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# **BMJ Open**

## Entrustable professional activities in nursing education: a scoping review protocol

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Keywords:	EDUCATION & TRAINING (see Medical Education & Training), Protocols & guidelines < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, MEDICAL EDUCATION & TRAINING, PRIMARY CARE



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2 3	1	Entrustable professional activities in nursing education: a scoping review
4	2	protocol
5	3	
6 7 8	4	Nicholas Alexander <sup>1</sup> , Asja Maaz <sup>1</sup> , Harm Peters <sup>2</sup> , Jan Kottner <sup>1</sup>
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16	9	Corresponding author: Nicholas Alexander (nicholas.alexander@charite.de)
17 18 19	10	
20 21	11	ABSTRACT
22	12	Introduction: Entrustable Professional Activities were introduced in medical education more than 15 years ago.
23	13	Entrustable Professional Activities define units of professional practice that can be fully entrusted to sufficiently
24 25	14	competent professionals. Today, entrustable professional activities have been developed and implemented in many
26	15	health professions, as the concept is useful in bridging the gap between competency-based education and the daily
27	16	tasks health professions have to deal with in the workplace. While some evidence exists in medical education, the
28	17	role of EPAs in nursing education is not yet fully understood. Therefore, the overall aim of this scoping review is to
29	18 19	describe the current body of evidence regarding EPA implementation in nursing education.
30	20	<b>Methods and analysis</b> : A two-stage screening process will be used during the search phase, in order to screen retrieved abstracts and titles that focus primarily on the discussion of EPA in nursing education in all languages
31 32	20	within the last two decades. The electronic databases, OVID (Embase and PubMed combined), and EBSCOhost
32 33	22	(CINHAL and ERIC combined), as well as grey literature will be searched. The search period will be up until
34	23	31.12.2021. Data will be extracted according to study design, context (geographical location and type of nursing
35	24	program), details of EPAs mentioned (title, specifications, limitations, and competency domains), as well as
36	25	evidence of implementation, outcomes, and effect sizes.
37	26	Ethics and dissemination: Ethical approval is not required as this review will be using previously collected data.
38	27	Review findings will be published in a peer-reviewed journal and presented at scientific conferences.
39 40	28	
41		
42 43	29	STRENGTHS AND LIMITATIONS OF THIS STUDY
44	30	Scoping reviews are a helpful method to gauge the state of literature on a previously unknown
45	31	field of interest with broad review questions.
46	32	<ul> <li>The PRISMA extension for scoping reviews ensures rigorous methodological reporting and</li> </ul>
47 49	33	provides clear replication steps for others.
48 49	34	<ul> <li>It is possible that evidence may be missed due to the search strategy</li> </ul>
50	35	<ul> <li>Within scoping reviews critical appraisal on the quality of evidence is not planned</li> </ul>
51 52	36	
53 54	37	INTRODUCTION
55 56	38	Entrustable Professional Activities (EPAs) were introduced in medical education more than 15 years
50 57	39	ago. <sup>[1]</sup> EPAs define observable units of professional practice that can be fully entrusted to sufficiently
57 58 59 60	40	competent professionals in the workplace. <sup>[2]</sup> They require an integration of various competencies that

come from knowledge, skills, and attitudes accrued with achievable tasks that are not time-dependent, but have clearly defined beginning and end. These learned tasks closely resemble daily work tasks and help achieve a measurable synthesis of various competency roles that would otherwise be difficult to measure or observe.<sup>[2]</sup> In doing so, EPAs not only offer a way to integrate competency-based education in a given field, but they also provide trainees with the groundwork to master particular practices that they need upon graduation, while also helping curriculum developers identify and define the outcomes of their training programs. Furthermore, with EPAs, work-based tasks can be carried out by individuals across a spectrum of experience and do not exclude those who have just begun their training or those about to complete theirs. Each individual is adequately trusted to carry out tasks safely, according to a supervisory assessment by their trainers. EPAs can therefore standardize a means to transfer competencies from experienced supervisors/faculty to trainees in a clear, succinct form that is transparent for all parties, rather than following a general checklist of time-based achievements.<sup>[3]</sup> With such an innovation, the implementation of EPAs in medical education has resulted in a mass adoption across diverse health professions with clear training outcomes for trainees, supervisors and programs themselves<sup>[4, 5]</sup>. However, this innovation is not without its setbacks that could arise due to failure to include the experts with appropriate skills to balance the focus of broader versus finer details or not having a flexible enough environment to adapt and improve up the EPAs or the limited availability of literature on EPAs in highly-specific fields<sup>[6]</sup>. Nevertheless, the aforementioned challenges have not quelled the strong adoption over such a short time frame. Even though EPAs have gained popularity in many health professions, it is unclear how much has been proposed in this form for academic nursing programs. The most well-known of these are the Quality and Safety Education in Nursing project, which proposed two groups of competencies for nurses from undergraduate and postgraduate level education as proto EPAs<sup>[7, 8]</sup>; and the possible inclusion of EPAs in nursing curricula proposed by a think tank in 2014.<sup>[9]</sup> When developing higher education programs for nursing qualification, it is important to note that nursing trainees have to be fully equipped from the time they begin their professional careers to care for patients of various age groups, conditions, as well as in different settings.<sup>[4]</sup> In essence, the EPAs needed for nursing education need to account for a wide array of skills and competencies. Nursing educators, likewise, have to therefore constantly evaluate and improve their programs to help equip nurses with the skills and knowledge to practice safe and high-quality care in various settings.<sup>[7, 10]</sup> Up until recently, most nursing programs incorporated a time-based milestone checklist to assess the development and competencies of learners.<sup>[8]</sup> But not many have taken into account the evolving reflection and evaluation needed for the transference of competencies from supervisors to trainees.<sup>[11]</sup> As such, an up-to-date overview is needed to gain better insight into the current state of development and implementation of EPAs in nursing education programs. Therefore, this scoping review will be conducted. METHODS AND ANALYSIS The scoping review will follow the structure of the Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for Scoping Reviews (PRISMA-ScR) as well as the refined scoping review approach proposed by Levac et al.<sup>[12]</sup> The review will be conducted according to the following steps: 

1	90	Review questions						
2 3	91	The main aim is to d	escribe and to summarize the existence and possible effe	cts of EPAs in nursing				
4	92	education and empi	ical evidence supporting their use. Further objectives are	e to understand if such EPAs				
5	93	have been fully impl	emented in any educational programs or are only discuss	ed. Therefore, the specific				
6	94	review questions to be answered are:						
7 8	95	(1) Which EPAs have	(1) Which EPAs have been developed/proposed for nursing education?					
o 9	96	(2) Which EPAs have	been implemented in nursing education?					
10	97	(3) What is the empi	rical evidence supporting any effects of implementing EP	As in nursing education?				
11	98							
12 13	99	Information source	s and searches					
14	100	The following electronic databases will be searched: MEDLINE and EMBASE databases via OVID, CINAHL						
<sup>15</sup> 101 and ERIC via EBSCO host, as well as Google Scholar for grey literature. Search strategies we				strategies were developed				
16 17	102	and refined iteratively using free text keywords relating to nursing education and EPAs, which were						
17	103	combined by Boolea	n operators. If MeSH terms are available in databases, the	ese will also be used to				
19	104	include associated se	arch terms. All search strings are listed in table 1. In addi	tion, reference lists from				
20	105	relevant articles will	be screened for additional literature.					
21 22	106							
23	107	Table 1: Search strings for electronic databases (01.01.1995-31.21.2021)						
24 25		Databases	Searches	Number of hits				

Databases	Searches	Number of hits
Medline and	((entrustable professional activit* or epa or epas)	279 hits including
Embase combined	and (nursing education or nursing student* or	duplicates
search via OVID	nurs*)).ti,ab.	
ERIC und CINAHL	TI ( ("entrustable professional activit*" or epa or	17 hits including
combined search	epas) ) AND AB ( ("nursing education" or "nursing	duplicates
via EBSCOhost	student*" or nurs*) ) 🔨	
Google Scholar	("nursing education" OR "nursing student* OR	3570 hits
	nurs*) AND (entrustable professional activit* OR	
	epa OR epas)	
Eligibility criteria		

### 38 109 Eligibility criteria

Any articles or studies relating to EPAs and nursing will be considered addressing any of the review questions. Specifically, articles or studies should meet the following criteria 1) Publication period includes the first mention of EPAs up until 2021 (01.01.1995-31.21.2021) 2) Language: No language restrictions 3) Types of literature: All types of literature will be searched including but not limited to descriptive studies, interventional studies, and reviews 4) All academic nursing education fields including undergraduate, postgraduate, student nurses, nursing education, and Bachelor of Science in Nursing 5) EPAs must be mentioned either in the title or abstract. 

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## 50 118 Study screening and selection

Study screening will be conducted in a two-stage process. The first author will screen all databases and select the literature based on title and abstract, using the keywords and searches mentioned above. Duplicate screening will occur via a preselected settings in OVID, as well as EBSCOhost. Thereafter, all electronic results will be exported into EndNote reference manager and, if necessary, further deletion of duplicates will be done. 

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- with the first reviewer's screening.<sup>[13]</sup> Any articles that are not clearly considered eligible by both
  - reviewers will be discussed with a third reviewer.

Data charting and items 

Data extraction forms will be used to extract the relevant information and evidence. The data items are described in table 2.

Table 2: Data charting variables and domains relating to article description 

Item/domain	Description
Article details	
Year	Year of publication
Author/s	List of all authors
Publication type	Review, commentary, empirical study, other
Study design	If it is an empirical study, what design was used (descriptive, experimental)?
Geographical location	On which continent and in which country is the institution located?
Setting	Type of school/institute
Type of nursing	Is this an undergraduate, postgraduate, BSN or other type of academic
program	program?
EPA details	
EPAs characteristics	What are the listed EPAs and how are they characterized?
Title	Title of the EPA <sup>[2]</sup>
Specifications	Clear listing of what is included in the activity <sup>[2]</sup>
Limitations	Clear listing of what is excluded in the activity <sup>[2]</sup>
Most relevant competency domains	Refers to competency framework used to develop the EPAs <sup>[2]</sup>
Implementation	Were the EPAs that were proposed included in the local academic nursing program(s)? If so, when and how were they implemented?
Effects	If any effects are reported, which ones were described using which outcomes?
Evidence supporting effects	Effect sizes described in empirical studies

### Synthesis of results

Extracted information will be described qualitatively and using frequencies. Described EPAs will be summarized inductively into overarching domains. The number of proposed EPAs will be compared with the number of implemented EPAs per institution type and/or nursing program. Empirical evidence supporting effects of EPA use will be summarized and outcomes measuring effects will be listed. 

Patient and public involvement 

There was no involvement of the public or patients regarding the design of this scoping review. 

#### DISCUSSION

EPAs have gained popularity in medical and other health professions education programs. This scoping review will map the existing body of evidence about EPAs in nursing education. Review results will help to evaluate the current status of EPA dissemination and implementation. Innovations in education and 

1	147	curriculum development are needed, but it is also necessary to evaluate the impact of introducing new
2	148	concepts on programs and learning outcomes.
3	149	Like other aspects in evidence-based nursing education, it is of great interest to understand if EPAs can
4 5	149	also have positive effects on trainees, supervisors, as well as the curriculum. Some evidence suggests that
6	150	EPAs can be feasible as an effective work-based assessment tool in e-portfolios for both trainees and
7		•
8	152	supervisors. <sup>[14]</sup> This would suggest a great opportunity to help digitalize lots of paperwork and improve
9	153	the flexibility of assessment.
10 11	154	It also remains to be seen whether EPAs can have the same appeal throughout various nursing training
12	155	programs from undergraduate to postgraduate and if the implementation process can be easily adopted
13	156	by faculty in differing settings. If such evidence is missing, it is important to prioritize research in this
14	157	area in order to improve on patient safety and quality healthcare.
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19	159	ETHICS AND DISSEMINATION
20	160	An ethics approval is not required as this protocol will be using previously collected data. The application
21	161	of a transparent and rigorous search process means that future research on this topic can be replicated
22	162	and help guide other researchers in similar reviews, as well as inform new EPA implementations in
23 24	163	nursing programs.
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26	164	
27	165	Contributorship statement
28 29		
30	166	Conceptualisation and design of study: NA, JK, AM
31	167	Collected and reviewed data: NA, JK, AM
32	168	Wrote the manuscript: NA, JK, HP
33	169	All authors revised and approved the manuscript
34 35	170	
36	171	Funding
37		
38	172	This research received no specific grant from any funding agency in the public, commercial or not-for-
39	173	profit sectors.
40 41	174	
42	175	Competing interests None declared
43	176	None declared
44		None declared
45 46	177	
46 47	178	REFERENCES
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49	180	theory and clinical practice? Academic Medicine. 2007;82:542-7.
50	181	DOI: 10.1097/ACM.0b013e31805559c7
51 52	182	2. Ten Cate O, Chen HC, Hoff RG, et al. Curriculum development for the workplace using Entrustable
52 53	183	Professional Activities (EPAs): AMEE Guide No. 99. <i>Med Teach</i> . 2015; <b>37</b> :983-1002. DOI:
54	184	<u>10.3109/0142159X.2015.1060308</u>
55	185	3. Meyer EG, Chen HC, Uijtdehaage S, et al. Scoping Review of Entrustable Professional Activities in
56	186	Undergraduate Medical Education. Acad Med. 2019;94:1040-9. DOI:
57	187	10.1097/ACM.0000000002735
58 59	188	4. Al-Moteri M. Entrustable professional activities in nursing: A concept analysis. <i>Int J Nurs Sci</i> .
60	189	2020; <b>7</b> :277-84. DOI: <u>10.1016/j.ijnss.2020.06.009</u>
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1	190	5.	Ten Cate O, Taylor DR. The recommended description of an entrustable professional activity: AMEE
2	191		Guide No. 140. Medical Teacher. 2021:1-9. DOI: <u>10.1080/0142159X.2020.1838465</u>
3	192	6.	van Loon KA, Driessen EW, Teunissen PW, et al. Experiences with EPAs, potential benefits and
4	193		pitfalls. <i>Medical teacher</i> . 2014; <b>36</b> :698-702. DOI: <u>10.3109/0142159X.2014.909588</u>
5	194	7.	Wagner LM, Dolansky MA, Englander R. Entrustable professional activities for quality and patient
6	195		safety. Nurs Outlook. 2018;66:237-43. DOI: <u>10.1016/j.outlook.2017.11.001</u>
7	196	8.	Lau ST, Ang E, Samarasekera DD, et al. Development of undergraduate nursing entrustable
8 9	197		professional activities to enhance clinical care and practice. <i>Nurse education today</i> . 2020; <b>87</b> :104347.
9 10	198		DOI: <u>10.1016/j.nedt.2020.104347</u>
11	199	9.	Giddens JF, Lauzon-Clabo L, Morton PG, et al. Re-envisioning clinical education for nurse practitioner
12	200	5.	programs: themes from a national leaders' dialogue. <i>J Prof Nurs</i> . 2014; <b>30</b> :273-8. DOI:
13	200		10.1016/j.profnurs.2014.03.002
14	201	10	
15		10.	Anthamatten A, Pfieffer ML, Richmond A, et al. Exploring the utility of entrustable professional
16	203		activities as a framework to enhance nurse practitioner education. <i>Nurse educator</i> . 2020; <b>45</b> :83-7.
17	204		DOI: <u>10.1097/NNE.0000000000697</u>
18	205	11.	Keating S, McLeod-Sordjan R, Lemp M, et al. Evaluating Entrustable Professional Activities in a Nurse
19	206		Practitioner Readiness for Practice Simulation. The Journal for Nurse Practitioners. 2021.
20	207		https://doi.org/10.1016/j.nurpra.2021.01.003
21	208	12.	Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. Implement Sci.
22	209		2010; <b>5</b> :69. DOI: <u>10.1186/1748-5908-5-69</u>
23	210	13.	Lockwood C, Dos Santos KB, Pap R. Practical Guidance for Knowledge Synthesis: Scoping Review
24	211		Methods. Asian Nurs Res (Korean Soc Nurs Sci). 2019;13:287-94. DOI: 10.1016/j.anr.2019.11.002
25	212	14	Bramley A, Forsyth A, McKenna L. Design, implementation and evaluation of novel work-based
26	213		clinical assessment tool: An e-portfolio with embedded Entrustable Professional Activities. <i>Nurse</i>
27	214		Education Today. 2021; <b>107</b> :105101. DOI: 10.1016/j.nedt.2021.105101
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<b>Primary Subject Heading</b> :	Nursing
Secondary Subject Heading:	Nursing
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17	11	ABSTRACT
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20	13	Entrustable Professional Activities define units of professional practice that can be fully entrusted to sufficiently
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22	15	health professions, as the concept is useful in bridging the gap between competency-based education and the daily
23	16	tasks health professions have to deal with in the workplace. While some evidence exists in medical education, the
24	17	role of EPAs in nursing education is not yet fully understood. Therefore, the overall aim of this scoping review is to
25 26	18	describe the current body of evidence regarding EPA implementation in nursing education.
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32	24 25	nursing program), details of EPAs mentioned (title, specifications, limitations, and competency domains), as well as
33 34	25	evidence of implementation, outcomes, and effect sizes. <b>Ethics and dissemination</b> : Ethical approval is not required as this review will be using previously collected data.
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39		
40 41	30	<ul> <li>Scoping reviews are a helpful method to gauge the state of literature on a previously unknown</li> </ul>
42	31	field of interest with broad review questions.
43	32	<ul> <li>The PRISMA extension for scoping reviews ensures rigorous methodological reporting and</li> </ul>
44	33	provides clear replication steps for others.
45	34	<ul> <li>EPAs may help innovate nursing education by focusing on workplace-based practices and</li> </ul>
46 47	35	competency-based education
47	36	<ul> <li>It is possible that evidence may be missed if not indexed in the selected databases</li> </ul>
49	37	<ul> <li>Within scoping reviews critical appraisal on the quality of evidence is not planned</li> </ul>
50	38	
51		NTROPHOTION
52	39	INTRODUCTION
53 54	40	Entrustable Professional Activities (EPAs) were introduced in medical education more than 15 years
54 55	41	ago. <sup>[1]</sup> Since the introduction of competency-based medical education activities in the mid-90s and the
56	42	conceptualization of EPAs in the 2000s, medical educators have sought a means to propose clear steps
57	43	and pathways to guide trainees in competency-based medical education. <sup>[2]</sup> They can be defined as
58	44	observable units of professional practice that can be fully entrusted to sufficiently competent
59 60	45	professionals in the workplace. <sup>[3]</sup> Additionally, they require an integration of various competencies that
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1	46	come from knowledge, skills, and attitudes accrued with achievable tasks that are not time-dependent,
2	47	but have clearly defined beginning and end.
3	48	
4 5	49	These learned tasks closely resemble daily work tasks and help achieve a measurable synthesis of various
5	50	competency roles that would otherwise be difficult to measure or observe. <sup>[3]</sup> In doing so, EPAs not only
6		
7	51	offer a way to integrate competency-based education in a given field, but they also provide trainees with
8 9	52	the groundwork to master particular practices that they need upon graduation, while also helping
9 10	53	curriculum developers identify and define the outcomes of their training programs.
11	54	
12	55	Furthermore, with EPAs, work-based tasks can be carried out by individuals across a spectrum of
13	56	experience and do not exclude those who have just begun their training or those about to complete
14	57	theirs. Each individual is adequately trusted to carry out tasks safely, according to a supervisory
15	58	assessment by their trainers. EPAs can therefore standardize a means to transfer competencies from
16	59	experienced supervisors/faculty to trainees in a clear, succinct form that is transparent for all parties,
17	60	rather than following a general checklist of time-based achievements. <sup>[4]</sup>
18	61	Tather than following a general checklist of time-based achievements."
19 20		
20	62	Complete EPAs typically consist of the following elements, as proposed by ten Cate & Taylor <sup>[3]</sup> :
22	63	1. EPA Title: a short, precise description of the activity
23	64	2. Specification and limitations: the scope of conditions for fulfilling the activity and elements the trainee
24	65	is not yet qualified to undertake
25	66	3. Potential risks in case of failure: information for trainees and supervisors on what can possibly go
26	67	wrong
27	68	4. Most relevant competency domains: based on roles taken from competency frameworks for education
28 29	69	in each relevant health profession
29 30	70	5. Required knowledge, skills, attitudes and experiences: the tools and behaviors needed to allow for
31	71	summative entrustment
32	72	6. Information sources to assess progress and support summative entrustment
33	73	7. Entrustment / supervision level: stages of training at which trainee can be trusted to carry out tasks in
34		
35	74	direct or indirect supervision
36	75	8. Time period to expiration if not practiced: regular practice of EPAs is needed to ensure safety
37	76	
38 39	77	With such an innovation, the implementation of EPAs in medical education has resulted in a mass adoption
40	78	across diverse health professions with clear training outcomes for trainees, supervisors and programs
41	79	themselves <sup>[5, 6]</sup> . However, this innovation is not without its setbacks that could arise due to failure to
42	80	include the experts with appropriate skills to balance the focus of broader versus finer details or not having
43	81	a flexible enough environment to adapt and improve up the EPAs or the limited availability of literature on
44	82	EPAs in highly-specific fields <sup>[7]</sup> . Nevertheless, the aforementioned challenges have not quelled the strong
45	83	adoption over such a short time frame.
46	84	
47		Even though EPAs have gained popularity in health professions such as, dentistry, physiotherapy,
48 49	85	
50	86	pharmaceutical education and global health, it is unclear how much has been proposed in this form for
51	87	academic nursing programs. <sup>[8-13]</sup> The most well-known of these are the North American Quality and
52	88	Safety Education in Nursing project, which proposed two groups of competencies for nurses from
53	89	undergraduate and postgraduate level education as proto-EPAs; as well as the development of EPAs in a
54	90	Delphi study for application in nursing telehealth in the Netherlands. [14, 15]
55	91	
56	92	When developing higher education programs for nursing qualification, it is important to note that
57 50	93	nursing trainees have to be fully equipped from the time they begin their professional careers to care for
58 59	94	patients of various age groups, conditions, as well as in different settings. <sup>[5]</sup> In essence, the EPAs needed
60	95	for nursing education need to account for a wide array of skills and competencies. Nursing educators,

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1 2 3	96 97 98	likewise, have to therefore constantly evaluate and improve their programs to help equip nurses with the skills and knowledge to practice safe and high-quality care in various settings. <sup>[8, 16]</sup>
4	99	Up until recently, most nursing programs incorporated a time-based milestone checklist to assess the
5	100	development and competencies of learners. <sup>[9]</sup> But not many have taken into account the evolving
6 7	101	reflection and evaluation needed for the transference of competencies from supervisors to trainees. <sup>[17]</sup>
8	101	As such, an up-to-date overview is needed to gain better insight into the current state of development
9	102	and implementation of EPAs in nursing education programs. Therefore, this scoping review will be
10	103	conducted to investigate all published literature since the earliest mention of EPAs and whether any of
11	104	the results that reference any nursing education programs/settings have discussed or proposed any
12		
13 14	106	specific EPAs and their impacts on trainees and supervisors.
14	107	
16 17	108	METHODS AND ANALYSIS
18	109	The scoping review will follow the structure of the Preferred Reporting Items for Systematic Reviews and
19	110	Meta-Analysis extension for Scoping Reviews (PRISMA-ScR) as well as the refined scoping review
20	111	approach proposed by Levac et al. <sup>[18, 19]</sup> According to scoping review guidelines by the Joanna Briggs
21 22	112	Institute, the main Population/Concept/Context (PCC) elements for this review are defined as follows: <sup>[20]</sup>
23	113	Population: All learning settings such as schools, institutes, or educational clinics
24	114	Concept: Entrustable Professional Activities or competency-based education activities
25	115	Context: Any nursing education programs, including undergraduate, postgraduate, Bachelor of Science in
26	116	Nursing, and clinic-based programs
27 28	117	
29 30	118	Review questions
30 31	119	The main aim is to describe and to summarize the existence and possible effects of EPAs in nursing
32	120	education and empirical evidence supporting their use. Further objectives are to understand if such EPAs
33	121	have been fully implemented in any educational programs or are only discussed. Therefore, the specific
34	122	review questions to be answered are:
35 36	123	(1) Which EPAs have been developed/proposed for nursing education?
37	124	(2) Which EPAs have been implemented in nursing education?
38	125	(3) What is the empirical evidence supporting any effects of implementing EPAs in nursing education
39	126	programs?
40	127	
41 42	128	Information sources and searches
43		
44	129 120	A preliminary search on any existing scoping reviews relating to EPAs and nursing was conducted to
45	130	confirm that no duplicate work is undertaken for the scoping review. The following electronic databases will be searched: MEDLINE and EMBASE databases via OVID, CINAHL and ERIC via EBSCO host, as well as
46 47	131	
48	132	Google Scholar for grey literature. Search strategies were developed and refined iteratively using free
49	133	text keywords relating to nursing education and EPAs, which were combined by Boolean operators. If
50	134	MeSH terms are available in databases, these will also be used to include associated search terms. All
51	135	search strings are listed in table 1. In addition, reference lists from relevant articles will be screened for
52 53	136	additional literature.
54	137	
55		
56		
57 58		
50 59		
60		

	138	-		es (01.01.1995-31.21.2021)	
		Databases	Searches		Number of hits
		Medline and		sional activit* or epa or epas)	279 hits including
		Embase combined		ion or nursing student* or	duplicates
		search via OVID	nurs*)).ti,ab.		
		ERIC und CINAHL		ofessional activit*" or epa or	17 hits including
		combined search via EBSCOhost	epas) ) AND AB ( ("n student*" or nurs*)	ursing education" or "nursing )	duplicates
		Google Scholar		' OR "nursing student* OR able professional activit* OR	3570 hits
	139				
	140	Eligibility criteria			
	141	Any articles or studies	relating to EPAs and nu	rsing will be considered address	ing any of the review
	142	questions. Specifically	, articles or studies shou	Ild meet the following criteria:	
	143	1) Publication period i	ncludes the first known	mention of EPAs in 1995 up unt	il 2021 (01.01.1995-
	144	31.21.2021). 2) Langua	age: No language restric	tions. 3) Types of literature: All t	types of literature will be
	145	searched including but	t not limited to descript	ive studies, interventional studie	es, reviews. Opinions may
	146	also be included, as lo	ng as they have a clear i	mention of specific EPAs. 4) All a	cademic nursing education
	147	fields including under	graduate, postgraduate,	student nurses, nursing educati	on, and Bachelor of Scier
	148	in Nursing. Clinically-b	ased programs may also	b be included if they present any	EPAs used to train nursir
	149	students. 5) EPAs mus	t be mentioned either in	n the title or abstract.	
	150				
	151	Study screening and	l selection		
<ul> <li>30</li> <li>31</li> <li>31</li> <li>35</li> <li>36</li> <li>37</li> <li>38</li> <li>39</li> <li>30</li> <li>31</li> <li>31</li> <li>31</li> <li>31</li> <li>31</li> <li>31</li> <li>31</li> <li>32</li> <li>31</li> <li>32</li> <li>31</li> <li>31</li> <li>31</li> <li>31</li> <li>31</li> <li>32</li> <li>32</li> <li>32</li> <li>32</li> <li>31</li> <li>31</li> <li>32</li> <li>3</li></ul>					screen all databases and
	153 select the literature based on title and abstract, using the keywords and searches mentioned a				
	154		•	ed settings in OVID, as well as EB	
	155		•	te reference manager and, if ne	cessary, further deletion of
	156	duplicates will be don	е.		
	157				
	158			the full texts will be screened fo	
	159			ved articles and these will be cor	
	160		• •	cles that are not clearly consider	ed eligible by both
	161	reviewers will be discu	issed with a third review	ver.	
	162				
	163	Data charting and ite	ems		
	164	Data extraction forms	will be used to extract t	the relevant information and evi	dence. The data items are
	165	described in table 2.			
	166				
	167	Table 2: Data charting	variables and domains	relating to article description	
		PCC elements	Item/domain	Description	
			Year	Year of publication	
			Author/s	List of all authors	
			Publication type	Review, commentary, empirica	
			Study design	If it is an empirical study, what	design was used
				(descriptive, experimental)?	
			Geographical	On which continent and in whi	ch country is the
			location	institution located?	Para di Alta t
		Population	Setting	Type of school/institute/educa	itional clinic

	Context	Type of nursing	Is this an undergraduate, postgraduate, BSN or other	
		program	type of academic program/clinic?	
	Concept	EPAs	What are the listed EPAs and how are they	
		characteristics	characterized?	
		Title	Title of the EPA <sup>[3]</sup>	
		Specifications	Clear listing of what is included in the activity <sup>[3]</sup>	
		Limitations	Clear listing of what is excluded in the activity <sup>[3]</sup>	
		Most relevant	Refers to competency framework used to develop the	
		competency	EPAs <sup>[3]</sup>	
		domains		
		Implementation	Were the EPAs that were proposed included in the	
			local academic nursing program(s)? If so, when and	
			how were they implemented?	
		Effects	If any effects are reported, which ones were described	
			using which outcomes?	
		Evidence	Effect sizes described in empirical studies	
		supporting		
		effects		
168				
169	Synthesis of results			
170	Extracted information will be described qualitatively and using frequencies. Described EPAs will be			
171	summarized inductively into overarching domains. The number of proposed EPAs will be compared wi			

summarized inductively into overarching domains. The number of proposed EPAs will be compared with the number of implemented EPAs per institution type and/or nursing program. Empirical evidence supporting effects of EPA use will be summarized and outcomes measuring effects will be listed. 

#### Patient and public involvement

There was no involvement of the public or patients regarding the design of this scoping review. 

#### ETHICS AND DISSEMINATION

An ethics approval is not required as this protocol will be using previously collected data. Review findings will be published in a peer-reviewed journal and presented at scientific conferences.

### DISCUSSION

EPAs have gained popularity in medical and other health professions education programs. This scoping review will map the existing body of evidence about EPAs in nursing education. Review results will help to evaluate the current status of EPA development, dissemination and implementation in nursing education and to identify areas of future development. Innovations in education and curriculum development are needed, but it is also necessary to evaluate the impact of introducing new concepts on programs and learning outcomes. 

The reporting of this review will follow the PRISMA extension for scoping reviews, which will ensure that the review objectives are met and that the review steps can be replicated.<sup>[19]</sup> 

Even though rigorous reporting will be undertaken, it is possible that the search strategy may not be sensitive enough or that some keywords/mesh terms might be missing. This would lead to an incomplete evidence map. Furthermore, the risk of bias of research results and the quality of evidence will not be appraised. 

1	196	Like oth	her aspects in evidence-based nursing education, it is of great interest to understand if EPAs can	
2	197		ve positive effects on trainees, supervisors, as well as the curriculum. Some evidence suggests	
3				
4	198		As can be feasible as an effective work-based assessment tool in e-portfolios for both trainees	
5	199	and sup	pervisors. <sup>[22]</sup> This would suggest a great opportunity to help digitalize lots of paperwork and	
6	200	improv	e the flexibility of assessment.	
7	201			
8	202	It also r	remains to be seen whether EPAs can have the same appeal throughout various nursing training	
9				
10	203	programs from undergraduate to postgraduate and if the implementation process can be easily adopted		
11	204	by faculty in differing settings. If such evidence is missing, it is important to prioritize research in this		
12	205	area in order to improve on patient safety and quality healthcare.		
13	206			
14				
15	207	Contrib	putorship statement	
16	208	Conceptualisation and design of study: NA, JK, AM		
17	209			
18		Collected and reviewed data: NA, JK, AM		
19	210		the manuscript: NA, JK, HP	
20	211	All auth	ors revised and approved the manuscript	
21	212			
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23	213	Fundin	g	
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25	215	FMM2020-45 132).		
26	216			
27	210			
28	217	Competing interests		
29	218	There are no competing interests for any author		
30	219			
31	215			
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