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Author

O'shea, Marie-Claire, Palermo, Claire, Rogers, Gary D, Williams, Lauren T

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Systematic Review

Simulation-Based Learning Experiences in Dietetics Programs: A Systematic Review

Marie-Claire O'Shea, BHSc, AdvAPD[1]; Claire Palermo, PhD, MPH, AdvAPD[2]; Gary D. Rogers, MBBS, MGPPsych, PhD, FANZHPE, FAMEE, PFHEA[3]; Lauren T. Williams, PhD, FDAA[1,4]

ABSTRACT

Objective: Simulation-based learning experiences (SBLEs) are widely used in education for health professionals, but this literature has not yet been synthesized for dietetics. The aim of this study was to describe presupervised practice SBLEs using simulated patients within programs credentialing dietitians.

Methods: A systematic review following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. A total of 8 databases were searched (MEDLINE by EBSCO HOST, CINAHL Plus with Full Text, Web of Science, PsycINFO, Scopus, ERIC ProQuest, Embase, and ProQuest Education) for studies published up to November 2, 2018 with the terms "dietitian," "standardized patient," "student," and their synonyms.

Results: Fourteen out of 740 studies were identified. Most focused on development/assessment of communication and counseling skills. Learning outcomes were measured in 12 studies with 8 different tools.

Conclusions and Implications: The dietetics profession needs robust and consistent reporting methods to enable the development of a high-quality body of evidence on SBLEs. The quality and quantity of SBLE research need to improve to ensure that simulations are pedagogically sound and are accompanied by measures of quality and impact on learning.

Key Words: reporting quality, student, simulation-based learning, dietitian, simulated patient (*J Nutr Educ Behav.* 2019;000:1−10.)

INTRODUCTION

Simulation is a widely used teaching and learning strategy in health professional student education.[1−7] The Healthcare Simulation Dictionary defines simulation-based learning experiences (SBLEs) as follows:

> *... an array of structured activities that represent actual or potential situations in education and practice. Simulation activities allow participants to develop or enhance their knowledge, skills, and attitudes, or to analyze and respond to realistic situations in a simulated environment.*[8]

The history and development of simulation-based education, also known as simulation-based medical education or simulation-based learning, has been well documented[9] since the first phase of part-task simulators were used in the 18th century.[10] Historically, simulation referred to mannequins and part-task trainers used to teach a particular skill. Today, simulation and SBLEs encompass a range of modalities and technologies, spanning novice to expert learners and incorporating varying contexts and settings.[10] Simulation-based learning experiences include computer-based simulations, simulated patients (SPs), part-task trainers, mannequin simulators, virtual reality, role-plays, and hybrid simulations including 2 or more types of SBLEs.[8,10−12] Such SBLEs allow student practice without risk to patient safety[1,13,14] while promoting the development of student professionalism and resilience.[15] Within university-based education of health professionals, SBLEs are applied to increase student preparedness[2,16] and perceived confidence to perform on clinical placement[3,4] and as an assessment tool.[5,6] Simulation-based learning experiences can offer on-demand scenarios and purpose-developed cases to provide learners with experiences they may not otherwise encounter because of the limitations of clinical placement.[7,17]

The application of SBLEs within nursing and medical curricula has been extensively documented over several decades with case studies,

[1]Department of Nutrition and Dietetics, School of Allied Health Sciences, Griffith University, Gold Coast, Queensland, Australia
[2]Department of Nutrition, Dietetics and Food, Monash University, Notting Hill, Victoria, Australia
[3]School of Medicine, Griffith University Gold Coast Campus, Queensland, Australia
[4]Menzies Health Institute Queensland, Griffith University Gold Coast Campus, Queensland, Australia

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Address for correspondence: Marie-Claire O'Shea BHSc, AdvAPD, School of Allied Health Sciences, Griffith University Gold Coast Campus, Parklands Drive, Southport, Queensland 4222, Australia; E-mail: m.oshea@griffith.edu.au

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critical reviews, and systematic reviews[6] reporting activities that identify simulation-based approaches as a powerful form of education.[18] Cant and Cooper[19] determined that the body of SBLE literature within nursing education was too large to undertake a conventional systematic review and consequently undertook an umbrella systematic review. Their review of reviews identified 25 systematic reviews covering over 700 articles focusing on SBLEs' contribution and curriculum integration in nursing and suggested that SBLE activities contribute to strong student satisfaction and improved self-efficacy.

Some allied health professions have also made significant contributions to SBLE research, notably speech pathology, physiotherapy, and audiology. These disciplines have used simulation techniques to expose students to specialized areas of practice[20,21] to assess foundational knowledge and clinical skills in a simulated placement environment[22,23] and to enhance clinical placement preparedness.[2] A systematic review of randomized controlled trials with large sample sizes examining SBLEs vs standard curriculum delivery in preparing physiotherapy students for practice provides evidence of the effectiveness of SBLEs in replacing clinical placement hours in this discipline.[24]

Comparatively, SBLEs appear to have played a lesser role in the credentialing education of dietitians.[3,25,26] Studies published from the late 1970s to early 2000s largely reported on computer-assisted instruction or computer-based instruction that provided students with scenarios designed to enhance decision making and communication skills.[27–30] These computer-based tools have more recently been replaced with SP simulations. The professional associations representing dietitians of the US, Australia, and the United Kingdom have encouraged SBLEs within education programs, as a means of decreasing demands on professional placement.[11,25,31] Monetary grants to assist with simulation resource development, increased exposure of curriculum-based SBLEs through conference presentations, and support for the collaborative development of standards and evaluation tools have been suggested by members of the Academy of Nutrition and Dietetics in the US to encourage uptake and use of SBLEs.[26,31] A review of teaching and skill assessment SBLE activities within Australian university dietetics programs summarized by the professional association identifies a wide and varied use of simulation.[11] However, these results were published but not peer-reviewed and were self-reported by program directors, and no guidelines, best practice terminology, or categorization for the activities were applied.[11] No distinction was made between the simulations designed to prepare students for their placement and those conducted as part of the placement.

To the authors' knowledge, there has not been a synthesis of the published literature regarding simulations in dietetics. Therefore, this synthesis is required to ensure dietetics remains fully informed and up to date in this area. The study search was deliberately focused on SBLEs with SPs, rather than all types of simulation. This was an important decision for 2 reasons: first, SP SBLEs are considered by leading simulation researchers as contemporary simulation,[21] and second, SP SBLEs are the primary form of SBLEs used to develop complex skills in communication in a safe environment,[25] which is especially relevant to dietetics. This paper reports the findings of a systematic review[32] of published articles that aimed to identify simulation activities with SPs, undertaken before the major supervised placement or internship, within dietetics university programs. A second aim was to assess how the activities were reported, focusing on simulation activity description using a purpose-designed reporting appraisal tool.

METHODS

Search Strategy

This review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses[33] as detailed in the Figure. Eight databases were searched (MEDLINE by EBSCO HOST, CINAHL Plus with Full Text, Web of Science, PsycINFO [from database inception to March, 2017], Scopus, ERIC ProQuest, and Embase, ProQuest Education) for articles published in the peer review literature, including any date up to November 2, 2018 using the following search terms (#1: dietician* OR nutrition OR dietetic* OR dietitian*), (#2: "standardised patient*" OR "standardized patient" OR simulat* OR osce OR "Objective Structured Clinical Examination"), (#3: student*) combined with AND. Google Scholar was searched using the same search terms and included any date up to November 2, 2018. The first 5 pages containing 100 results were reviewed, consistent with the approach recommended by Haddaway et al.[34] The following single search terms were used: "diet" and "nutrition" in any field, from the year 2013 to November 2, 2018. To ensure that all sources were explored, 3 dietetics-specific journals (*Journal of Nutrition and Dietetics*, *Journal of the Academy of Nutrition and Dietetics*, and the *Journal of Human Nutrition and Dietetics*) and 5 industry Web sites were also searched (QualSim, Simulation Australasia incorporating Australian Society for Simulation in Healthcare, National Health Education and Training Simulation, Association for Medical Education in Europe, and Society in Europe for Simulation Applied to Medicine) for conference papers or associated journals through the on-site search engine on November 2, 2018. Authors of abstracts and conference proceedings identified were contacted to ask whether the paper had been published, given only published studies were included. Finally, references of the included articles were hand-searched for any relevant literature not already identified.

Eligibility Criteria

Two authors considered highly experienced with simulation activities determined the scope and definition of activities of the included studies. Studies were required to include dietetic students enrolled in an accredited credentialing program, participating in SBLEs. Students could be at undergraduate or postgraduate level but

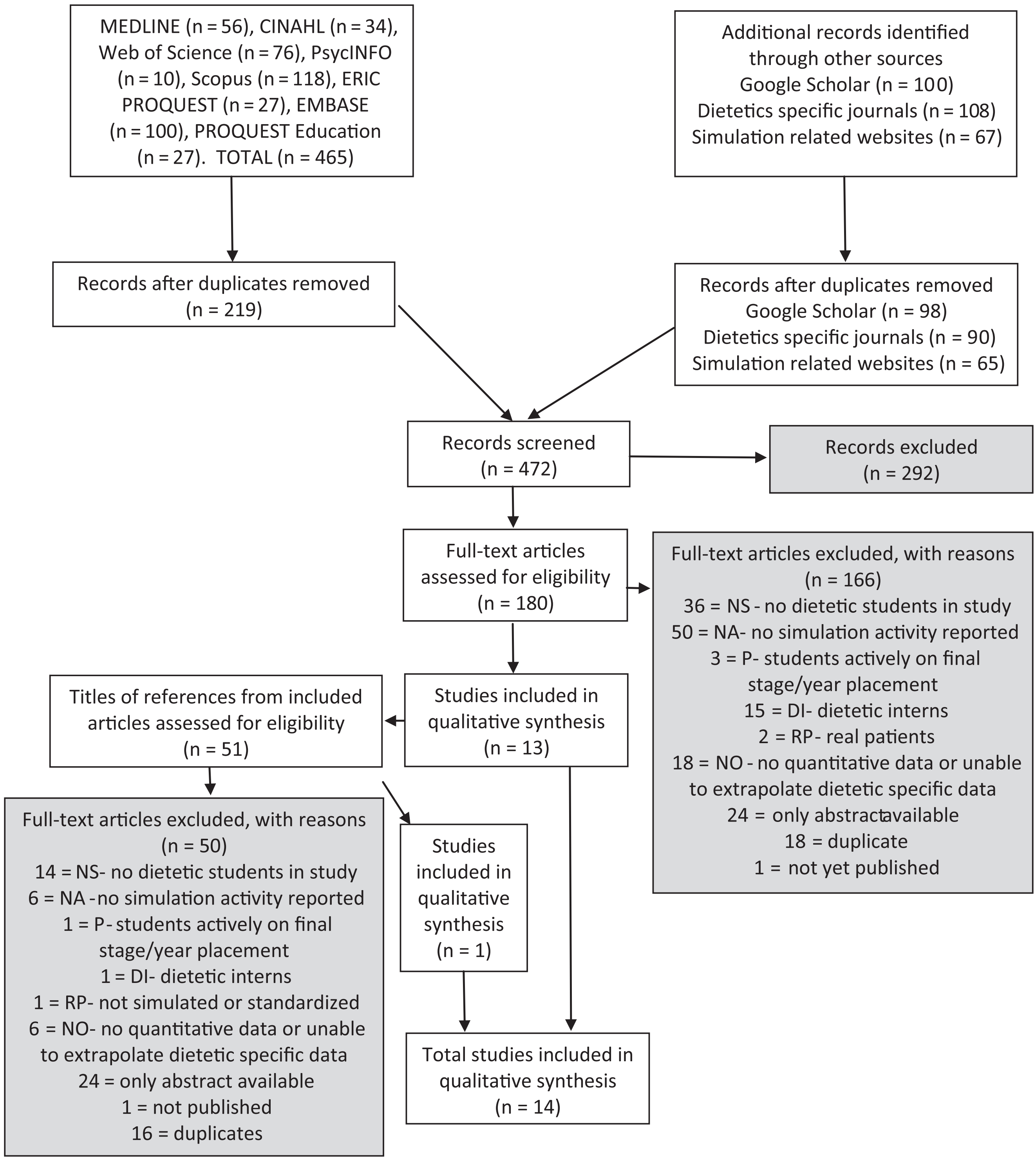

Figure. Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) flow diagram for a systematic review of included articles relating to simulation-based learning experiences in dietetic curricula. CINAHL indicates Cumulative Index to Nursing and Allied Health; ERIC, Education Resources Information Center.

were required to be at a stage before their internship or final major professional placement, given that this review aimed to identify simulation activities in the previous years. This excluded dietetic interns and students actively on placement or who had completed their final year of professional placement. All studies reporting all types of SBLEs modalities were included, with the exception of those primarily describing the use of mannequins, computer-assisted simulation, videos or online learning modules, real-patient clinics or activities, and unscripted role-play because the focus of this review was to assess SBLEs that simulated a patient encounter.

Studies discussing simulation pedagogy or design without reporting an activity were excluded. Interprofessional student groups and studies including dietetic students from more than 1 program level were included, provided data specific to the target group could be extracted. Only SBLEs using standardized scenarios or patients were included. To address the secondary aim of this review, only studies that evaluated and reported at least 1 measurable outcome were included.

Article Selection

Titles and abstracts were each screened by 2 authors for eligibility. Full-text articles requiring further review were obtained. If insufficient or unclear data were documented in the article, authors were contacted through e-mail to clarify details or obtain data. Articles were excluded if insufficient data were available to complete the data extraction table. All full-text articles retrieved were read in full and independently reviewed by 2 authors and assessed against the inclusion criteria. Any conflicts were resolved through discussion between the 2 reviewers. Inter-rater reliability was established by randomly selecting 5 full-text articles discussed by all 4 authors. Ineligible articles were removed, and reasons for exclusion were noted.

Data Extraction

Data from studies were extracted by 2 authors in parallel based on study aim, activity summary, participants, learning and teaching measures and results, evaluation measures and results, key messages, limitations, and simulation design (orientation, duration, feedback, debrief, skills targeted, SP details, and assessment component). Any discrepancies were resolved through discussion between at least 2 authors.

Simulation reporting appraisal. Because of the lack of published consensus as to the *gold standard* critical appraisal tools in health care literature,[35,36] a purpose-designed reporting appraisal tool was developed by adapting the "Reporting guidelines for health care simulation research: extensions to the CONSORT and STROBE Statements" by Cheng et al.[37] The reporting methods were critiqued rather than undertaking a critical appraisal of included studies, given the variability of the study designs in this review. Relevant *elements* as described by Cheng et al[37] were identified and scored. The criterion on make or model of equipment and mannequins or simulators was omitted, given these modes of simulation were not included in this review.

A scoring system was developed with a total of 20 marks available for each of the 20 elements. A half-score (0.5) was given if the element was partially described or briefly mentioned but not sufficiently detailed to receive the full score. Based on the assumption that all data should be reported, only data presented within the article were used for appraising simulation reporting quality. Three authors independently scored each article, and discrepancies were resolved by discussion between these authors. Inter-rater reliability was achieved with 3 randomly selected articles where consensus was established with discussion.

RESULTS

Search Strategy Results

The combined database searches resulted in 465 abstracts, narrowed to 219 after duplicates were removed (Figure). An additional 108 abstracts were identified through individual journal searching and a further 67 through the relevant industry Web sites. Google Scholar results totaled 100 abstracts. Combined, this resulted in 740 abstracts screened, of which 180 full-text articles were assessed for eligibility. Twenty-four studies reported insufficient details to determine eligibility based on student type, and those authors were contacted via e-mail to request for additional information. This was provided for 20 of the studies. Fifty-one additional studies were retrieved from hand-searching of reference list, of which 1 study was eligible for inclusion. After full-text review from all search strategies, 14 studies were included in the data synthesis (Figure).

Description of included articles. The included studies are described in Table 1, according to the category of simulation activity, human patients (including SPs and actors), or Objective Structured Clinical Examinations (OSCEs) using SPs or actors. There was a biphasic pattern to publication date. The oldest paper was published in 1979[38] with 2 more publications up to 2005.[39,40] The second main phase of publication occurred in the past decade. Of the 14 studies, 2 describe the same series of simulation activities,[41,42] giving a total of 13 unique simulations (Table 1).

Ward simulations were featured in 1 study,[43] the outpatient setting in 4,[39,44–46] and 2 articles used a multisetting scenario.[47,48] Although all students participating in the simulations were prefinal placement, different student cohorts were represented: 2 studies included Sophomore (second year) students,[46,49] 4 studies included Senior (fourth year) students,[38,44,45,47] 6 studies included Junior (third year) students,[40–43,48,50] and 2 studies included graduate students as the participants.[39,44] Student year level was unable to be determined in 1 study.[3] Simulations involving other health care students or professionals were described in 1 study.[43]

Quantitative Outcomes Measured by Included Studies

Assessment of student learning reported by included studies. All but 2[45,47] of the included studies quantitatively measured learning outcomes related to the simulation. Five studies measured changes in patient communication and counseling scores.[39,44,46,48,50] Counseling scores were also measured in 1 other study[38]; however, the activity was employee management in food service rather than the clinical setting. Confidence in ability and readiness to practice was measured in 1 study.[3] The final study measured students' ability to contribute to and work in a

Table 1. Summary of Study and Simulation Characteristics for Included Studies in Systematic Review of Studies on Simulation in Dietetics According to Simulation Category

Author(s)	Year, Study Location	Study Design	Simulation Type	Dietetics Students, n	Learning Outcomes Measured	Process Evaluation (Participant Satisfaction)
Simulation Type: Human Patient (SPs, Actors)						
Beshgetoor and Wade[47]	2007, US	Posttest, cross-sectional design	SPs and RPs	NR	NR	Postsurvey
Dobson et al[43]	2007, Canada	Posttest, cross-sectional design	SPs	25	Posttest scores, Self-efficacy score	Postsurvey
Fiedler and Beach[38]	1979, US	Pretest/posttest design	SPs	17	SPOC, CC	Postsurvey
Russell et al[39]	1985, US	Posttest, cross-sectional design	SP	7	ICS-AD	Postsurvey
Schwartz et al[44]	2015, US	Pretest/posttest design	SP and RP	75	CCOG, BECCI	NR
Stephenson et al[45]	2015, US	Posttest, cross-sectional design	SP	136	NR	Postsurvey
Tada et al[48]	2018, Japan	Pretest/posttest design	SP	108	Self-efficacy survey	Postsurvey
Whitehead et al[46]	2014, United Kingdom	Pretest/posttest design	SP	15	DIET-COMMS	NR
Simulation Type: OSCE						
Farahat et al[3]	2015, US	Pretest/posttest design	OSCE	5	PRDP	Postsurvey
Gibson and Davidson[50]	2015, Australia	Pretest/posttest design	OSCE	45–60	Pretest/Posttest scores	NR
Hawker et al[42]; Hawker and Walker[41]	2010, Australia	Pretest/posttest design	OSCE	193	Posttest scores	Postsurvey
Lambert et al[49]	2010, United Kingdom	Posttest, cross-sectional design	OSCE	35	Posttest scores	Postsurvey
Pender and de Looy[40]	2004, United Kingdom	Posttest, cross-sectional design	OSCE	37	Posttest scores	Postsurvey

BECCI indicates Behavior Change Counseling Index; CC, Counseling Checklist; CCOG, Calgary Cambridge Observation Guide Rating; ICS-AD, Interview and Counselling Skills for Adherence to Diet; NR, not reported; OSCE, Objective Structured Clinical Examination; PRDP, Perceived Readiness for Dietetic Practice Questionnaire; RP, real patient; SP, simulated patient; SPOC, Self-Perception of Confidence Scale.

multidisciplinary team with postsimulation care plan scores[43] assessed.

Process evaluation reported by included studies. Eleven studies conducted a process evaluation of the simulation activity.[3,38–43,45,47–49] No standardized or validated tool was used for this purpose, rather the studies[3,38–43,47–49] developed their own surveys exploring student experiences. One study described process evaluation only in the form of formal course evaluation.[45]

Aims of the included studies. The stated aims of the studies can be grouped into 5 themes: (1) description of the simulation experience,[38,39] (2) inclusion of SPs in simulations,[45,47,48,50] (3) experience of interprofessional learning,[43] (4) effect of the simulation of student readiness to practice,[3] and (5) use of OSCE for assessment.[40–42,49]

The reported findings of the learning outcomes and process evaluations were all favorable for the benefits of simulation except for the multistation OSCE simulation aimed at enhancing communication and counseling skills, described by Gibson and Davidson[50] who reported limited justification for SP SBLE for most of the students because of the cost and limited skill improvement. They did, however, determine that OSCEs were valuable SBLEs as preparation for presupervised practice and to improve performance in students who needed additional practice or support.[50]

Description of simulation activities. Key characteristics of the simulation activities are summarized in Table 2. Four of the 13 simulations did not report on an orientation component of the simulation.[40,42,44,45] Of the 10 that did report orientation activities, 5 provided written or preparatory reading information,[38,43,46–48] 2 orientated students to the simulation equipment or room through a demonstration,[3,39] 1 simulation provided

Table 2. Summary of Simulation Activities Included in the Systematic Review of Studies on Simulation in Dietetics According to Simulation Category[a] Adapted From Relevant Elements as Described by Cheng and Colleagues in "Reporting Guidelines for Health Care Simulation Research: Extensions to the CONSORT and STROBE Statements" According to Simulation Category

Simulation Modality, Author(s)	Orientation Provided	Duration of Simulation	Feedback to Participants	Debrief	Dietetic Skills Targeted	Assessment	Quality Rating/20
Simulation Type: Human Patient (SPs, actors)							
Beshgetoor and Wade[47]	Y, NR	2 × 20 min	NR	NR	Data collection, C&C	NR	3
Dobson et al[43]	30 min	35 min	Y	Y, 25 min	IPL, Care planning, documentation	Formative	8
Fiedler and Beach[38]	Y, NR	5 d	Y	Y, time NR	Food service management	NR	8
Russell et al[39]	Y, NR	4 × 20–30 min	NR	NR	C&C	NR	7.5
Schwartz et al[44]	NR	NR	Y	NR	C&C	NR	8.5
Stephenson et al[45]	NR	NR	Y	NR	C&C	NR	3.5
Tada et al[48]	Y, time NR	10 min	Y	Y, time NR	C&C	NR	12
Whitehead et al[46]	L, time NR	NR	NR	NR	C&C	NR	3.5
Simulation Type: OSCE							
Farahat et al[3]	15 min	115 min	Y	40 min	C&C, Documentation, IPL, Reflection	Formative	12
Gibson and Davidson[50]	90 min	86 min	Y	Y, time NR	C&C	Formative, summative	12.5
Hawker et al 2010[42]; Hawker and Walker 2010[41]	NR; Y: time NR	60 min	Y	NR	C&C	Summative	7;9
Lambert et al[49]	Y: time NR	90 min	NR	NR	C&C, Knowledge	Summative	6.5
Pender and de Looy[40]	NR	60 min	NR	NR	C&C, Knowledge	Summative	6.5

C&C indicates communication and counseling; CONSORT, Consolidated Standards of Reporting Trials; d, day; IPL, interprofessional learning; L, limited; min, minute; NR, details not reported; OSCE, Objective Structured Clinical Examination; SP, simulated patient; STROBE, Strengthening the Reporting of Observational Studies in Epidemiology; Y, yes, stated in the study.

[a]Adapted from relevant *elements* as described by Cheng et al.[37]

Notes: Half-scores (0.5) were given where the *element* was partially described or briefly mentioned. *Elements* were as follows: orientation to simulator or environment, location of simulation, event description, learning objectives, group vs individual activity, facilitator characteristics, pilot testing, SPs description, activity duration, timing relative to learning, repetition, description of scenario variations, nonsimulation interventions, integration with curriculum, feedback source and duration, facilitator presence, facilitator characteristics, feedback structure and timing, and video or scripting used. Complete and clear descriptions were required to receive the full score.

students with a workshop,[49] and 1 provided a comprehensive prebriefing covering aspects of the simulation including simulation timing, design, assessment, and activities,[50] with 1 study[48] also offering individual tutorial support for students in preparation for the simulation.

Feedback provided to students was mostly in written or verbal form, from SPs,[3,44,48,50] facilitators,[3,44,45,48,50] and other group members[41,42,45,48] and focused primarily on communication skills or performance. Self-analysis of student performance captured by video recording the simulation was reported in 5 studies.[3,38,39,44,50] One study[45] described 2 cohorts where only 1 group received SP and peer feedback following the session, the other did not. Five of the 14 studies reported conducting a distinct debrief session.[3,38,43,48,50]

Details of SPs were described in all 14 studies; 11 simulations used trained or experienced SPs,[3,39–44,46,48–50] 1 simulation used actors only,[38] 1 simulation used teaching assistants and paid theater students,[45] and 1 simulation used actors and students in role-plays.[47] Seven simulations described the relationship between the timing of the simulation and the learning activities within the program curriculum.[3,41,42,44,48–50]

Appraisal of simulation reporting. The studies scored between 3[47] and 12.5[50] out of a possible 20 for simulation reporting, as shown in Table 2. Only 6 studies clearly stated the learning objectives of the simulation.[38,40–42,49,50] Five of the simulations specifically stated whether the participants worked individually or in groups.[40,43,45,47,48] Video recordings were used in 5 simulation activities[3,38,39,44,50] to enable students to review and reflect on their own performance. In 1 study,[46] video recordings were used for summative assessment purposes. Only 5 of the simulations referred to the presence of a facilitator, and none provided further details such as simulation training or facilitation experience.[38,43,44,48,50] Pilot testing of the simulation activity was reported in only 1 simulation.[40]

DISCUSSION

To the authors' knowledge, this study is the first to identify and synthesize simulation activities undertaken in dietetics programs and to assess the activities of the simulations and their evaluation. The review included 14 studies describing 13 different simulation activities in presupervised practice (or preinternship) in dietetics education. The predominance of communication and counseling simulations in dietetics is understandable, given these have been identified as areas of preclinical skill development requiring more attention.[51] Cant and Aroni[51] suggest that counseling education courses or units within university programs focused on knowledge acquisition at the expense of practical skills. They recommended that students have increased opportunities for skills practice and clinical experience before graduation.

Quantitative outcomes of student learning were measured in almost all the studies. Eight different tools were used to measure learning, and only 3 simulations used validated tools such as the Behaviour Change Counseling Index,[44] Counseling Checklist,[38] and DIET-COMMS[46] to measure student learning assessed by qualified dietitians, which reduced the ability of this review to compare outcome data. Furthermore, the reasons for selecting validated or purpose-designed tools was not evident within the included studies. Given that the stated aims of many of the studies included a description of the simulation experience and the inclusion of SPs within simulation activities, the studies were able to demonstrate increased counseling skills and perceived readiness for practical placement without the use of such tools.

In a 2016 publication, Sevdalis et al[52] called for more consistent simulation design and subsequent standardized reporting of simulation activities within the nursing profession, which would also be of clear benefit for dietetics. Less than optimal reporting found in this review may be a result of design flaws or inadequate description of the activities and events. The lack of a widely accepted checklist to ensure quality reporting may be a contributing factor to inconsistent reporting.

There is a need for studies to report clearly on essential characteristics of simulation such as instructional design, outcomes, and debriefing. Description of the integration of SBLEs within the curriculum was mostly absent in the body of evidence reviewed. Failure to consider how and where SBLEs fit within the curriculum has been described as careless and may reduce the effectiveness of an intervention.[1,53] Possible reasons for poor reporting standards highlighted in this study could include the lack of research experience of those facilitating and reporting SBLEs[54] or the fact that simulation in dietetics is still a developing area and stronger facilitator and simulation design skills are required. With experimental designs and activities using such guidelines as those by Arthur[53,55] and Jeffries,[56] as well as the use of *Seven Principles of Good Practice in Undergraduate Education* (active learning, prompt feedback, student-faculty interaction, collaborative learning, high expectations, allowing diverse styles for learning, and time on task) by Chickering and Gamson,[57] simulations and their reporting could be improved.

Despite the time span of the search, the resulting body of evidence is not large. Two distinct historical phases of reporting were identified: early simulation activities, considered innovative for their era, followed by a second phase from 2007 to present. The relatively slow and limited uptake of SBLEs in dietetics education could be because of the counseling-based nature of the skills required by dietitians rather than the manual, procedural skills traditionally associated with doctors and nurses. Given the relative lack of risk to patient safety of dietetics interventions, there has not been the same imperative to use simulation as for medicine and nursing.[1]

Limitations of Study

Because of the small number of published studies in this field, the research question was confined to collation and description. The authors acknowledge that the analysis of student impact and outcomes because of SBLEs would have enhanced this study. The inclusion of SP SBLE must now be highlighted as a limitation; however, this was a careful decision by the authors based on the current literature[21,25] where SP SBLEs have predominantly been used to develop complex skills that are core to dietetic education such as communication. The quality reporting assessment was based on the reporting guidelines by Cheng et al[37] that were only published in 2016, meaning only 1 study[48] would have had the opportunity to use these guidelines to improve the quality of their reporting.

IMPLICATIONS FOR RESEARCH AND PRACTICE

The synthesis of literature has shown a clear trend toward SP SBLE in dietetics, particularly in the development and assessment of counseling skills, over the past decade. The use of simulation to develop counseling skills and readiness for practical placement and SP SBLE to assess counseling skills in OSCEs were favorably reported. Although there is evidence that the profession first engaged with simulation over 40 years ago, the entire evidence base remains scant. There is a need to build a credible evidence base of teaching and learning activities.

Dietetics is a profession where evidence-based practice forms the foundation of decision making. More consistent, robust and evidence-based evaluation methods and tools need to be developed and applied to strengthen the evidence base for simulation skill acquisition in dietetics education. Simulation design features and implementation recommendations have been published by the leaders in the nursing profession,[53,55,56,] and these guidelines could be applied in dietetics education. SBLEs designed according to quality checklists, such as that provided by Cheng et al,[37] would result in higher quality reports of simulation activities. Learning outcomes for activities and how they relate to core competencies of the profession also need to be clearly documented by educators and facilitators.[5,27] This will build the evidence base to enable SBLEs to move from a novelty to an evidence-based pedagogy that can justifiably be incorporated into university dietetics curricula.

Future research is required to identify which dietetic skills can be developed and enhanced through simulation and where in the curriculum SBLEs optimize learning. This study focused on SBLEs with SPs; however, further analysis of the various types of SBLEs and their use for different competency skill development is also required. At present, the dietetic profession is considering its possibilities and opportunities in the ever-changing health care landscape.[26,58] Extending the scope of practice and the burgeoning digital space, along with the increasing demand for student placements, will encourage educators to adopt innovative practices[59] to prepare students for supervised practice, of which SBLEs could form a strong component. The development of simulation guidelines specific for dietetics education will provide simulation designers with the tools to face these challenges.

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