues, completed the survey more than once. For anonymity purposes, we could not tell which students completed the questionnaire twice; hence, we kept all responses included in the study.

CONCLUSIONS

Dietetic practitioner faculty should develop advanced teaching and assessment approaches, such as integrating core curriculum concepts into clinical and didactic courses. The study presented OSCE and SBL approaches, which were applied for the first time in the KAU CLN program. The students' feedback on the implemented clinical education approaches confirms the importance of using simulated-based sessions and exams for dietetic students in a well-designed simulation center such as the KAU Medical Centre.

The study is the first to the best of the authors' knowledge' to provide a comprehensive report of data collected focusing on students' perceptions of integrated SBL and OSCE approaches in their dietetic education to enhance competencies for future clinical placements.

Conflict of Interests

The authors affirm that they do not have any conflicts of interest, including financial, regarding the publication or presentation of this work.

Disclosure

The authors did not receive any form of commercial support, either in the form of compensation or financial assistance, for this case report. The authors have no financial interest in any of the products, devices, or drugs mentioned in this article.

Ethical Approval

This research has been approved by the Ethics and Research Committee of the Faculty of Medical Applied Sciences at King Abdulaziz University (Reference No. FAMS-EC2021-23). Before proceeding with the survey questions, the dietetic students consented to participate. All participants had the right to decline to participate and the right to withdraw from the study at any point without penalty.

Availability of Data

Information and details about the survey conducted in the academic year 2018–2019 can be found in an additional document labeled "see Additional file."

Acknowledgments

The authors express their sincere gratitude to the senior dietetic students at King Abdulaziz University who participated in the survey upon completing their course. A special acknowledgment goes to dietitian Lamyaa Abdulrahman Bakheet for voluntarily distributing the electronic survey link to students and thoroughly following up to ensure their responses. Special thanks are also extended to the aspiring dietitian Aisha Yasir Hussein for her contributions to data organization, tables, graphs, and manuscript proofreading. Best wishes are extended to them in the future as they accomplish their professional goals.

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REFERENCES CITED

[1] Winterfeldt EA et al. Dietetics: Practice and Future Trends. 3rd Edition, London: Jones and Bartlett Learning. Published online 2010.

[2] Hwalla N, Koleilat M. Dietetic practice: the past, present and future. Eastern Mediterranean Health Journal. 2004;10(6):716-730. doi:https://doi.org/10.26719/2004.10.6.716

[3] Aljaaly E. First cycle professional higher education degree in dietetics: a comparison of Saudi programme with the European standards. International Journal of Food, Nutrition and Public Health. 2016;8(2):1-0. doi:https://doi.org/10.47556/j.ijfnph.8.2.2016.3

[4] Aljaaly EA. Challenges and Reflections on the Experience and Development of the Profession of Nutrition and Dietetics: a Starting Point with the First Indigenous Dietitian in Saudi Arabia. Hameed S, El-Kafafi S, Waretini-Karena R, eds. Handbook of Research on Indigenous Knowledge and

Bi-Culturalism in a Global Context Hershey, PA: IGI Global. Published online 2019:95-119.

[5] HY S, Chen PP, Wong GK, Chan TT. Simulation in Medical Education. Journal of the Royal College of Physicians of Edinburgh. 2019;49(1):52-57.

[6] Wright HH, Cameron J, Wiesmayr-Freeman T, Swanepoel L. Perceived Benefits of a Standardized Patient Simulation in Pre-Placement Dietetic Students. Education Sciences. 2020;10(7):186. doi:https://doi.org/10.3390/educsci10070186

[7] Elbilgahy AA, Eltaib FA, Mohamed RK. Implementation of Objective Structured Clinical Examination (OSCE): Perceiving Nursing Students and Teachers Attitude & Satisfaction. American Journal of Nursing Research. 2020;8(2):220-226. doi:https://doi.org/10.12691/ajnr-8-2-11

[8] McMahon CJ, Tretter JT, Redington AN, et al. Medical education and training within congenital cardiology: current global status and future directions in a post COVID-19 world. Cardiology in the Young. 2022;32(2):185-197. doi:https://doi.org/10.1017/S1047951121001645

[9] von Wendt CEA, Niemi-Murola L. Simulation in Interprofessional Clinical Education. Simulation in Healthcare: The Journal of the Society for Simulation in Healthcare. 2018;13(2):131-138. doi:https://doi.org/10.1097/sih.0000000000000261

[10] Donovan SK, Herstein JJ, Prober CG, et al. Expansion of simulation and extended reality for undergraduate health professions education: A call to action. Journal of Interprofessional Education & Practice. 2021;24:100436. doi:https://doi.org/10.1016/j.xjep.2021.100436

[11] Algabbany S, Al Anazi R, Sekhar K. Periodical Assessment of Objective Structured Clinical Examination (OSCE) at Family Medicine program, Northern Borders (arar), Saudi Arabia-a Method for Academic Improvement. Published online 2022.

[12] Alshammari E. Implementing eOSCE during COVID-19 Lockdown. Journal of Advanced Pharmacy Education & Research| Jan-Mar. 2020;10(1):175.

[13] HY So, Chen PP, Wong GK, Chan TT. Simulation in Medical Education. Journal of the Royal College of Physicians of Edinburgh. 2019;49(1):52-57.

[14] Gandy J, ed. Manual of Dietetic Practice. John Wiley & Sons. Published online August 26, 2019.

[15] Elaf Farahat, Gail Taylor Rice, Daher N, Heine N, Schneider LI, Connell B. Objective Structured Clinical Examination (OSCE) Improves Perceived Readiness for Clinical Placement in Nutrition and Dietetic Students. PubMed. 2015;44(4):208-214.

[16] Von Elm E, Altman DG, Egger M, et al. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. J Clin Epidemiol. 2008;61(4):344-349. doi:10.1016/j.jclinepi.2007.11.008

[17] O'Shea MC, Palermo C, Rogers GD, Williams LT. Simulation-Based Learning Experiences in Dietetics Programs: A Systematic Review. Journal of Nutrition Education and Behavior. Published online July 2019. doi:https://doi.org/10.1016/j.jneb.2019.06.015

[18] Senan NAM. Developmental review program impact on enhancing the effectiveness of "Teaching and Learning" in accounting program: a case study in a Saudi University. Tvaronavičienė M, ed. Entrepreneurship and Sustainability Issues. 2018;6(2):1001. doi:https://doi.org/10.9770/jesi.2018.6.2(35)

[19] Adam M, Baete E, Le Bruyn B, Vanherle K, eds. Output 4 and 5 Learning Outcomes and Evaluation Questions Reflection and Portfolio. Published online 2017.

[20] Wu MJ, Zhao K, Fils-Aime F. Response Rates of Online Surveys in Published research: a meta-analysis. Computers in Human Behavior Reports. 2022;7(2):1-11. doi:https://doi.org/10.1016/j.chbr.2022.100206

[21] Daikeler J, Bošnjak M, Lozar Manfreda K, eds. Web versus Other Survey modes: an Updated and Extended meta-analysis Comparing Response Rates. Journal of Survey Statistics and Methodology. 2020;8(3):513-539.

[22] Wright HH, Cameron J, Wiesmayr-Freeman T, Swanepoel L. Perceived Benefits of a Standardized Patient Simulation in Pre-Placement Dietetic Students. Education Sciences. 2020;10(7):186. doi:https://doi.org/10.3390/educsci10070186

[23] Knight A, Baldwin C, Reidlinger DP, Whelan K. Communication skills teaching for student dietitians using experiential learning and simulated patients. Journal of Human Nutrition and Dietetics. 2020;33(5):601-613. doi:https://doi.org/10.1111/jhn.12743

[24] Salima Elfagi, Elamni SF, Faiza Nouh, Ashmisa Eltohami, Omar M. Undergraduate Student Feedback on OSCE: The First Experience of a Nutrition Department, University of Benghazi 2019. Journal of advances in education and philosophy. 2020;04(05):104-110. doi:https://doi.org/10.36348/jaep.2020.v04i05.001.

[25] Parkin T, Collinson A. Observations on the relationship between the dietetic objective structured clinical examination and placement outcome. Nutrition & Dietetics. 2019;76(5):628-633. doi:https://doi.org/10.1111/1747-0080.12537.

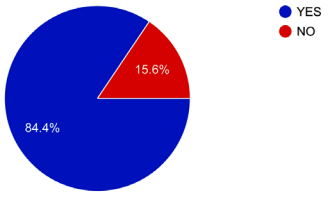
SUPPLEMENTARY FILE 1 FOR ALL SURVEY RESULTS

A survey to evaluate usefulness of simulation-based approach in preparing senior KAU CLN students for competences & clinical placement.

45 responses

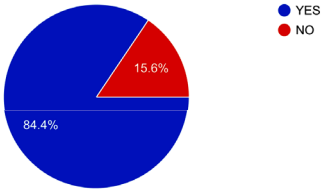
1/In my opinion, the KAUH' Simulation Centre is well-designed for clinical nutrition students to practice their profession before dealing with real patients in real wards.

45 responses



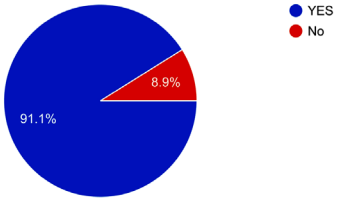
2/The application of simulated introductory session in the 1st level of the course, helped me to come across the KAUH polices and standards when involved with the whole training process of in-patient area using the hospital system.

45 responses



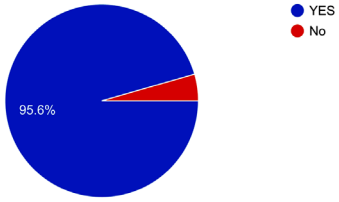
3/The application of simulated introductory session in the 1st level of the course, prepared me for real inpatient wards in less threatening and scary setting.

45 responses



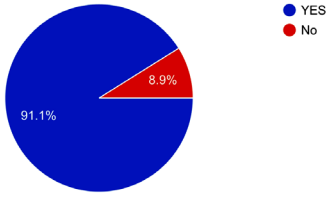
4/In general, going through the simulated-based introductory session and exams, helped me to be prepared to apply my previously learned theories and concepts of medical nutrition therapy and the nutrition care process model in managing in-patient cases.

45 responses



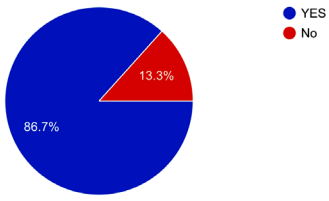
5/In general, going through the simulated-based introductory session and exams, gave me the opportunities to develop critical thinking and decision-making skills to manage individual case studies.

45 responses



6/In general, going through the simulated-based introductory session and exam, helped me to combine and contrast information from various resources and to take evidence-based decisions in managing individual case studies.

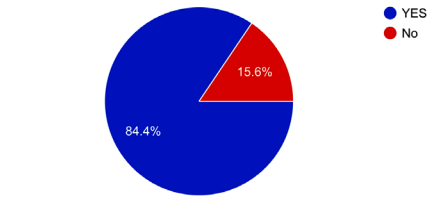
45 responses



7/Considering patient referral, simulation-based training and evaluation process helped me to gain skills in decisions for

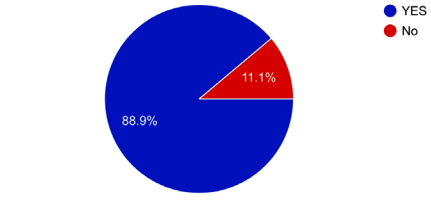
referring patients to other professionals and services and in following up patient in the clinic.

45 responses



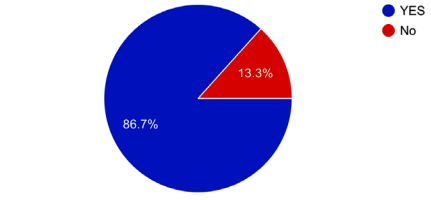
8/Considering communication with peers & course instructors, the simulated-based introductory session and exams, helped me in gaining effective skills when communicating with peers & instructors of the course.

45 responses



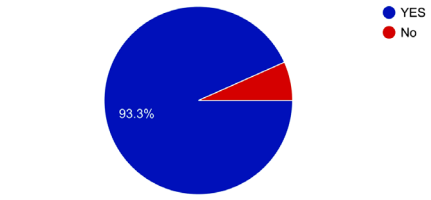
the simulated-based introductory session and exams, helped me in gaining effective skills to communicate with patients and hospital staff when gathering and delivering information.

45 responses



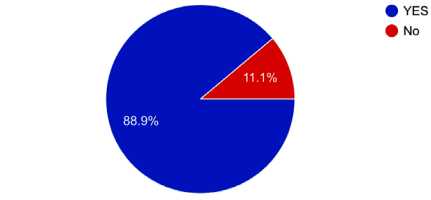
10/Considering communication with health professionals, simulation-based training and evaluation process helped me to gain skills in communicating with other healthcare professionals (KAUH RDs, physicians, nurses, speech therapist, social workers…).

45 responses



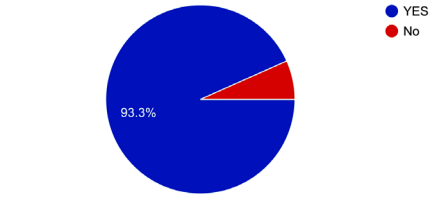
11/Considering communication with health professionals, simulation-based training and evaluation process helped me to gain skills in demonstrating active participation, teamwork and contribution in group setting such as my colleagues and course instructors.

45 responses



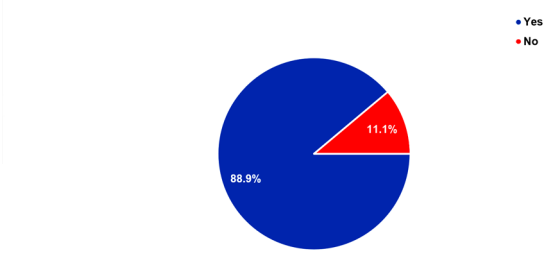
12/Considering the professional roles, simulation-based training and evaluation process helped me in prioritizing patient care needs.

45 responses



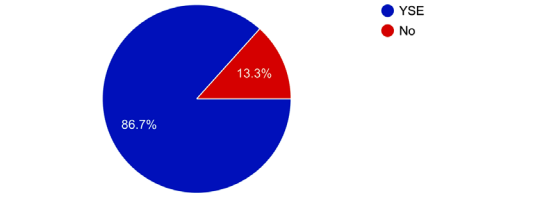
13/Considering patient interaction, simulation-based training and evaluation could help me in future to use updated education and counselling skills to assist patients in their behaviour change.

45 responses



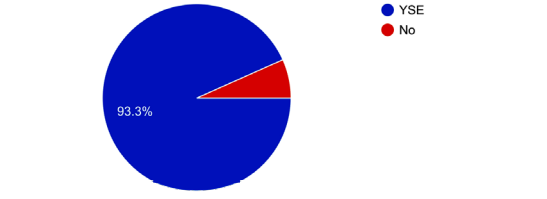
14/Considering patient interaction, simulation-based training and evaluation process helped me to gain skills in delivering respectful, evidence-based answers to patient questions.

45 responses



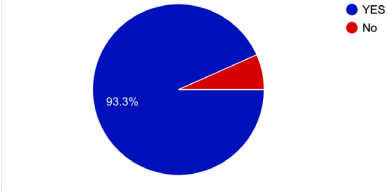
15/Considering patient referral, simulation-based training and evaluation process helped me to gain skills in being familiar with the roles of other health professions and how they interact with my responsibilities.

45 responses



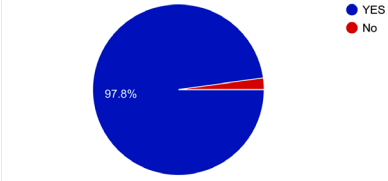
16/Considering patient referral, simulation-based training and evaluation process helped me to gain skills in developing personal goals and objectives when managing MNT for patients.

45 responses



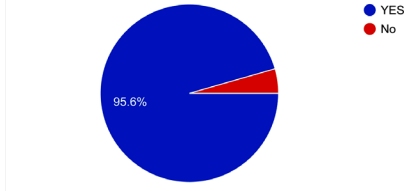
17/Considering the professional roles, simulation-based training and evaluation process helped me in prioritizing patient care needs.

45 responses



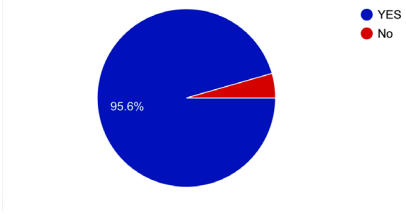
and evaluation process helped me to act professionally and to adhere to high ethical standards that preserve patients' rights and information confidentiality.

45 responses



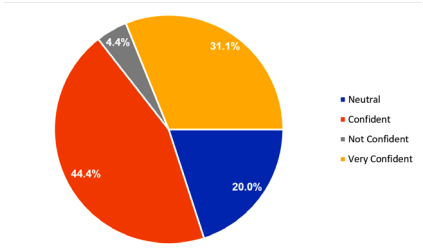
19/Considering the professional roles, simulation-based training and evaluation process allowed me in using evidence-based guidelines in my practice.

45 responses

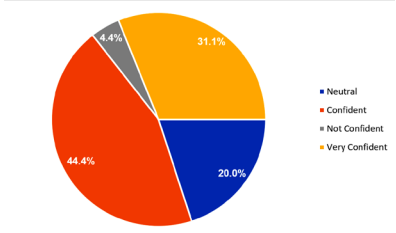


20/The Simulation-based approach helped me to work hard on my skills in counselling patients appropriately on a range of health risks including poor nutrition and I became;

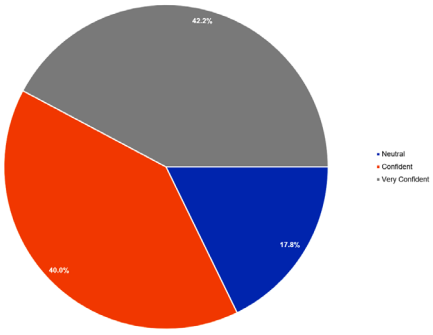
45 responses



21/ The Simulation-based approach helped me to work hard on my skills in performing nutrition-focused physical examination technique and I became;

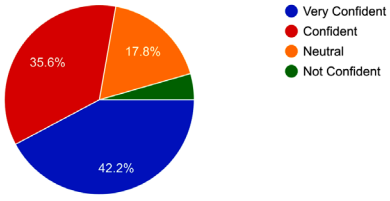


22/ The Simulation-based approach helped me to work hard on my skills in obtaining diet history from patients and I became;



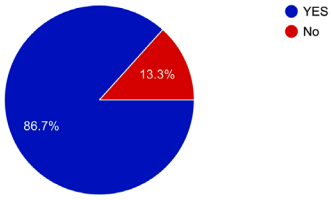
23/The Simulation-based approach helped me to work hard on my skills in defining the nutrition diagnosis of patients and I became;

45 responses



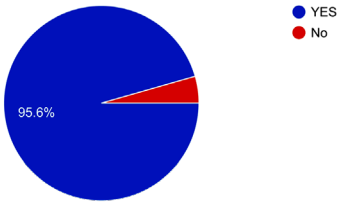
24/Do you think that using the simulation training and evaluation approach, should also include the outpatient area

45 responses



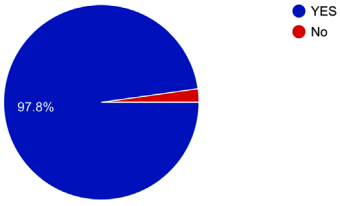
25/Do you think that students' evaluation process using simulation-based quizzes, to take place after completing each assigned inpatient ward for training?

45 responses



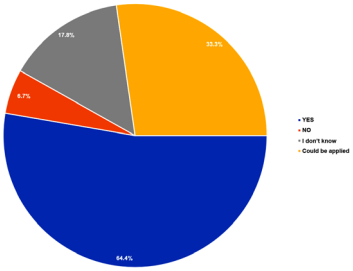
26/Do you think that students' evaluation process using simulation-based exams should continue to take place in this course and part of grading marks should be allocated for simulation in addition to written exam?

45 responses



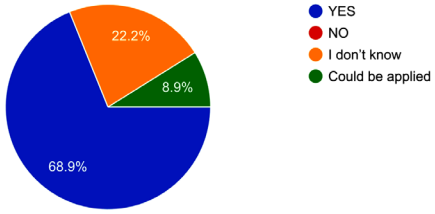
27/Do you think that Simulation-based learning, training and evaluation process are applied for dietetics students in national academic programs for clinical nutrition?

45 responses



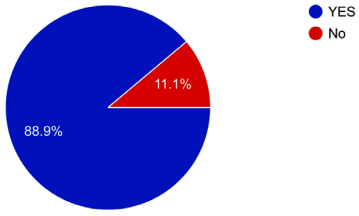
28/Do you think that Simulation-based learning, training and evaluation process are applied for dietetics students in international academic programs for clinical nutrition?

45 responses



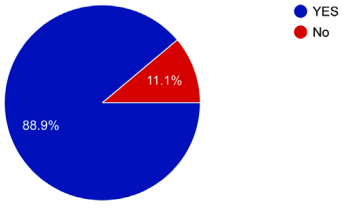
29/Do you think that Simulation-based learning and training process allow students to make mistakes, which are not acceptable in real patient setting.

45 responses



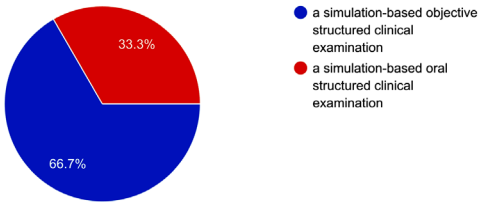
30/As you previously went for final OSCE exams, do you know what is the OSCE abbreviate for?

45 responses



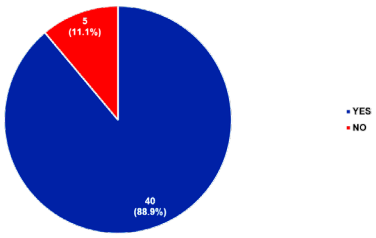
31/If yes, is OSCE abbreviate for:

42 responses



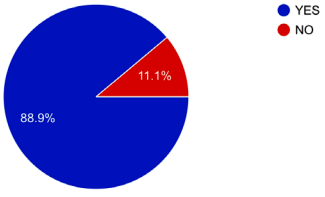
32/Do you think that OSCE is being stressful for you?

45 responses



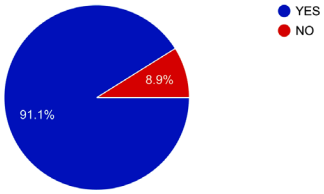
33/As you previously went for final OSCE exam/s and passed through different stations during exams, do you know what is mean by stations in OSCE?

45 responses



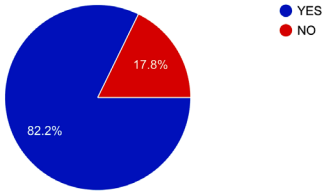
34/During your OSCE and simulation-based quizzes, where you as a "student" provided instructions outside exam stations?

45 responses



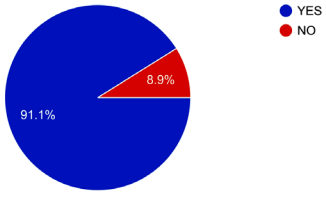
35/During your OSCE and simulation-based quizzes, did you have a chance to read the instructions outside the exam stations?

45 responses



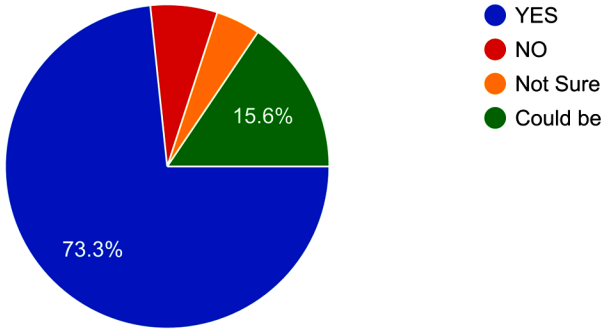
36/The application of simulation-based introductory session and exams is important to prepare students for clinical practice and should be applied in the following academic years. Do you agree with this statement?

45 responses



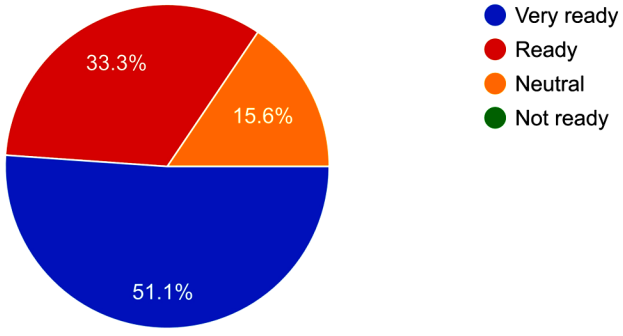
37/In your opinion, do you think that simulation-based approach has prepared you for clinical placement and you think that you are ready for it?

45 responses



38/In general, do you think that you are ready to perform the professional dietetics role?

45 responses



39/What suggestions, if any, do you have in regards to tailoring OSCE for clinical nutrition senior students (write one suggestion)

45 responses

No

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-

Decide student to separate dates to prevent waiting for too long

Divide the group into two days

Increase time inside the stations

Don't have

Giving appropriate instruction before exam , and let students face what they are expected to in real life.

Guidelines for Osce

The oral questions better to be each Doctor alone

Nothing

زيادة الدرجات على الاختبارات العمليه وتكثيرها يعني اكثر تقليل الدرجات على الاختبارات النظرية

Make OSCE more realistic by making the situation more designed to make the students feel more involved in it

Make it more interactive with other health professionals

No

Good

No stressful doctors please

No suggestion this semester better than the last semester, thank you

I think only 2 is enough

I suggest more specified practice before the exam and follow up with each student's lows

To give more information about the exam protocol before exam

Simulation for outpatient

Make it harder

Provide a course beforehand about the correct way to approach OSCE and tips as well as common mistakes

As we alreaey meet the patint during all semester ,i think it enouph for us.

Nothings

less stress .. more information about exam.. send guideline for students

ان يكون هناك تنظيم اكثر لدخول الطالبات

Incresea time of OSCE exam

Time is limited

Creating different scenarios during OSCE quizzes that help us to communicate effectively with other members of the medical team such as pharmacist and physiotherapist.

If possible, more examiner in two rooms for example so students don't wait too long for the exam

Give a NGT case in the final OSCE exam