

## Supplementary file

### Box - Complete search strategy

#### *PubMed*

1. exp Education, nursing/
2. nurs\$.ti,ab.
3. educat\$.ti,ab.
4. 2 and 3
5. "nursing degree course".ti,ab.
6. student\$.ti,ab.
7. 2 and 6
8. exp Students, nursing/
9. "teaching and learning model".ti,ab.
10. 2 and 9
11. exp Teaching/
12. 2 and 11
13. 1 or 4 or 5 or 7 or 8 or 10 or 12
14. "acute care".ti,ab.
15. AED.ti,ab.
16. exp Airway management/
17. exp Cardiovascular diseases/
18. CPR.ti,ab.
19. exp Critical care/
20. exp Critical care nursing/
21. exp Life support care/
22. defibrillat\$.ti,ab.
23. exp Defibrillators/
24. exp Electrocardiography/
25. ECG.ti,ab.
26. exp Electric countershock/
27. electrocardio\$.ti,ab.
28. exp Emergencies/
29. exp Emergencies nursing/
30. exp Emergency medical service/
31. exp Emergency treatment/
32. exp Hemodynamics/
33. exp Monitoring, physiologic/
34. "patient deterioration".ti,ab.
35. exp Respiration disorders/
36. exp Respiration, therapy/
37. 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36
38. fidelity.ti,ab.
39. "human patient".ti,ab.
40. mannequin\$.ti,ab.
41. exp Program development/
42. scenario\$.ti,ab.
43. "simulated patient\$".ti,ab.
44. "simulation-based training".ti,ab.
45. 38 or 39 or 40 or 41 or 42 or 43 or 44
46. exp Mental processes/
47. \$confiden\$.ti,ab.
48. exp Clinical decision-making/
49. debrief\$.ti,ab.
50. exp Educational measurement/
51. "fitness to practice".ti,ab.
52. gain\$.ti,ab.
53. exp Health knowledge, attitudes, practice/
54. exp Needs assessment/
55. "objective structured clinical examination".ti,ab.
56. OSCE.ti,ab.
57. perceive\$.ti,ab.
58. perception\$.ti,ab.
59. performance\$.ti,ab.
60. exp Personal satisfaction/

61. "physical assessment".ti,ab.
62. exp Psychomotor performance/
63. exp Aptitude tests/
64. retention\$.ti,ab.
65. retain\$.ti,ab.
66. satisfact\$.ti,ab.
67. exp Self concept/
68. aware\$.ti,ab.
69. efficac\$.ti,ab.
70. skill\$.ti,ab.
71. 46 or 47 or 48 or 49 or 50 or 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63 or 64 or 65 or 66 or 67 or 68 or 69 or 70
72. 13 and 37 and 45 and 71
73. limit 72 to (article type="Comparative Study", "Journal Article", "Observational Study". "Clinical Trial", "Controlled Clinical Trial", "Randomized Trial") and (publication date to "2017/05/31")

### **Scopus**

TITLE-ABS-KEY (((nurs\* AND educat\*) OR "nursing degree course" OR (nurs\* AND student\*) OR ("teaching and learning model" AND nurs\*)) AND ("acute care" OR aed OR cpr OR defibrillat\* OR ecg OR electrocardio\* OR "patient deterioration") AND (simulat\* OR fidelity OR "human patient" OR manikin\* OR mannequin\* OR scenario\*) AND (\*confiden\* OR debrief\* OR "fitness to practice" OR gain\* OR "objective structured clinical examination" OR osce OR perceive\* OR perception\* OR performance\* OR "physical assessment" OR retention\* OR retain\* OR satisfact\* OR aware\* OR efficac\* OR skill\*)) [Article types: Article, Article in Press]

### **CINAHL with Full Text**

S71 limit S70 to (document type="academic publication", "journals", "CEU"), ("research article"), (year="1900.01.01"-2017.05.31") and expand to ("search also in full text")

- S70 S12 and S35 and S43 and S69  
 S69 or/S44-S68  
 S68 (MH "Mental Processes")  
 S67 AB (skill\*)  
 S66 AB (efficac\*)  
 S65 AB (aware\*)  
 S64 (MH "Self Concept+")  
 S63 AB (satisfact\*)  
 S62 AB (retain\*)  
 S61 AB (retention\*)  
 S60 (MH "Aptitude Tests")  
 S59 (MH "Psychomotor Performance+")  
 S58 AB ("physical assessment")  
 S57 (MH "Student Satisfaction+")  
 S56 AB (performance\*)  
 S55 AB (perception\*)  
 S54 AB (perceive\*)  
 S53 (MH "Student Performance Appraisal+")  
 S52 AB (OSCE)  
 S51 AB ("objective structured clinical examination")  
 S50 (MH "Needs Assessment")  
 S49 (MH "Health Knowledge")  
 S48 AB (gain\*)  
 S47 AB ("fitness to practice")  
 S46 (MH "Educational Measurement+")  
 S45 AB (debrief\*)  
 S44 AB (\*confiden\*)  
 S43 or/S36-S42  
 S42 (MH "Program Development+")  
 S41 (MH "Problem-Based Learning")  
 S40 AB (mannequin\*)  
 S39 AB (manikin\*)  
 S38 (MH "Learning Environment+")  
 S37 AB ("human patient")  
 S36 AB (fidelity)  
 S35 or/S13-S34  
 S34 (MH "Respiration Therapy+")  
 S33 (MH "Respiration Disorders+")

S32 AB ("patient deterioration")  
 S31 (MH "Monitoring, Physiologic+")  
 S30 (MH "Hemodynamics+")  
 S29 AB (electrocardio\*)  
 S28 AB (ECG)  
 S27 (MH "Defibrillation")  
 S26 (MH "Defibrillators+")  
 S25 AB (defibrillat\*)  
 S24 (MH "Life Support Care+")  
 S23 (MH "Critical Care Nursing+")  
 S22 (MH "Emergency Treatment+")  
 S21 (MH "Emergency Medical Service+")  
 S20 (MH "Emergency Care+")  
 S19 (MH "Emergencies+")  
 S18 (MH "Critical Care+")  
 S17 AB (CPR)  
 S16 (MH "Cardiovascular Diseases+")  
 S15 (MH "Airway Management+")  
 S14 AB (AED)  
 S13 AB ("acute care")  
 S12 or/S1-S8 or S11  
 S11 S9 and S10  
 S10 AB (nurs\*)  
 S9 (MH "Teaching+")  
 S8 AB ("teaching and learning model" and nurs\*)  
 S7 (MH "Students, Nursing+")  
 S6 AB (nurs\* and student\*)  
 S5 AB ("nursing degree course")  
 S4 AB (nurs\* and educat\*)  
 S3 (MH "Emergency Nursing+")  
 S2 (MH "Education, Nursing+")  
 S1 (MH "Education, Competency-Based+")

**Wiley Online Library**

(nurs\* AND educat\*) OR "nurse faculty" OR "nursing degree course" OR (nurs\* AND student\*) OR  
 ("teaching and learning model" AND nurs\*) in Abstract AND ("acute care" OR AED OR CPR OR defibrillat\*  
 OR ECG OR electrocardio\* OR "patient deterioration") in FullText AND (simulat\* OR fidelity OR "human  
 patient" OR manikin\* OR mannequin\* OR scenario\*) in Abstract AND (\*confiden\* OR debrief\* OR "fitness to  
 practice" OR gain\* OR "objective structured clinical examination" OR OSCE OR perceive\* OR perception\*  
 OR performance\* OR "physical assessment" OR retention\* OR retain\* OR satisfact\* OR aware\* OR efficac\* OR  
 skill\*) in FullText [Publication Type: Journals]

**Web of Science**

TS=(((nurs\* AND educat\*) OR "nursing degree course" OR (nurs\* AND student\*) OR ("teaching and learning  
 model" AND nurs\*)) AND ("acute care" OR AED OR CPR OR defibrillat\* OR ECG OR electrocardio\* OR "patient  
 deterioration") AND (simulat\* OR fidelity OR "human patient" OR manikin\* OR mannequin\* OR scenario\*) AND  
 (\*confiden\* OR debrief\* OR "fitness to practice" OR gain\* OR "objective structured clinical examination" OR  
 OSCE OR perceive\* OR perception\* OR performance\* OR "physical assessment" OR retention\* OR retain\* OR  
 satisfact\* OR aware\* OR efficac\* OR skill\*)) [All years, Document Types: Article]

**Table A - NICE Quality Appraisal Checklist for Quantitative Intervention Studies**

<b>SECTION 1: POPULATION</b>
<b>1.1 Is the source population or source area well described?</b> Was the country, setting, location (urban, rural), population demographics etc. adequately described?
<b>1.2 Is the eligible population representative of the source population?</b> Was the recruitment well defined? Was the population representative of the source?
<b>1.3 Do the selected participants or areas represent the eligible population or area?</b> Was the method of selection of participants from the eligible population well described? What % of selected individuals or clusters agreed to participate? Were there any sources of bias? Were the inclusion or exclusion criteria explicit and appropriate?
<b>SECTION 2: METHOD OF ALLOCATION TO INTERVENTION (OR COMPARISON)</b>
<b>2.1 Allocation to intervention (or comparison). How was selection bias minimised?</b> Was allocation to exposure and comparison randomised? Was it truly random ++ or pseudo-randomised + (e.g. consecutive admissions)? If not randomised, was significant confounding likely (-) or not (+)? If a cross-over, was order of intervention randomised?
<b>2.2 Were interventions (and comparisons) well described and appropriate?</b> Were interventions and comparisons described in sufficient detail? Were comparisons appropriate?
<b>2.3 Was the allocation concealed?</b> Adequate allocation concealment (++) would include centralised allocation or computerised allocation systems.
<b>2.4 Were participants or investigators blind to exposure and comparison?</b> Were those delivering or assessing the intervention kept blind to intervention allocation? (Triple or double blinding score ++). If lack of blinding is likely to cause important bias, score -.
<b>2.5 Was the exposure to the intervention and comparison adequate?</b> Is reduced exposure to intervention or control related to the intervention or fidelity of implementation?
<b>2.6 Was contamination acceptably low?</b> Did any in the comparison group receive the intervention or vice versa? If so, was it sufficient to cause important bias? If a cross-over trial, was there a sufficient wash-out period between interventions?
<b>2.7 Were other interventions similar in both groups?</b> Did either group receive additional interventions or have services provided in a different manner? Were the groups treated equally by researchers or other professionals? Was this sufficient to cause important bias?
<b>2.8 Were all participants accounted for at study conclusion?</b> Were those lost-to-follow-up <20%? Did the proportion dropped differ by group?
<b>2.9 Did the setting reflect usual practice?</b> Did the setting in which the intervention or comparison was delivered differ significantly from usual practice? For example, did participants receive intervention (or comparison) condition in a hospital rather than a community-based setting?
<b>2.10 Did the intervention or control comparison reflect usual practice?</b> Did the intervention or comparison differ significantly from usual practice?
<b>SECTION 3: OUTCOMES</b>
<b>3.1 Were outcome measures reliable?</b> Were outcome measures subjective or objective? How reliable were measures? Was there any indication that measures had been validated?
<b>3.2 Were all outcome measurements complete?</b> Were all or most study participants who met the defined study outcome definitions likely to have been identified?
<b>3.3 Were all important outcomes assessed?</b> Were all important benefits and harms assessed? Was it possible to determine the overall balance of benefits and harms?
<b>3.4 Were outcomes relevant?</b> Where surrogate outcome measures were used, did they measure what they set out to measure?
<b>3.5 Were there similar follow-up times in exposure and comparison groups?</b> If groups are followed for different lengths of time, then more events are likely to occur in the group followed-up for longer distorting the comparison. Analyses can be adjusted to allow for differences in length of follow-up.
<b>3.6 Was follow-up time meaningful?</b> Was follow-up long enough to assess long-term benefits or harms? Was it too long, e.g. participants lost to follow-up?
<b>SECTION 4: ANALYSES</b>
<b>4.1 Were groups similar at baseline? If not, were these adjusted?</b> If so, were these adjusted for in the analyses (e.g. multivariate analyses or stratification)
<b>4.2 Was intention to treat analysis conducted?</b> Were all participants (including dropped out or did not complete the intervention) analysed?
<b>4.3 Was the study sufficiently powered to detect an intervention effect?</b> A power of 0.8 is the conventional standard. Is a power calculation presented?
<b>4.4 Were the estimates of effect size given or calculable?</b> Were effect estimates (e.g. relative risks, absolute risks) given or possible to calculate?
<b>4.5 Were the analytical methods appropriate?</b> Were important differences in follow-up time and likely confounders adjusted for? Were subgroup analyses pre-specified?
<b>4.6 Was the precision of intervention effects given or calculable? Were they meaningful?</b> Were CIs or p values for effect estimates given or possible to calculate?

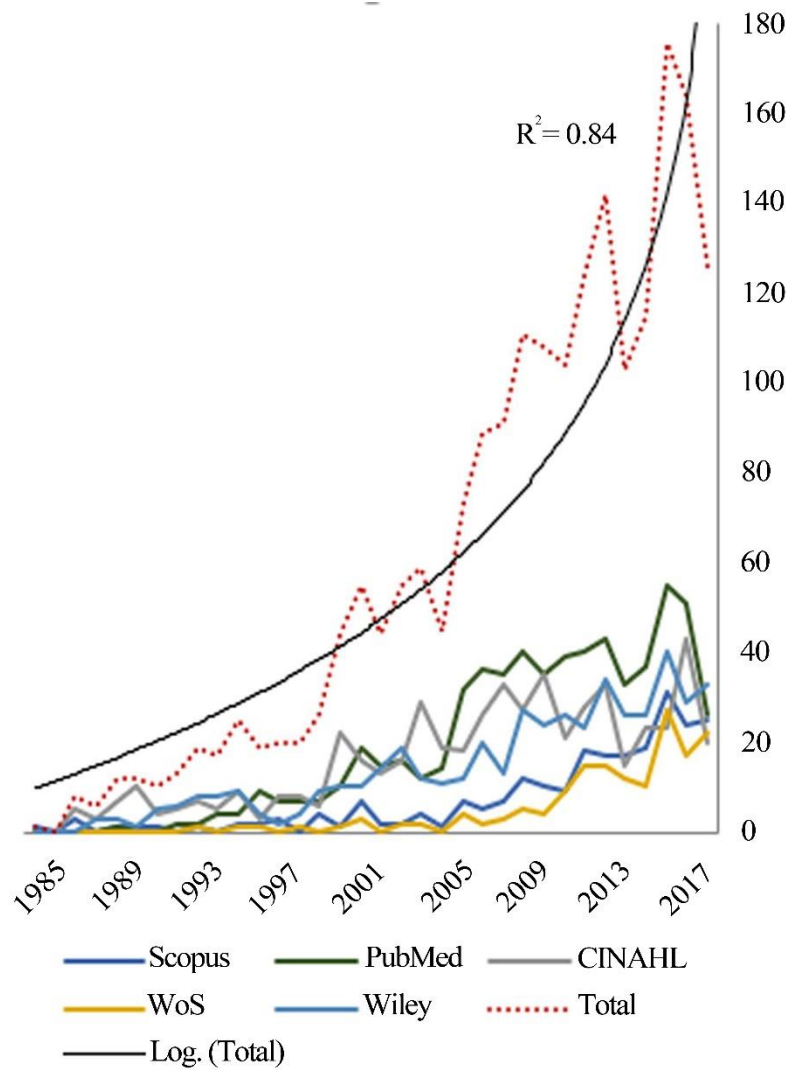


Figure 1 - HFPS Publication trend

**Table B - Description of included studies (n = 33; k = 44)**

n	k	First Author	Title	IF	Country	Aim	Students enrolled	N	Year	Age M (SD)	Females N (%)
1	1	Ackermann 2009	Investigation of learning outcomes for the acquisition and retention of CPR knowledge and skills learned with the use of high-fidelity simulation	1.277	USA	To investigate the impact of variables such as accelerated versus traditional nursing students and the experience with CPR on a living person.	Undergraduate (Baccalaureate)	65	1 <sup>st</sup>	nd	nd
2a	2	Ahn 2015	Implementation and outcome evaluation of high-fidelity simulation scenarios to integrate cognitive and psychomotor skills for Korean nursing students.	2.533	South Korea	To implement two high-fidelity simulations to help nursing students integrate their cognitive and psychomotor skills.	Undergraduate (Bachelor)	69	3 <sup>rd</sup>	IG 20.1 (1.2) CG 20.8 (2.7)	IG 32 (91.4) CG 32 (94.1) All 64 (92.8)
3	4	Akhu-Zaheya 2013	Effectiveness of simulation on knowledge acquisition, knowledge retention, and self-efficacy of nursing students in Jordan	1.277	Jordan	To examine the effect of high-fidelity BLS simulation on knowledge acquisition, knowledge retention, and self-efficacy of Jordanian nursing students	Undergraduate (Bachelor)	110	2 <sup>nd</sup>	20.0 (0.6)	74 (67.0)
4a	5	Alinier 2006	Effectiveness of intermediate-fidelity simulation training technology in undergraduate nursing education.	1.998	UK	To determine the effect of scenario-based simulation training on nursing students' clinical skills and competence.	Postgraduate (Diploma)	99	2 <sup>nd</sup>	IG 29.3 (7.5) CG 33.0 (8.4) All 31.2 (8.2)	IG 42 (85.7) CG 41 (82.0) All 83 (83.8)
4b	6										
4c	7										
5	8	Aqel 2014	High-Fidelity Simulation Effects on CPR Knowledge, Skills, Acquisition, and Retention in Nursing Students.	2.103	Jordan	To examine the effect of using high-fidelity simulators on knowledge and skills acquisition and retention with university students.	Undergraduate (Baccalaureate)	90	2 <sup>nd</sup>	19.9 (1.8)	71 (78.9)
6	9	Baptista 2016	Satisfaction and gains perceived by nursing students with medium and high-fidelity simulation: A randomized controlled trial.	2.533	Portugal	To analyze and benchmark gains and satisfaction perceived by nursing students, according to their participation in medium- and high-fidelity simulated practice.	Undergraduate (Bachelor)	85	4 <sup>th</sup>	21.9 (2.8)	IG 44 (49.8) CG 35 (97.2) All 79 (92.9)
7a	10	Baxter 2012	Teaching Critical Management Skills to Senior Nursing Students: Videotaped or Interactive Hands-On Instruction?	0.91	Canada	To examine and compare the effectiveness of videotape training versus hands-on instruction in preparing senior nursing students to respond to emergency clinical situations.	Undergraduate (Bachelor)	17 (a) 21 (b)	4 <sup>th</sup>	nd	nd
7b	11										
8	12	Brannan 2008	Simulator effects on cognitive skills and confidence levels.	1.28	USA	To compare the effects of two instructional methods to teach specific nursing education content on junior-level nursing students' cognitive skills and confidence.	Undergraduate (Baccalaureate)	107	1 <sup>st</sup>	IG 28.6 (8.4) CG 28.3 (7.2)	IG 50 (93.0) CG 51 (96.0) All 101 (79.5)
9	13	Brown 2009	The effect of simulation learning on critical thinking and self-confidence when incorporated into an electrocardiogram nursing course	1.277	USA	To demonstrate the effect of simulation activities on critical thinking and self-confidence in an electrocardiogram nursing course	Undergraduate (Baccalaureate)	140	4 <sup>th</sup>	IG 28.0 (nd) CG 26.7 (nd) All 27.5 (nd)	IG 62 (89.0) CG 62 (89.0) All 62 (89.0)
10a	14	Chen 2015	Evaluating the impact of high-and low-fidelity instruction in the development of auscultation skills.	4.005	Canada	To explore the effectiveness of HF and low-fidelity instruction on tasks that are chosen to deliberately test skills close to, and more removed from, the clinical environment, within the clinical domains of cardiac and respiratory auscultation and physical assessment skill development.	Undergraduate (Bachelor)	42 (a) 33 (b) 42 (c) 33 (d)	3 <sup>rd</sup>	nd	nd
10b	15										
10c	16										
10d	17										
11	18	Cobbett 2016	Virtual versus face-to-face clinical simulation in relation to student knowledge, anxiety, and self-confidence in maternal-newborn nursing: A randomized controlled trial.	2.533	Canada	To compare the effectiveness of two maternal newborn clinical simulation scenarios; virtual clinical simulation and face-to-face high-fidelity manikin simulation.	Undergraduate (Bachelor)	84	3 <sup>rd</sup>	25.0 (nd)	47 (84.0)
12	19	Corbridge 2010	Online learning versus simulation for teaching principles of mechanical ventilation to nurse practitioner students.	1.04	USA	To determine differences in knowledge acquisition and student satisfaction between two methods of teaching mechanical ventilation to advanced practice nursing (APN) students: high-fidelity patient simulation versus an online, narrated PowerPoint presentation.	Postgraduate (Advanced Practice Nursing)	20	na	IG 34.5 (10.1) CG 39.2 (9.9)	nd
13	20	Harris 2011	Simulation-enhanced pediatric clinical orientation.	1.28	USA	To determine the effect of simulation-enhanced orientation on pediatric acute care examination scores and pediatric clinical course grades among junior-level baccalaureate nursing students.	Undergraduate (Baccalaureate)	71	1 <sup>st</sup>	nd	nd
14a	21	Kang 2015	Comparison of knowledge, confidence in skill performance (CSP) and satisfaction in problem-based learning (PBL) and simulation with PBL educational modalities in caring for children with bronchiolitis.	2.533	South Korea	To compare changes in nursing students' knowledge, confidence in skill performance (CSP), and satisfaction resulting from training using three educational modalities.	Undergraduate (Bachelor)	131(a) 136 (b)	4 <sup>th</sup>	nd	nd
14b	22										
15	23	Kardong-Edgren 2009	VitalSim® versus SimMan®: A comparison of BSN student test scores, knowledge retention, and satisfaction.	1.277	USA	To verify if student satisfaction and knowledge gains are equivalent with a medium-fidelity simulator such as VitalSim® and a high-fidelity simulator such as SimMan®, and if they provide more overall student and program access to simulation.	Undergraduate (Bachelor)	89	1 <sup>st</sup>	nd	nd
16	24	King 2011	Teaching advanced cardiac life support protocols	1.372	USA	To compare the effectiveness of static simulation to high-fidelity simulation when teaching advanced cardiac life support guidelines	Undergraduate (Bachelor)	49	4 <sup>th</sup>	nd	nd
17	25	Lapkin 2011	A cost-utility analysis of medium vs. high-fidelity human patient simulation manikins in nursing education.	1.214	Australia	To determine whether the extra costs associated with high-fidelity manikins can justify the differences, if any, in the outcomes of clinical reasoning, knowledge acquisition and student satisfaction.	Undergraduate (Bachelor)	352	2 <sup>nd</sup> (268) 3 <sup>rd</sup> (84)	nd	299 (85.0)
18	26	Lee 2016	Effects of high-fidelity patient simulation led clinical reasoning course: Focused on nursing core competencies, problem solving, and academic self-efficacy.	0.554	South Korea	To examine effects of high-fidelity patient simulation (HFPS) led clinical reasoning course among undergraduate nursing students.	Undergraduate (Bachelor)	49	4 <sup>th</sup>	nd	nd

19	27	Lee 2017	Effects of pre-education combined with a simulation for caring for children with croup on senior nursing students.	1.17	South Korea	Educational outcomes were compared between groups that received education through simulation combined with pre-education, simulation alone, and preeducation alone.	Undergraduate (Bachelor)	87	4 <sup>th</sup>	nd	nd
20a	28	Liaw	Developing clinical competency in crisis event management: An integrated simulation problem-based learning activity.	1.06	Singapore	To evaluate the integration of a simulation-based learning activity on nursing students' clinical crisis management performance in a problem-based learning (PBL) curriculum.	Undergraduate (Baccalaureate)	30 (a) 33 (b)	1 <sup>st</sup>	20.0 (1.0)	nd
21a	30	Luctkar-Flude	Evaluating high-fidelity human simulators and standardized patients in an undergraduate nursing health assessment course.	2.533	Canada	To investigate learners' satisfaction, self-efficacy and performance behaviors among high-fidelity human simulators (HFPS), standardized patients (SP) and community volunteers (CV).	Undergraduate (Bachelor)	30 (a) 28 (b)	2 <sup>nd</sup>	nd	nd
22	32	Merriman 2014	Comparing the effectiveness of clinical simulation versus didactic methods to teach undergraduate adult nursing students to recognize and assess the deteriorating patient.	1.277	UK	To evaluate the effectiveness of clinical simulation compared to classroom teaching in the assessment of the deteriorating patient.	Undergraduate (Bachelor)	34	1 <sup>st</sup>	nd	nd
23	33	Montgomery 2012	Student satisfaction and self-report of CPR competency: Heart-Code™ BLS courses, instructor-led CPR courses, and monthly voice advisory manikin practice for CPR skill maintenance	1.04	USA	To evaluate the effects of brief monthly refresher training on CPR skill retention, confidence, and satisfaction with CPR skill level of nursing students.	Undergraduate (Baccalaureate) Postgraduate (Diploma, Associate)	341	1 <sup>st</sup> na	nd	nd
24	34	Oldenburg 2013	Traditional clinical versus simulation in 1st semester clinical students: students' perceptions after a 2nd semester clinical rotation.	1.277	USA	To analyze the immediate and long-term impact on students' perception of clinical competence after high-fidelity simulation.	Undergraduate (Baccalaureate)	95	1 <sup>st</sup>	nd	nd
25	35	Powell-Laney 2012	The use of human patient simulators to enhance clinical decision-making of nursing students.	0.56	USA	To assess if HPS technology leads to greater clinical decision-making ability and clinical performance compared to the teaching modality of a paper and pencil case study.	Undergraduate (Licensed Practical Nursing)	133	na	32.0 (nd)	117 (88.0)
26	36	Rodgers 2009	The effect of high-fidelity simulation on educational outcomes in an advanced cardiovascular life support course.	1.615	USA	To determine subjects' educational outcomes through videos of subjects performing a simulated cardiac arrest after the conclusion of the course.	Undergraduate (Baccalaureate) Postgraduate (Associate)	34	4 <sup>th</sup> na	32.5 (nd)	29 (86.5)
27	37	Roh 2014	Effects of high-fidelity patient simulation on nursing students' resuscitation-specific self-efficacy.	1.301	South Korea	To assess the difference in pre- and post-test self-efficacy after simulation training and to compare differences in between nursing students exposed to medium- or high-fidelity patient simulations.	Undergraduate (Baccalaureate)	163	2 <sup>nd</sup>	IG 22.4 (5.9) CG 21.3 (4.0)	IG 25 (89.3) CG 125 (92.6)
28	38	Scherer 2007	A comparison of clinical simulation and case study presentation on nurse practitioner students' knowledge and confidence in managing a cardiac event.	1.04	USA	to compare the efficacy of controlled simulation mannequin (SM) assisted learning and case study presentation on knowledge and confidence of nurse practitioner (NP) students in managing a cardiac event	Postgraduate (Acute Care Nurse Practitioner, Adult Nurse Practitioner)	23	na	nd	nd
29	39	Shinnick 2014	Does Nursing Student Self-Efficacy Correlate with Knowledge When Using Human Patient Simulation?	1.277	USA	To demonstrate self-efficacy and knowledge gain in subjects who participated in high-fidelity simulation	Undergraduate (Baccalaureate)	161	4 <sup>th</sup>	25.7 (nd)	142 (88.2)
30a	40	Smith	High-fidelity simulation and legal/ethical concepts: A transformational learning experience.	1.755	USA	To compare the new HFHS experience with in-person and online student groups using the same case	Undergraduate (Baccalaureate)	33 (a) 26 (b)	3 <sup>rd</sup>	nd	nd
30b	41	Smith	High-fidelity simulation and legal/ethical concepts: A transformational learning experience.	1.755	USA	To compare the new HFHS experience with in-person and online student groups using the same case	Undergraduate (Baccalaureate)	33 (a) 26 (b)	3 <sup>rd</sup>	nd	nd
31	42	Tubaishat 2014	Effect of cardiac arrhythmia simulation on nursing students' knowledge acquisition and retention	1.313	Jordan	To evaluate the effect of simulation-based teaching on acquisition and retention of arrhythmia-related knowledge among nursing students	Undergraduate (Bachelor)	91	4 <sup>th</sup>	20.4 (1.0)	56 (61.5)
32	43	Tuzer 2016	The effects of using high-fidelity simulators and standardized patients on the thorax, lung, and cardiac examination skills of undergraduate nursing students.	2.533	Turkey	To compare the effects of the use of a high-fidelity simulator and standardized patients on the knowledge and skills of students conducting thorax-lungs and cardiac examinations, and to explore the students' views and learning experiences	Undergraduate (Baccalaureate)	52	1 <sup>st</sup>	23.0 (nd)	46 (88.5)
33	44	White 2013	Comparison of instructional methods: Cognitive skills and confidence levels.	1.277	USA	To compare the effectiveness of two instructional methods (traditional classroom method and high-fidelity simulator method) to teach content related to distributive shock.	Undergraduate (Baccalaureate)	54	nd	nd	IG 16 (100.0) CG 31 (82.0)

n = number of studies; k = number of estimates; IF = Impact Factor; N = sample size; Year = academic year attended;

**Table C- Coding protocol for data extraction**

Study (n), Scenario	Tool	Experimental	Control	N (IG/CG)	IG	CG	Statistical test	p
<b>Objectively-evaluated Knowledge (n = 12, k = 13)</b>								
[1] Cardiac arrest	14-item Multiple-choice [AHA, 2005c]	Laerdal SimMan®	No intervention	32/33	12.25 (1.22)	11.52 (1.15)	F test	0.015
[3] Cardiac arrest	12-item Multiple-choice [AHA, 2010]	METI™ version 6	Static half-torso manikin (Low-fidelity manikin)	52/58	9.10 (nd)	8.60 (nd)	Independent t-test	0.1
[5] Cardiac arrest	14-item Multiple-choice [AHA, 2010]	METI™	Low-fidelity manikin	45/45	12.67 (1.06)	11.22 (0.90)		
[11] Preeclampsia	10-item Multiple-choice	HFPS	Laerdal vSim® (Medium-fidelity manikin)	42/42	4.80 (1.19)	4.12 (1.54)	Independent t-test	0.09
[12] Respiratory failure	12-item Multiple-choice	Laerdal SimMan®	Web-based learning	10/10	9.20 (1.30)	9.10 (1.70)	Independent t-test	0.891
[14a] Bronchiolitis	20-item Dichotomous	HFPS	Problem-based learning	62/69	0.86 (0.07)	0.83 (0.07)	nd	nd
[14b] Bronchiolitis	20-item Dichotomous	HFPS	Lecture	62/74	0.86 (0.07)	0.78 (0.11)	nd	nd
[19] Pulmonary edema	10-item Dichotomous	Laerdal SimMan®	Lecture	45/42	5.31 (1.29)	5.21 (1.47)	ANOVA	<0.001
[26] Cardiac arrest	ACLS Written Examination [AHA]	Laerdal SimMan®	Low-fidelity manikin	16/18	90.00 (7.59)	87.78 (9.05)	Mann-Whitney U test	0.447
[29] Heart failure, Pulmonary edema	12-item Multiple-choice HF Clinical Knowledge	Laerdal SimMan®	No intervention	89/72	61.39 (12.71)	55.47 (14.77)	Nd	nd
[31] Arrhythmia	20-item Multiple-choice [AHA, 2010]	METI™ version 6	Lecture	47/44	13.20 (3.35)	7.60 (2.36)	Independent t-test	≤0.001
[32] Intensive care	22-item Multiple-choice	HFPS	Standardized patient	26/26	72.79 (9.13)	73.80 (11.28)	Nd	nd
[33] Shock	10-item Multiple-choice Distributive Shock Questionnaire (DSQ)	HFPS	Lecture	16/38	6.75 (1.61)	7.82 (1.45)	ANOVA	<0.03
<b>Objectively-evaluated Performance (n = 14, k = 21)</b>								
[1] Cardiac arrest	BLS for Healthcare Provider Course Final Evaluation Skills Sheet for Adult CPR [AHA, 2001]	Laerdal SimMan®	No intervention	32/33	13.19 (0.78)	11.36 (1.27)	F test	0.000
[4a] Intensive care #1	Ad-hoc	Laerdal SimMan®	No intervention	49/50	47.54 (8.46)	48.82 (10.26)	nd	nd
[4b] Intensive care #2	Ad-hoc	Laerdal SimMan®	No intervention	49/50	61.71 (7.53)	56.00 (9.46)	nd	nd
[5] Cardiac arrest	AHA BLS for Healthcare Provider Course Final Evaluation Skills Sheet for Adult CPR [AHA, 2005c]	METI™	Low-fidelity manikin	45/45	13.13 (1.01)	11.58 (1.63)	Independent t-test	≤0.001
[7a] Cardiac arrest, Pulmonary embolism, COPD	7-item Likert-type	HFPS	No intervention	11/6	5.04 (0.48)	3.64 (1.22)	ANOVA	<0.05
[7b] Cardiac arrest, Pulmonary embolism, COPD	7-item Likert-type	HFPS	Video-watching	11/10	5.04 (0.48)	4.74 (0.88)	ANOVA	>0.05
[8] Cardiac arrest	20-item Acute Myocardial Infarction Questionnaire (AMIQ)	METI™	Lecture	54/53	15.58 (2.13)	14.17 (1.86)	Independent t-test	0.002
[9] Dysrhythmias	30-item Multiple-choice ECG SimTest [Morrison, 2006]	Laerdal SimMan®	Lecture	70/70	1008.00 (nd)	1070.00 (nd)	Independent t-test	0.143
[10a] Heart failure	7-item Likert-type	METI BabySIM®	Audio listening	21/21	3.41 (0.33)	3.71 (0.30)	nd	nd
[10b] Heart failure	7-item Likert-type	METI BabySIM®	No intervention	21/12	3.41 (0.33)	3.23 (0.35)	nd	nd
[10c] Pneumothorax	7-item Likert-type	METI PediaSIM®	Audio listening	21/21	3.39 (0.32)	3.50 (0.29)	nd	nd
[10d] Pneumothorax	7-item Likert-type	METI PediaSIM®	No intervention	21/12	3.39 (0.32)	3.60 (0.34)	Nd	nd
[13] Bronchiolitis, Dehydration, Respiratory distress	RN Nursing Care of Children Content Mastery Test [Assessment Technologies Institute, 2008]	Laerdal SimBaby™ METI PediaSim®	No intervention	55/16	65.33 (6.86)	67.46 (8.45)	Independent t-test	0.19
[16] Cardiac arrest	25-item Multiple-choice [AHA, 2006]	Laerdal SimMan®	Low-fidelity manikin	24/25	22 (92.00%)	23 (93.00%)	nd	nd
[20a] Respiratory distress	Dichotomous	Laerdal SimMan®	Problem-based learning	13/17	20.08 (1.93)	18.19 (2.55)	Independent t-test	0.034
[20b] Cardiac arrest	Dichotomous	Laerdal SimMan®	Problem-based learning	18/15	27.56 (2.15)	23.07 (2.69)	Independent t-test	0.00
[21a] Asthma exacerbation	47-item Dichotomous Respiratory Assessment Checklist	HFPS	Role-play	14/16	32.90 (4.20)	28.90 (4.50)	nd	nd
[21b] Asthma exacerbation	17-item Likert-type Health Assessment Educational Modality Evaluation (HAEME)	HFPS	Standardized patient	14/14	32.90 (4.20)	27.40 (4.90)	nd	nd
[22] Intensive care	24-item Dichotomous	HFPS	Lecture	15/19	19.00 (3.20)	16.00 (3.70)	nd	nd
[25] Cardiac arrest	Nd	Laerdal SimMan®	Lecture	66/67	69.70 (12.20)	61.60 (13.70)	Independent t-test	<0.001
[26] Cardiac arrest	ACLS Mega Code Performance Score Sheet [AHA]	Laerdal SimMan®	Low-fidelity manikin	16/18	73.60 (17.70)	64.60 (15.60)	nd	nd
<b>Self-rated Satisfaction with simulation (n = 10, k = 13)</b>								



[6] Hypovolemic shock, Bradycardia, Pneumonia, Pulmonary edema	17-item Likert-type Satisfaction with Clinical Experience Simulation Scale (SCESS)	Laerdal Resusci Anne with iStan®	Laerdal Resusci Anne with VitalSim® (Medium-fidelity manikin)	49/36	89.37 (6.18)	84.88 (6.98)	nd	nd
[12] Respiratory failure	5-item Likert-type	Laerdal SimMan®	Web-based learning	10/10	24.6 (0.97)	19.3 (2.90)	Independent t-test	<0.0001
[14a] Bronchiolitis	18-item Likert-type Satisfaction with Simulation Experience Scale (SSE)	HFPS	Problem-based learning	62/69	4.17 (0.53)	4.67 (0.39)	nd	nd
[14b] Bronchiolitis	20-item Dichotomous	HFPS	Lecture	62/74	4.17 (0.53)	3.48 (0.62)	nd	nd
[15] Cardiac arrest	7-item Likert-type	Laerdal SimMan®	Laerdal VitalSim® (Medium-fidelity manikin)	45/44	4.58 (0.44)	4.50 (0.48)	nd	nd
[17] Hypervolemia, Pulmonary edema	18-item Likert-type Satisfaction with Simulation Experience Scale (SSE)	Laerdal SimMan®	MegaCode Kelly™ with VitalSim™ (Medium-fidelity manikin)	352/352	4.51 (0.37)	4.42 (0.42)	Independent t-test	0.546
[19] Pulmonary edema	9-item Likert-type [Otieno, 2007]	Laerdal SimMan®	Lecture	45/42	3.39 (0.42)	3.03 (0.36)	ANOVA	<0.001
[21a] Asthma exacerbation	17-item Likert-type Health Assessment Educational Modality Evaluation (HAEME)	HFPS	Role-play	14/16	40.86 (6.71)	46.38 (5.97)	nd	nd
[21b] Asthma exacerbation	17-item Likert-type Health Assessment Educational Modality Evaluation (HAEME)	HFPS	Standardized patient	14/14	40.86 (6.71)	41.00 (12.20)	nd	nd
[23] Cardiac arrest	5-item Likert-type	HFPS	Lecture	165/176	153/12	156/20	nd	nd
[28] Cardiac arrest	6-item Likert-type Open-ended Evaluation Instrument	Med Sim-Eagle	Lecture	13/10	2.85 (0.39)	2.85 (0.42)	Independent t-test	0.784
[30a] Cardiac arrest	1-item Likert-type	HFPS	Lecture	16/17	4.50 (0.73)	4.20 (0.75)	nd	nd
[30b] Cardiac arrest	1-item Likert-type	HFPS	Web-based learning	16/10	4.50 (0.73)	3.60 (0.52)	nd	nd
<b>Self-rated Self-confidence (n = 15, k = 18)</b>								
[2a] Pneumonia	Ad-hoc	METI™	Lecture	35/34	4.05 (0.48)	3.86 (0.53)	ANCOVA	0.034
[2b] Increased intracranial pressure	Ad-hoc	METI™	Lecture	35/34	3.37 (0.41)	3.56 (0.34)	ANCOVA	0.093
[3] Cardiac arrest	17-item [Arnold, 2009]	METI™ version 6	Static half-torso manikin (Low-fidelity manikin)	52/58	Student t = 3.91		Independent t-test	0.001
[4c] Intensive care	Likert-type	Laerdal SimMan®	No intervention	49/50	3.40 (0.80)	3.50 (1.00)	Mann-Whitney	0.819
[6] Hypovolemic shock, Bradycardia, Pneumonia, Pulmonary edema	26-item Likert-type Gains Perceived with High-fidelity Simulation Scale (GPHSS) [Baptista, 2013]	Laerdal Resusci Anne with iStan®	Laerdal Resusci Anne with VitalSim® (Medium-fidelity manikin)	49/36	80.73 (7.03)	78.73 (4.76)	nd	nd
[8] Cardiac arrest	34-item Confidence Level (CL) [Madorin, 1999]	METI™	Lecture	54/53	106.29 (19.71)	113.51 (17.87)	Independent t-test	0.09
[11] Preeclampsia	27-item Likert-type Nursing Anxiety and Self-Confidence with Clinical Decision-Making Scale (NASC-CDM)	HFPS	Laerdal vSim® (Medium-fidelity manikin)	42/42	115.25 (21.95)	104.89 (17.52)	Independent t-test	0.059
[14a] Bronchiolitis	27-item Likert-type	HFPS	Problem-based learning	62/69	3.57 (0.33)	3.69 (0.30)	nd	nd
[14b] Bronchiolitis	20-item Dichotomous	HFPS	Lecture	62/74	3.57 (0.33)	3.38 (0.44)	nd	nd
[18] Cardiac arrest	70-item Likert-type Nursing core competencies measurement tool [Lee, 2011]	Laerdal SimMan®	No intervention	23/26	256.47 (32.33)	247.26 (23.17)	Fisher's exact test	0.008
[19] Pulmonary edema	13-item Likert-type	Laerdal SimMan®	Lecture	45/42	4.06 (0.47)	3.82 (0.55)	ANOVA	0.011
[21a] Asthma exacerbation	17-item Likert-type Health Assessment Educational Modality Evaluation (HAEME)	HFPS	Role-play	14/16	3.50 (0.94)	4.31 (1.01)	nd	nd
[21b] Asthma exacerbation	17-item Likert-type Health Assessment Educational Modality Evaluation (HAEME)	HFPS	Standardized patient	14/14	3.50 (0.94)	4.21 (0.70)	nd	nd
[22] Intensive care	33-item Likert-type Nursing Competencies Questionnaire [Bartlett, 1998]	HFPS	Lecture	15/19	84.40 (1.20)	81.21 (2.70)	Mann-Whitney U test	<0.01
[23] Cardiac arrest	5-item Likert-type	HFPS	Lecture	165/176	146/19 *	136/40 *	nd	nd
[24] Intensive care	5-item Likert-type	HFPS	No intervention	64/31	20.31 (2.13)	18.65 (2.65)	Independent t-test	<0.001
[29] Heart failure, Pulmonary edema	3-item Likert-type [Ravert, 2004]	Laerdal SimMan®	No intervention	89/72	2.47 (0.86)	2.08 (0.97)	nd	nd
[33] Shock	34-item Likert-type [Madorin, 1999]	HFPS	Lecture	16/38	111.38 (16.27)	108.26 (14.55)	nd	>0.05
<b>Self-rated Self-efficacy (n = 4, k = 5)</b>								
[18] Cardiac arrest	28-question Likert-type Academic self-efficacy tool [Kim, 2001]	Laerdal SimMan®	No intervention	23/26	114.83 (13.90)	110.19 (13.15)	Fisher's exact test	0.167
[21a] Asthma exacerbation	17-item Likert-type Health Assessment Educational Modality Evaluation (HAEME)	HFPS	Role-play	14/16	18.79 (4.17)	21.63 (3.30)	nd	nd
[21b] Asthma exacerbation	17-item Likert-type Health Assessment Educational Modality Evaluation (HAEME)	HFPS	Standardized patient	14/14	18.79 (4.17)	19.50 (3.01)	nd	nd

[22] Intensive care	Likert-type General Perceived Self-Efficacy Scale (GPSES) [Schwarzer, 1997]	HFPS	Lecture	15/19	148.0 (14.80)	149.0 (10.76)	nd	nd
[27] Cardiac arrest	Resuscitation Self-Efficacy Scale [Roh, 2012]	Laerdal SimMan®	Laerdal Resusci Anne® (Low-fidelity manikin)	28/135	3.82 (0.39)	3.45 (0.58)	Independent t-test	<0.001

\*: no. of students with correct/incorrect outcome data.

Note: studies in the first column are labelled with the corresponding number exhibited in the previous 'Description of included studies'.

**Table D - List of study design feature checking (studies with allocation to interventions at the individual level)**

Items \ N	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]	[30]	[31]	[32]	[33]		
a1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y		
a2	Y	Y	Y	Y	Y	N	N	Y	N	N	N	Y	N	Y	Y	Y	Y	Y	Y	N	N	Y	N	Y	Y	N	Y	Y	Y	N	Y	Y	Y		
b1	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	Y	N	Y	N	N		
b2	Y	Y	Y	Y	Y	N	Y	N	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	N	Y	N	Y	N	Y	N	N	Y	N	Y	N	Y	Y		
b3	N	N	N	N	N	N	N	P	N	Y	N	N	N	P	N	N	N	P	P	Y	N	N	N	P	N	Y	P	N	N	N	N	N	N		
b4	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	
b5	N	N	N	N	N	N	N	P	N	N	N	N	N	P	N	N	N	P	P	P	N	N	N	P	N	P	P	N	N	N	N	N	N		
b6	N	N	N	N	N	N	N	P	N	N	N	N	N	P	N	N	N	P	P	N	N	N	N	P	N	P	N	N	N	N	N	N	N	N	
b7	N	N	N	N	N	N	N	P	N	N	N	N	N	P	N	N	N	P	P	N	N	N	N	P	N	P	N	N	N	N	N	N	N	N	
b8	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
c1	Y	Y	Y	Y	Y	Y	Y	P	Y	Y	Y	Y	Y	P	Y	Y	Y	P	P	Y	Y	Y	Y	P	Y	Y	P	Y	Y	Y	Y	Y	Y		
c2	Y	Y	Y	Y	Y	Y	Y	P	Y	Y	Y	Y	Y	P	Y	Y	Y	P	P	Y	Y	Y	Y	P	Y	Y	P	Y	Y	Y	Y	Y	Y		
c3	Y	Y	Y	Y	Y	Y	Y	P	Y	Y	Y	Y	Y	P	Y	Y	Y	P	P	Y	Y	Y	Y	P	Y	Y	P	Y	Y	Y	Y	Y	Y		
c4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
d1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
d2	P	P	P	P	P	P	P	Y	P	P	P	P	P	Y	P	P	P	Y	Y	P	Y	P	Y	Y	Y	P	Y	Y	P	Y	P	Y	Y		
	Q-RCT	Q-RCT	Q-RCT	Q-RCT	Q-RCT	RCT	Q-RCT	CBA	Q-RCT	NRCT	Q-RCT	Q-RCT	Q-RCT	CBA	Q-RCT	Q-RCT	Q-RCT	CBA	CBA	NRCT	Q-RCT	RCT	Q-RCT	CBA	Q-RCT	NRCT	CBA	Q-RCT	RCT	Q-RCT	RCT	Q-RCT	Q-RCT		

Notes: Was there a comparison: (a) [between two or more groups of participants receiving different interventions? (a1)], [within the same group of participants over time? (a2)]. Were participants allocated to groups by: (b) [concealed randomization? (b1)], [quasi-randomization? (b2)], [by other action of researchers? (b3)], [time differences? (b4)], [location differences? (b5)], [treatment decisions? (b6)], [participants' preferences? (b7)], [based on outcome? (b8)]. Which parts of the study were prospective? (c) [identification of participants? (c1)], [assessment of baseline and allocation to intervention? (c2)], [assessment of outcomes? (c3)], [generation of hypotheses? (c4)]. On what variables was comparability between groups assessed: (d) [potential confounders? (d1)], [baseline assessment of outcome variables? (d2)].

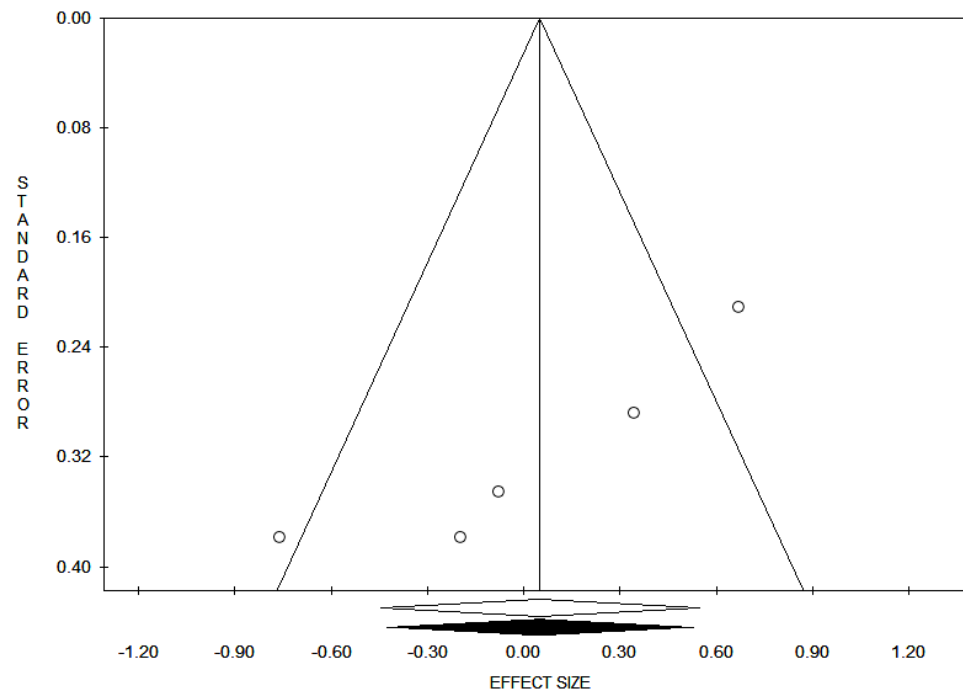
Y: yes; N: no; P: possible; RCT: randomized controlled trial; Q-RCT: quasi-RCT; NRCT: non-RCT; CBA: controlled before-after.

Note: studies in the first column are labeled with the corresponding number exhibited in the previous 'Description of included studies'.

Table E - Quality appraisal of included studies according to NICE checklist

Items N	1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	3.1	3.2	3.3	3.4	3.5	3.6	4.1	4.2	4.3	4.4	4.5	4.6	EV	IV	
1	-	-	-	+	++	-	-	+	++	+	+	-	+	-	+	+	+	+	+	+	-	-	-	+	+	-	+	
2	++	-	-	+	+	-	-	+	-	+	+	++	+	-	+	+	+	+	+	+	+	-	++	+	+	+	-	+
3	++	-	-	+	+	-	-	+	++	+	+	++	+	-	+	+	+	+	+	+	+	-	-	-	+	+	-	+
4	++	++	++	+	+	-	-	+	++	+	+	-	+	-	+	+	+	+	+	+	+	-	-	-	+	+	++	+
5	++	++	++	+	+	-	-	+	++	+	+	-	+	-	+	+	+	+	+	+	+	-	-	-	+	+	++	+
6	++	-	-	++	+	+	-	+	++	+	+	++	+	-	+	+	+	+	+	+	+	-	-	-	+	+	-	+
7	-	-	-	+	+	-	-	+	++	+	+	++	+	+	+	+	+	+	+	+	nr	-	-	-	+	+	-	+
8	++	+	+	-	+	-	-	+	++	+	+	++	+	-	+	+	+	+	+	+	+	++	++	+	+	+	+	+
9	++	-	-	+	+	-	-	+	-	+	+	++	+	+	+	+	+	+	+	+	+	++	++	+	+	+	-	+
10	-	-	-	+	+	-	-	+	++	+	+	++	+	+	+	+	+	+	+	+	nr	-	++	+	+	+	-	+
11	++	-	-	+	+	-	-	+	++	+	+	++	+	-	+	+	+	+	+	+	+	+	++	+	+	+	-	+
12	+	+	+	+	+	-	-	+	++	+	+	++	+	-	+	+	+	+	+	+	+	++	++	+	+	+	+	+
13	-	-	-	+	+	-	-	+	++	+	+	++	+	+	+	+	+	+	+	nr	++	++	+	+	+	+	-	+
14	-	++	++	-	++	-	-	+	++	+	+	++	+	-	+	+	+	+	+	+	+	-	-	-	+	+	++	+
15	-	+	+	+	+	-	-	+	++	+	+	-	+	-	+	+	+	+	+	+	+	-	++	+	+	+	+	+
16	-	-	-	+	+	-	-	+	++	+	+	++	+	-	+	+	+	+	+	nr	++	++	+	+	+	+	-	+
17	+	-	-	+	+	-	-	+	++	+	+	-	+	-	+	+	+	+	+	nr	-	++	+	+	+	+	-	+
18	-	+	+	-	+	-	-	+	++	+	+	++	+	-	+	+	+	+	+	+	+	++	-	-	+	+	+	+
19	+	+	+	-	++	-	-	+	-	+	+	-	+	-	+	+	+	+	+	+	-	-	-	-	+	+	+	+
20	+	-	-	-	++	-	-	+	++	+	+	++	+	+	+	+	+	+	+	nr	++	++	+	+	+	+	-	+
21	-	-	-	+	+	-	-	+	++	+	+	++	+	-	+	+	+	+	+	nr	++	++	+	+	+	+	-	+
22	-	-	-	++	++	+	-	+	++	+	+	-	+	-	+	+	+	+	+	nr	-	++	+	+	+	+	-	+
23	++	-	-	+	+	-	-	+	++	+	+	-	+	-	+	+	+	+	+	nr	-	++	+	+	+	+	-	+
24	-	-	-	-	+	-	-	+	++	+	+	-	+	-	+	+	+	+	+	nr	-	++	+	+	+	+	-	+
25	++	+	+	+	+	-	-	+	++	+	+	++	+	+	+	+	+	+	+	nr	++	++	+	+	+	+	++	+
26	++	-	-	-	+	-	-	+	++	+	+	++	+	-	+	+	+	+	+	nr	-	++	+	+	+	+	-	+
27	++	++	++	-	+	-	-	+	++	+	+	++	+	-	+	+	+	+	+	+	-	-	-	+	+	++	+	
28	-	+	+	+	++	-	-	+	na	+	+	++	+	-	+	+	+	+	+	+	++	++	+	+	+	+	+	+
29	++	++	++	++	+	+	-	+	++	+	+	++	+	-	+	+	+	+	+	+	++	-	-	+	+	+	++	+
30	-	-	-	+	++	-	-	+	++	+	+	-	+	-	+	+	+	+	+	nr	-	++	+	+	+	+	-	+
31	++	+	+	+	+	+	-	+	++	+	+	++	+	-	+	+	+	+	+	+	+	-	-	-	+	+	++	+
32	++	-	-	++	+	-	-	+	++	+	+	-	+	-	+	+	+	+	+	nr	-	++	+	+	+	+	-	+
33	+	++	++	++	+	-	-	+	++	+	+	++	+	-	+	+	+	+	+	nr	++	-	-	+	+	+	++	+

na: not applicable; nr: not reported; EV: external validity; IV: internal validity.



**Figure 2 - Funnel plot for self-efficacy**