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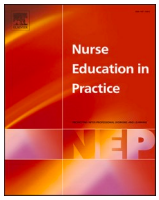

Effectiveness appraisal of interventions to increase retention of newly qualified nurses implemented in the final year of pre-registration programmes: A literature review

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ABSTRACT

Aim: To understand the effectiveness of interventions to increase retention of early career nurses, implemented during the pre-registration programme.

Background: Retention of nurses is an issue of global concern. The transition period spanning the final year of pre-registration nurse education programmes and the first year of qualified practice is a point of high risk for attrition from the profession.

Design: A systematic review without meta-analysis and a thematic synthesis of wider literature, reported using SWiM and ENTREQ guidelines.

Methods: A convergent segregated approach was used to capture qualitative and quantitative study designs. A systematic review of quantitative papers reporting intervention and retention data and scoping review of a wider body of literature related to interventions supporting transition to qualified practice were conducted. Searches used Medline and CINAHL databases in October 2021. Data extracted from wider literature were inductively collated into themes relating to the intervention type and synthesised.

Results: Six papers were included in the systematic review and 27 papers were included in the scoping review. Interventions included internships, externships, clinical immersion programmes, capstone projects, preceptorships and psychological wellbeing programmes. There was a lack of consensus about the benefits of implementing interventions during the final year of pre-registration programmes, but some evidence that interventions incorporating preceptors, expose students to the clinical environment and involve academic/clinical collaboration, report positive outcomes related to transition to qualified practice, which potentially has an impact on motivation to stay in the profession.

Conclusion: Greater understanding of interventions supporting student nurses to reduce likelihood of leaving once qualified has been achieved. There is some evidence these interventions lead to increases in retention, but this is limited by the quality of the reporting and the scarcity of data. Consideration should be given to maximizing students' exposure to clinical practice and the benefits that interventions with alternative approaches such as psychological wellbeing programmes may bring. This review has potential to influence effective implementation of interventions to increase retention of early career nurses if clinical practice and academic settings review proposed or actual interventions to maximise added value.

Reporting method: the manuscript has been written in adherence with the EQUATOR guidelines following the SWiM reporting guidelines for the systematic review and the ENTREQ guidelines for the scoping review.

1. Introduction

The retention of nurses and in particular the retention of those in their first year of practice after qualification, has been an issue of global concern for many years. Across high- and middle-income countries, the forecast deficit of nurses in the workforce over the forthcoming decade has focused attention on the need to develop interventions that support nurses to stay in their role and in the profession.

There is widespread recognition that the transition period spanning the final year of an undergraduate nurse education programme and the

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first year of qualified practice is a point of high risk for attrition from the profession (Wray, et al., 2021). The first year after qualification is a time when nurses are vulnerable to some of the individual level determinants of turnover such as stress and burnout, job dissatisfaction and lack of commitment (Halter, et al., 2017; Flinkman and Salanter 2015).

Review of evidence shows that the work environment has a causal relationship with retention (Mills, et al., 2017; Duffield, et al., 2009; Laschinger, 2012) and as such plays a significant role in career choices. The influence of work environment (Camveren, et al., 2020; Mills, et al., 2017), including workload, work-life balance, shortage of nurses (D'Ambra and Andrews, 2014) and the difference between expectation and reality (Camveren, et al., 2020; Duchscher, 2009) are highlighted as areas that affect nurses in this career stage. New nurses are particularly influenced, especially if they perceive there to be poor clinical practice and patient care (Flinkman and Salanter 2015), which may cause them moral distress and lead to outcomes such as burnout, dissatisfaction and intention to leave (Aiken, et al., 2012). Conversely, positive practice environments are associated with retention (Dawson, et al., 2014) and new nurses who can engage with high quality patient care, hospital decision-making, effective multi-professional relationships and supportive leadership (Twigg and McCullough, 2014), are more likely to settle into the workplace environment and have fewer transition-related concerns (Kramer, et al., 2013).

The challenges that newly qualified nurses face have been attributed in part to the phenomenon of transition shock (Duchscher, 2009), where newly qualified nurses struggle to assimilate the reality of their new roles and work environment with their expectations, potentially in the context of low self-efficacy. Transition shock highlights the contrast between the familiarity of the academic environment and the new roles, responsibilities and relationships of the qualified practice setting. In addition to environmental factors, individual factors influence the extent of transition shock and in turn the intentions of a newly qualified nurse to remain in their role or the profession. The impact of the role of mentors and preceptors in mitigating transition shock is also recognised (Chen, et al., 2021; Su, et al., 2021; Powers, et al., 2019). The behaviour of clinical educators is important, as access to social support systems established in higher education may be lost in the transition to qualified nurses (Ankers, et al., 2018). The preceptor or mentor role is also pivotal in the socialisation of the students or newly graduated nurses into the profession.

Issues with an impact on transition shock and consequently, retention of early career nurses, therefore need to be addressed. Early career has been the focus of much international research and there is growing understanding of the factors that influence transition (Kenny, et al., 2021; Van Rooyen et al., 2018) but there is little robust evidence of the impact interventions to enhance transition have on retention (Wray, et al., 2021). Broadly speaking, focused initiatives fall into two categories: those implemented during the undergraduate nursing education programme, with the intention of reducing the likelihood of leaving once qualified and those implemented in the first few months or year after graduation, with the intention of retaining newly qualified nurses in their role or the profession. Interventions implemented in the first year of qualified practice are well documented (Brook, et al., 2019) but less is known about the benefits on retention of implementing interventions in the final year of undergraduate programmes to better equip student nurses for their transition. Interventions in this period can be categorised according to one of six descriptors that broadly indicate the type of intervention implemented. These categories are capstone project; internship; externship; preceptorship; clinical immersion programme; psychological wellbeing programme; and other.

The intervention types differ in their content and delivery but all aim to ease the transition from student to practitioner. This is achieved by either supporting learners with a mentor or preceptor, immersing them in the clinical environment to enhance opportunities for learning and socialising into the profession, developing critical thinking and practical nursing skills, or providing strategies to relieve stress and enable coping mechanisms in the face of challenging situations. Interventions may be implemented jointly between the Higher Education Institute and the Healthcare organisation, by the prospective employer, or the higher education institute independently. All interventions attempt to increase student competence, confidence and perception of self-efficacy (Cowin and Hengstberger-Sims, 2006) so they feel better prepared to enter the qualified workforce. Advantages related to retention are less easily articulated and benefits are primarily associated with easing the transition from student to accountable practitioner. Intervention categories do not have strict boundaries and interventions assigned to each category vary in characteristics, duration, content and delivery mechanism.

1.1. Aims

This literature review was conducted to understand what interventions targeted student nurses with the goal of reducing likelihood of leaving their role once working as early career nurses, what the interventions tried to do and what evidence there was of intervention success. The review aimed to answer the question: what is the effectiveness of interventions to increase retention of early career nurses, when implemented during the undergraduate programme?

2. Method

A convergent segregated approach was undertaken to capture both quantitative and qualitative research designs (Stern, et al., 2021). The review was conducted in two stages, a systematic review of papers that included pre-post retention data, resulting in a synthesis without meta-analysis; and a scoping review of a wider body of literature that did not include pre-post retention data and therefore did not measure effectiveness, but was useful to inform understanding of the subject. Conclusions were drawn from the integrated body of evidence. The systematic literature review undertaken is reported, aligned to the SWiM reporting guidelines (Campbell, et al., 2020), followed by a thematic synthesis of the wider literature, reported according to the ENTREQ guidelines (Tong, et al., 2012).

2.1. Eligibility Criteria

Studies eligible for the systematic review were peer-reviewed journal articles published in the English language between 2001 and 2021. Studies were included in the systematic review if they reported primary research on interventions implemented during the final year of a pre-registration nursing programme, were designed to increase retention of early career nurses and reported retention data over at least two points. Studies that did not report retention data were included in the thematic review.

2.2. Search strategy

Search terms were based on a PICO structured question, focusing on pre-registration nursing students (Population), implemented in the final year of pre-registration programmes (Intervention) and increased retention of early career nurses (Outcome). Groups of search terms were used and then combined using the Boolean operators AND and OR including: (retention, attrition, turnover, transition, qualify, qualification, progress, progression) AND (student, trainee, graduate) AND nurs* AND (program*, project, intervention). All terms were used in each database.

2.3. Data sources

Medline and CINAHL were searched, due to the relevance of the database content description. The reference lists of relevant systematic reviews were used to identify further studies. Searches were conducted between August 2021 and October 2021.

2.4. Study selection and data extraction

Duplicate papers were removed, and studies were screened against the inclusion and exclusion criteria for eligibility, based on the abstract and title. Uncertainty about eligibility was resolved by reading full text papers and discussion between two authors (JB and LA). Full papers for all tentatively included studies were downloaded and scrutinised using a specifically created screening tool to confirm the studies met the inclusion criteria.

Eligible studies were subjected to data extraction and synthesis. Papers addressed issues of retention and reported quantitative data on at least two occasions for comparison. Studies that did not meet the inclusion criteria but were of relevance to the topic were included in the thematic synthesis. These papers addressed issues of transition and/or retention and reported qualitative data on student experience, or quantitative retention data with no comparison group. Papers in the systematic review were quality appraised and reported as a quantitative report of retention data.

2.5. Quality appraisal

Systematic review papers were quality appraised using the Joanna Briggs Institute checklist for quasi-experimental studies. Each paper was awarded a quality assessment score by adding the total number of positive responses. No paper was excluded based on the quality assessment score, but this information informed the critical discussion. Studies only included in the thematic synthesis were not quality appraised, due to the heterogeneity of the literature selected.

2.6. Data extraction

A data extraction spreadsheet was used to extract relevant information from the eligible studies. This included: 1) author and year; 2) country of study; 3) study design and methods; 4) study objectives; 5) intervention used; 6) participant sample size and characteristics; 7) outcome measures; 8) retention data; and 9) other outcomes.

2.7. Data synthesis

Key features and findings of included studies were reviewed and iteratively discussed by the authors to establish the structure of the synthesis of the study findings. Due to the heterogeneity of the studies and the nature of the question, meta-analysis was not performed. Instead, a quantitative summary of the effect of the different interventions on retention was conducted. Details of included studies is presented in Tables 1 and 2.

Retention data were used to guide comparison between studies. The change in retention was calculated by subtracting the pre-intervention/comparison group data from the post-intervention/target group data. Retention data are presented as a percentage, as this was a common method of presentation in all papers included in the systematic review. Detail of control group sample size was not present in all papers, which limited the potential to present source data. Data extracted from papers included in the thematic synthesis were inductively collated into themes relating to the intervention type by one author (JB) and then synthesised.

3. Results

A total of 1744 papers was identified through database searches and an additional 13 papers were found from the reference lists of identified studies. After removing duplicates and applying eligibility criteria to abstract and title, 179 papers remained for full text assessment. A further 146 papers were excluded, leaving 33 papers for inclusion in the review, 6 papers that met the criteria for the systematic review and 27 papers that met the criteria for the thematic synthesis. Fig. 1 illustrates the study selection process in the form of a PRISMA flowchart (Moher, et al., 2009). Included studies are outlined in Tables 1 and 2, including turnover and retention data where present and additional findings for the 33 studies.

3.1. Critical appraisal

All six papers were appraised using the Joanna Briggs Institute checklist for quasi-experimental studies. Out of a potential score of nine for quasi-experimental studies, one study scored seven, three scored between four and six and two studies scored three. The low appraisal scores were influenced by an absence of information. Only one study (Tseng, et al., 2013) reported how retention was calculated. In all six studies, the cause and effect were clear, and a control or comparison group was identified. Three of the six studies provided detail about the similarity of participants in comparison groups but only two of the six studies reported more detail about the comparison groups, making it difficult to ascertain their experience outside of the intervention. Two studies reported details of follow up. Quality appraisal scores are detailed in Table 1.

3.2. Study characteristics: systematic review papers

Five of the six studies included in the systematic review were conducted in USA and one in Taiwan. The study settings consisted of acute hospitals or medical centres, with one specified as a paediatric hospital (Cantrell and Browne, 2006). One intervention was delivered in a university School of Nursing (Meyer, et al., 2017) and one was delivered as a partnership between a hospital and a local university (Trice, et al., 2007). Five studies provided data on the number of nurses taking part in the intervention and sample sizes ranged from 19 to 193, with a median of 60.5 (IQR 38.5). Retention was reported in all six studies.

3.3. Systematic review findings

Five of the six studies described outcomes of externship programmes, implemented either prior to a post-qualification residency programme or internship, or in isolation. One study (Tseng, et al., 2013) used students undertaking an externship as a comparison group to explore the effect of a corporate academic cooperation programme. The sixth study (Meyer, et al., 2017) implemented a revised undergraduate curriculum, incorporating changes that focused on transition to practice in the final year of the programme.

The effect of externships on retention was mixed. Three of the five studies demonstrated an increase in retention of participants in externships compared with the comparison groups. One study (Kropkowski, et al., 2008) also calculated a financial saving for every 10 nurse externs that remained at the hospital for 1 year, due to lower requirement for agency nurses and a decreased length of orientation for externs who went on to work in the same area. Trice, et al., (2007) found positive changes in the demographics of the clinical area over the period of the externship implementation, including a reduction in average age of nurses in the centre compared with the national average and a higher level of academic qualification in relation to the rest of the hospital.

Two of the studies focusing on externships reported negative outcomes. Friday, et al., (2015) found that the non-extern comparison group had higher retention rates, with increased difference between the two groups at 12 months post qualification. The authors concluded that consideration should be given to the cost-effectiveness of providing an externship in addition to a post-graduate residency programme as the combination did not necessarily improve new nurses' perceptions of support, job satisfaction, or retention rates. Tseng, et al., (2013) compared an externship programme with a Corporate Academic Cooperation Programme (CACP), a programme of study and practical experience that is planned and delivered jointly by academics and healthcare organisation staff. Over time, the retention rate in the CACP group was

Table 1
Systematic review studies: quantitative synthesis of retention data (n = 6).

Author, Year & Country	Design	Sample Size for retention /turnover	Quality Score	Intervention	Duration of intervention	Main Findings in relation to retention and turnover	Additional Findings
Cantrell and Browne, (2006), USA	Non-equivalent control group posttest only	193 newly graduated nurses who had undertaken the externship (intervention group) Control group size not clear – all graduates who did not undertake the externship	4/9	Summer nurse externship program	10 weeks	**3% increase in retention compared with comparison group at 12 months** Of the 193 nurses who completed the externship, 153 accepted a graduate nurse position at the institution Intervention group vs Control group (graduate nurses who did not do an externship; 1998–2003) Average turnover from 1998 to 2003 for externs was 22.83 Institution wide average turnover from 1998 to 2003 for qualified nurses was 14% The intervention group had higher average turnover than the wider hospital workforce, but this decreased from 44% to 5% over 6 years of the externship.	None reported.
Friday, et al. (2015), USA	Non-equivalent control group posttest only	20 newly graduated nurses who had undertaken the externship and residency program (intervention group) 40 newly graduated nurses who just undertook the residency program (control group)	5/9	Pre-licensure extern program and post licensure residency program	Unclear	**4% decrease in retention at 1 year and 14% decrease at 2 years compared with non-extern group.** Overall retention on residency program was 95% at 1 year and 85% at 2 years. For the extern group 1 year retention rate was 92% and the 2 year rate was 77%. The non-extern group 1 year retention rate was 96% and the 2 year rate was 91%. Retention rate for extern group was higher than national average but dropped to 68% at 30 months.	Participants were also surveyed for five additional factors: support, patient safety, communication /leadership, professional satisfaction and job satisfaction, using the Casey-Fink Nurse Experience Survey. The results showed no statistically significant difference between those who attended the externship and the residency programme and those who just attended the residency programme.
Kropkowski and Most, (2008), USA	Non-equivalent control group posttest only	49 students over 4 years undertook the externship (intervention group) Control group size not clear – all graduates who did not undertake the externship	3/9	Extern program for senior nursing students	Up to 1 year	**34% increase in retention at 1 year compared with non-externs** 80% of the nurse externs took full-time nursing positions in the hospital in the first year and 75% of the first group of nurse extern graduates remain employed 2 years later. 88% of the 49 externs who completed the program between 2004 and 2008 have been recruited to positions in the hospital. The 1-year average nurse extern retention rate is 86%. By comparison, 52% of the new graduates who weren't nurse externs and hired in the same	Saving of $228,915 for 10 nurse externs that remain at the hospital for 1 year, due to elimination of agency nurses and decreased orientation. Qualitative survey feedback: • Enhanced experiences encountered in school. • All externs viewed the program as a means of providing a stronger clinical knowledge base as a new RN. • All externs would recommend the program to classmates. • Most externs learned the importance of role delineation. • Externs received superior technical and behavioural ratings in the second year of the program.

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Table 1 (*continued*)

Author, Year & Country	Design	Sample Size for retention /turnover	Quality Score	Intervention	Duration of intervention	Main Findings in relation to retention and turnover	Additional Findings
						year currently remain employed.	• Program assists them in assessment, documentation and time management while improving self-confidence. • Learning unit expectations, policies and procedures prepares them for the career decisions they must make on graduation.
Meyer, et al. (2017), USA	Non-equivalent control group posttest only	53 students undertaking the revised education programme (intervention group) 61 students who undertook the traditional education programme (control group)	6/9	Curriculum revision for final year students, including additional simulation, quality improvement course, transition to practice course. and a nursing immersion practicum	Up to 1 year	**At 6 months, 11% increase in retention compared with comparison group. At 12 months, 6% decrease in retention compared with comparison group (not statistically significant).** At 6 months, 29 members of the control group (70%) were in the same job and 5 (12%) had changed jobs (7 participants had no job at the time of the 3-month survey). For the experimental group, 36 individuals (81%) were in the same job they had 3 months before, whereas 3 (6%) had changed jobs (5 participants had no job at the time of the 3-month survey). At 12 months, 34 respondents from the control group (88%) and 37 of those in the treatment group (82%) were in the same job they had at 6 months.	Participants were also surveyed using the Casey-Fink Nurse Experience Survey. The participants in the treatment group reported higher professional satisfaction than those in the control group (P =.005). At 3 months postgraduation, participants from the new curriculum were more likely to recommend nursing to others, indicated higher professional satisfaction and were more likely to state that they were glad they chose nursing as a career. Graduates who left their positions before 12 months had lower overall Casey-Fink scores at 3 months than those who stayed in their same jobs 12 months postgraduation. By 12 months postgraduation, there was no significant difference between the 2 groups when looking at both their educational satisfaction and Casey-Fink transition-to-practice scores. From 3 months, the practice environment may be the most influential factor for both professional satisfaction and positive transition to practice.
Trice et al. (2007), USA	Non-equivalent control group posttest only	38 newly graduated nurses who had undertaken the externship (intervention group) 28 newly graduated non-extern nurses (control group)	3/9	Summer extern program	12 weeks	**Increase in retention of 21% over first two years compared with non-extern group.** The major reasons for nurse attrition are pregnancy and the transfer of a spouse to a different location.	The average age of the nurses in the OR at the medical centre is 37 years, compared with a national average age of 48–49 years. Of the perioperative nursing staff members, 60% have a minimum of a baccalaureate degree compared with 40–45% of nurses in the rest of the hospital. Staff members and physicians have become more committed to the success of the student externs and interns.
Tseng, et al. (2013), Taiwan	Non-equivalent control group Pretest posttest	19 student nurses completing the externship (comparison) 24 student nurses completing the corporate academic cooperation program (intervention)	7/9	Corporate-academic cooperation program (CACP) and externship program (EP)	Externship: 4 weeks plus additional study CACP: 4 weeks plus additional study jointly delivered by academics and practitioners	**39% increase in retention for CACP group compared with externship at 3 months and 37% higher at 1 year.** The retention rate declined over time in both groups. Three months and 1 year after beginning	Also surveyed using the 6-dimension scale for nursing competence (Schwirian, 1978). The CACP group achieved significantly higher scores than the EP group following practicum training across all 6 subscales.

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Table 1 (*continued*)

Author, Year & Country	Design	Sample Size for retention /turnover	Quality Score	Intervention	Duration of intervention	Main Findings in relation to retention and turnover	Additional Findings
						employment, the retention rates were 52.6% and 42.1% for the externship group and 91.7% and 79.2% for the CACP group, respectively. Over time, the retention rate in the CACP group was significantly higher than that in the externship group	

significantly higher and students who participated in the CACP group achieved a statistically significant improvement in nursing competence, compared with those in the extern group. However, the group numbers were small, which has an impact on the generalisability of the findings.

The final study (Meyer, et al., 2017) considered the effect of changes to the undergraduate nursing programme on transition to practice and measured retention rates, job satisfaction and graduate experience. At six months, the authors found an 11% increase in retention compared with comparison group, but at 12 months, there was a (non-statistically significant) 6% decrease in retention compared with comparison group.

Overall, the six studies reported varied outcomes, making inferences difficult to draw. Although all six studies reported retention data, the variation in sample size means that the percentage provides a limited illustration of effect size across studies.

The review of these studies does not indicate consensus about the benefits of implementing interventions during the final year of the pre-registration programme with the aim of increasing early career nurse retention. Although five of the papers reported outcomes on externships, two of those papers reported negative or less positive outcomes for retention. It was therefore important to explore the wider literature to understand the potential benefits of implementing interventions at this point in the transition from student to qualified practitioner.

3.4. Thematic synthesis study characteristics

Twenty-seven studies were included in the thematic synthesis. The studies were conducted in a range of countries, with most (n=12) from the USA. Other sources were Australia (n=3), United Kingdom (n=3), Canada (n=3), New Zealand (n=1), Hong Kong (n=1), Italy (n=1), Pakistan (n=1), Colombia (n=1) and Taiwan (n=1) (Table 2).

The interventions were provided by or implemented in acute hospitals or medical centres, often working in partnership with a university or school of nursing to implement the interventions. Seven of the studies described the primary setting as an acute hospital with no mention of partnership with academic organisations and one (Pullon, et al., 2016) was conducted in a rural area of high need, which may or may not have been an acute hospital setting. Nine of the studies reported the intervention setting to be both an acute setting and a university or school of nursing. The remaining ten papers described the setting as the university or school of nursing, with no mention of partnership with healthcare organisations. As there is disparity in the arrangements for clinical practice between programmes of study for nurses in different countries, it is difficult to ascertain the level of partnership the school of nursing or university may have with the acute hospital setting.

The papers described studies using qualitative (n=13), quantitative (n=11) and mixed methods (n=3). Sample size was described in nine studies and ranged from 22 to 111, with a median of 82 (IQR 42).

3.5. Thematic synthesis findings

In this group of papers, five of the studies reported retention without a comparison group or pre-post data. All five studies reported increased retention following the interventions, but this was based on as few as two early career nurses, or unsupported by data.

The findings were themed according to intervention type, with consideration of key findings related to transition to practice. All studies aimed to ease transition from student to qualified practitioner and deemed relevant to the aims of the review due to the influence that transition has on decisions to stay or leave the role or profession (Wray, et al., 2021).

3.6. Externships

Four of the papers reported interventions described as externships, all four were conducted in the USA. Two of these reported different aspects of the same research study (Cantrell, et al., 2005; Cantrell and Browne, 2005), which is also reported by one of the papers in the systematic review (Cantrell, et al., 2006). Their quantitative results indicate no support for the hypothesis that participating in the externship made a positive difference to job satisfaction, sense of belonging, professionalism, or role socialisation. However, qualitative findings support the benefit of externships for providing a clear and realistic understanding of the complexities of nursing care and the healthcare environment and the responsibilities inherent in the role. The authors suggest that this provoked anxiety for participants about the process of transition from student to qualified nurse, which had an impact on their confidence.

Gregory, et al., (2014) reported the implementation of a perioperative externship for senior undergraduate nurses. Students felt high levels of satisfaction, better prepared for their nursing career and learned about assessment, patient safety, teamwork and advocacy. In addition, increased interest from new graduates in perioperative nursing led to decreased agency nurse spend and a decrease in the average age of nurses in the clinical area. Positive benefits of externships are attributed to gaining critical thinking skills (Starr and Conley, 2006). Recognition as a team member was perceived as a major benefit by participants, which in contrast to findings from Cantrell and Browne (2005), increased self-confidence and decreased stress.

One additional paper (Courtney, 2005) describes a perioperative externship implemented in Colombia as a precursor to a pre-graduation internship. This described increased confidence when providing care to surgical patients and decreased costs associated with orientation and training once students were employed in the area. Due to the combination of internship and externship it is not possible to determine which had the greater influence.

3.7. Clinical immersion programmes

Eight of the papers report interventions described as clinical immersion programmes.

Three of the studies aimed to increase knowledge, interest and recruitment to perioperative or high dependency nursing and reported successes with recruitment. In addition, Frotjold, et al., (2007) found

Table 2
Studies included in narrative synthesis (n=27).

Author, Year & Country	Design	Intervention	Duration of intervention	Number of people undertaking intervention	Sample size	Findings in relation to retention and turnover	Additional findings
Courtney, T. 2005, Colombia	Qualitative descriptive evaluation	Extern / intern programme in OR dept.	Externship: 140 clinical hours plus classroom teaching Internship: 2 ×80 hours of teaching	9	9	6 out of 9 students were retained (no comparison data)	Students reported greater confidence and decreased levels of uncertainty when providing care to surgical patients. Reduced costs associated with orientation and training.
Dela Cruz F,A., Farr, S., Klakovich M, D., Esslinger P. 2013, USA	Pre and post quasi experimental Cohort study	SCAN programme (Second Careers and Nursing Programme) - includes a 300-hour internship	300-hour internship and other aspects	242 students over 9 cohorts	68 out of 74 students from cohorts 1–4	92% of students who completed the prelicensure phase worked as RNs and 88% proceeded to the program's graduate phase. All students from cohorts 1–4 found RN jobs, most in the hospitals where they spent their 300-hour internship.	Employers rated students as highly competent on communication skills and ethical and moral decision making.
Messina, B.A., Ianniceiello, J.M. and Escallier, L.A. 2011, USA	Descriptive survey evaluation	Introductory operating room experience for senior students and capstone course	2-week introduction and 15 weeks capstone practicum	Not clear – 7 on first course but subsequently more	Not clear	2 students from first 15-week course were hired on graduation. 8 nurses from the 15-week program have been hired over 3 years. 7 remain in employment in OR	Students enjoyed providing emotional support and education to patients, the structured OR environment and honed their communication and technical skills. The institution saved $264 in nurse recruitment costs and the facility saved $288 through not needing to re-interview applicants.
Bay, E., Sherzer, A., Darnbrook, E. 2018, USA	Qualitative case study	Capstone immersion course in critical care	15 weeks, 260 clinical hours	80 students per semester	Not clear	Not clear	90% of students achieved their leading career choice.
Broad, P. Walker, J., Boden, R. and Barnes, A. 2011, UK	Qualitative case study	Pre-registration transition module-partnership between the university and the trust.	Not clear	2 cohorts of students (not clear the size of the cohort)	Not clear	Not measured	Students felt more confident embarking on their new role, particularly around medicines management, planning, organisation and prioritisation of patient care.
Callaghan, D., Watts, W., McCullough, D., Moreau, J., Little, M., Gamroth, L. and Durnford, K. 2008, Canada	Retrospective, cross-sectional study	Collaborative Learning Unit and Preceptorship	Not clear but possibly one year	Not clear	37 (32% response rate) responded re CLU; 22 engaged with both models.	Not measured	Each model enhanced professional development and practice competence. CLU model: valued working with many nurses and health care providers; learning from different ways of practicing; being a team member; developing a distinct and personal way of practicing nursing. Preceptorship model: valued working with

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Table 2 (*continued*)

Author, Year & Country	Design	Intervention	Duration of intervention	Number of people undertaking intervention	Sample size	Findings in relation to retention and turnover	Additional findings
							one nurse; modelled the reality of nursing; based on trust and consistent feedback; facilitated participants to consolidate practice skills.
Cantrell, MA., Browne, A.M. and Lupinacci, P. 2005, USA	Descriptive comparative study. Case control study - matched pairs	Summer nurse externship program	10 weeks	131 in total	2 groups of 26 (control and intervention) = 52	Not measured	No statistical difference between the groups on job satisfaction or sense of belonging. Statistically different mean scores between groups for professionalism and role socialisation - higher for control group. Did not support the hypothesis that participating in the externship made a positive difference to the variables measured.
Cantrell, MA., Browne, A.M. 2005, USA	Qualitative study	Summer nurse externship program	10 weeks	131 in total	6	Not measured	Nurse externs gained a more thorough perspective of the healthcare environment. Nurse externs became aware that the transition into the professional role required active and full participation in providing care. Externs felt part of the healthcare environment. The externship provided a clear, realistic understanding of the complex nature of providing care in the professional role, which created anxiety about transition.
Cheli, S., De Bartolo, P., Agostini, A. 2020 Italy	Pilot non-randomised controlled trial	Mindfulness-based education programme (MBEP) for students	6 weeks - 5 ×3 hour sessions and 1 ×4.5 hour session	82	82 (7 drop outs)	Not reported	Significant increase of dispositional mindfulness and a significant decrease of perceived burnout. The research shows promising results for the application of an MBEP that is coherently integrated into the nursing curriculum.
Christensen, F. 2005, Canada	Descriptive case study	Introduction to perioperative nursing programme and preceptorship programme (available to senior students and registered nurses)	12 weeks full time.	Not clear - maximum of 30.	Not clear	Program has increased retention in OR work – both students in cohort 2 worked in OR after qualification.	Students in cohort 1 had not been required to commit themselves to the OR after the completion of the course. The program involved a large investment by the hospital with a fifty

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Table 2 (*continued*)

Author, Year & Country	Design	Intervention	Duration of intervention	Number of people undertaking intervention	Sample size	Findings in relation to retention and turnover	Additional findings
							percent retention rate after one year.
Christiansen, A. and Bell, A. 2009, UK	Interpretive Qualitative study	Peer learning partnership between first- and third-year student nurses	Not clear	Not clear - 3 cohorts of students	54	Not measured	The reciprocity inherent in peer learning was perceived as mutually beneficial. Peer learning partnerships brought both affective and cognitive gains in terms of increased self-esteem, the development of nurturing relationships essential to successful mentorship and a heightened sense of readiness for registration and future professional practice.
Chung, L.Y.F., Wong, F.K.Y. and Cheung, S.C.M. 2008, Hong Kong	Mixed methods	Pre-graduation clinical placement (PGCP)	1 month	Not clear	Not clear	Not measured	The PGCP fostered maturity for role transition. Students' competencies were improved, as rated by preceptors: 93% significantly improved and 7% insignificantly improved, as rated by students: 51% significantly improved and 49% insignificantly improve. Graduating students should be provided with the opportunity to undertake a continuous period of attachment for a supportive, reality-based, insider practice to ease the transition to the role of RN.
Difenbeck, C., Plowfield, L. and Herrman, J. 2006, USA	Descriptive evaluation	Clinical immersion senior year - Nurse Residency model.	Placements in each of 6 clinical areas for 3 days a week for 4 weeks and preceptor-ship 'capstone' in an area of their choice.	Not clear	Not clear	Programme retention rates are tracked but data not provided.	Benefits included: improved transition to practice; Increased student accountability; enhanced socialisation; decreased clinical and classroom teaching needs (faculty staff reduction from 24.9 to 19.5fte).
Epstein, C.D. 2007, USA	Qualitative descriptive report	Capstone teaching project and preceptorship in final semester of UG programme.	One semester	58	58	Not stated or measured	100% of the 58 seniors described the capstone teaching project as a positive and interesting experience.
Farooq S, Parpio Y, Ali F. 2015, Pakistan	Descriptive cross-sectional study	Implementation of a preceptorship model of supervision in final year	6 weeks (270 hours)	33	22	Not measured	18 (82%) participants considered it as good and very good; 9 (40.9%) of the participants were

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Table 2 (*continued*)

Author, Year & Country	Design	Intervention	Duration of intervention	Number of people undertaking intervention	Sample size	Findings in relation to retention and turnover	Additional findings
							very satisfied with their preceptor; 11 (51%) reported as satisfactory to fairly satisfactory; 2 (9%) were dissatisfied. Recognized as crucial approach to bridge theory and clinical practice, meet expectations as nurse professionals by role modelling & continuous support.
Frotjold, A., Hardy, J. and Butler, M. 2007, Australia	Quantitative descriptive study	4–6-hour snapshot visits to either the operating suite or high dependency area during the final nursing theory unit, plus additional academic preparation.	14 hours over 7 weeks.	OT - 168 HD - proportionate to OT. In 2007 123 students enrolled	Not clear	Not clear	Cohort size increased: For OT: 2005–25 students; 2006–48 students; 2007–95 students. For HD: proportionate increase to the OT. 89% felt it helped connect theory to practice; 88% that it contributed to considering working in the area on graduation; 88% greater understanding of the role; 83% that the snapshot enhanced the elective.
Gregory, S., Bolling, D. and Langston, N. 2014, USA	Qualitative descriptive evaluation	Externship for nursing students in perioperative area. Included clinical practicum and preceptor.	180 hours of clinical practicum	Between 2007 and 2011 120 students undertook the externship.	Not clear	Yearly attrition of new nurses in perioperative settings was 45%	Students felt it was an excellent experience to prepare them as a nurse, high levels of satisfaction with the programme. Increased interest in perioperative nursing as a career. Resulted in decreased use of agency nurses at the clinical site where the externships took place and increased numbers of younger nurses working in the perioperative areas where they externed.
Jiang R-S., Chou, C-C. and Tsai, P-L. 2012, Taiwan	Phenomenological study	Preceptor-guided clinical practicum	4 weeks	200 in the class	13	Not measured	Four themes emerged from the data: (1) information and new experience overload, (2) feelings of loneliness and stress, (3) questioning whether strict preceptors achieve the best results and (4) beginning to feel like a nurse.
Kim, K. 2007, USA	descriptive correlational design	Preceptorship programme in final course of the pre-registration programme	160 hours of clinical experience	117	102	Not measured	Nursing competence skills among senior nursing students were positively related to participation in a clinical preceptorship program. The greater the

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Table 2 (*continued*)

Author, Year & Country	Design	Intervention	Duration of intervention	Number of people undertaking intervention	Sample size	Findings in relation to retention and turnover	Additional findings
							amount of interaction with preceptors, the greater students' perception of their nursing competence skills became. Senior nursing students who felt that it was important to set goals and objectives with their preceptor perceived significantly greater nursing competence skills related to organizing, collaborating, delegating and initiating nursing care. Students who felt that it was important to develop a trusting relationship with their preceptor perceived significantly higher nursing skills related to effective communication, collaboration with others and attainment of new knowledge.
King M.L., Singh, M. and Harris, L. 2009, Canada	quasi-experimental design	Critical Care Bridging Programme (CCBP)	Specialty education (180 hours); supervised practice elements (300 hours)	Not clear	20 student-preceptor dyads	Not clear	Student and preceptor mean self-efficacy scores showed improvement following the CCBP. Preceptors reported significant improvement in students' confidence in all subscales except self-development.
Nash, R., Lemcke, P. and Sacre, S. 2009, Australia	Mixed methods	Enhanced model of final year nursing student placements to support effective transition experiences.	Not clear, possibly 8 weeks.	404	29 trial participants, 63 non-trial participants, total 92. Focus groups with 15 final year transition group students. Also 4 x FG with industry representatives.	Not measured.	No significant difference between the four groups regarding preparedness for practice. Themes from student focus groups: Growing in confidence and competence; becoming part of the team; experiencing real world nursing practice. Stakeholder FGs: Stepping back; feeling it's worthwhile; support for RN staff. The results of the trial indicated the importance of a positive and supportive clinical learning environment.
Pullon, S., Wilson, C., Gallagher.,	Pre and post quasi experimental Cohort study	A five-week, rurally located, clinically-based	5 weeks	131	55 (42%) intervention group	Not measured	Rurally based IPE at the entry-to-practice phase of training can

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Table 2 (*continued*)

Author, Year & Country	Design	Intervention	Duration of intervention	Number of people undertaking intervention	Sample size	Findings in relation to retention and turnover	Additional findings
Skinner., McInlay, M., Gray, L. and McHugh, P. 2016, New Zealand		interprofessional programme as a transition-to-practice rotation for final-year, pre-registration health professional students			and 56 control group		meet multiple objectives in preparing participating students for practice, over and above otherwise equivalent education for their non-participating peers. Challenging to set up in small communities with small health workforces, but delivery became easier over time, enhancing student learning and satisfaction. Students reported being significantly better prepared than a cohort of 56 non-participating colleagues in many aspects of their understanding of and knowledge about each of four key learning domains. Student satisfaction further increased across all domains in the second year.
Stacey, G., Aubeeluck, A., Cook, G. and Dutta, S. 2017, UK.	Case study methodology - qualitative evaluation.	Resilience-based clinical supervision	1 ×2 hour session every two weeks during clinical placement in the final six months of UG programme.	120	26	Not measured	Participants expressed positive experiences of resilience-based clinical supervision. Increased perception of the importance of self-care; commitment to caring for others was maintained. Students continued to demonstrate competencies of self-care six months after qualifying as nurses, despite the complexities of the workplace. Resilience-based clinical supervision has the potential to help healthcare practitioners to recognise and attend to workplace stressors through appropriate and effective alleviation strategies.
Starr, K. and Conley, V. 2006, USA	Qualitative methodology	Externship programme	3 ×12 hour shifts per week over a summer period of 16 weeks	16	10	Not measured	Growth within the nurse extern role is attributed to gaining basic and critical thinking skills, gaining confidence and moving toward future goals. A major benefit was recognition as a team member, this

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Author, Year & Country	Design	Intervention	Duration of intervention	Number of people undertaking intervention	Sample size	Findings in relation to retention and turnover	Additional findings
							increased students' confidence and decreased their stress.
Steen, J., Gould, W., Raingruber, B. and Hill, J. 2011, USA	Cross-sectional survey design. Quantitative	Internship programme	Unclear	60 potential subjects over 4 years of running the programme.	50	Not measured	Interns believed the programme increased their confidence in performing nursing tasks and in interacting with patients and families and created opportunities for career advancement. Internship programmes for nurses can significantly contribute to the success of new graduate nurses and consequently the quality of staff development.
Usher, K., Mills, J., West., C., Park, T. and Woods, C. 2015, Australia	Two-phase survey study	Capstone project	Not clear	54 intervention group, 113 control group	Not clear	Not measured	Preregistration student nurses' perceptions of preparedness for practice did not increase significantly following the introduction of the capstone subject.
Wieland, D.M., Atmiller, G. M., Dorr, M.T. and Robinson Wolf, Z. 2007, USA	Triangulated descriptive study	Pregraduation preceptored clinical experience	3 times per week for 3 weeks	32	32	Many students became integral members of hospital unit teams	Students' knowledge and skills increased during the preceptorship.

that clinical immersion helped to connect theory to practice and Messina, et al., (2011) found students perceived an improvement in their technical and communication skills.

One study (Pullon, et al., 2016) reported an interprofessional clinical immersion project that brought together students from several healthcare disciplines over five weeks to prepare them better for working as a multidisciplinary team during transition to practice. This case-control study indicated high student satisfaction and increased understanding and knowledge compared with the comparison group.

Four of the studies describe the clinical immersion as incorporating, or aligning with, a preceptorship. Most report positive outcomes in relation to transition to practice from the preceptor element, but Jiang, et al., (2012) describe students' feelings of new experience overload, loneliness, stress and concern about strict preceptors, suggesting that the context of the clinical immersion may influence the outcome. Both Chung, et al., (2008) and Weiland, et al., (2007) found students had enhanced confidence and competence by the end of the clinical immersion.

All studies acknowledged that increased immersion in a clinical environment in the final year of the undergraduate programme gives the students the opportunity to experience the reality of the nursing role and they report acting and feeling more like nurses at the end of the experience. The duration of the clinical immersion ranged from 14 hours to 12 weeks (mean 5.8 weeks), but lack of reported detail makes it difficult to determine whether duration or content influenced outcome. The influence of different clinical environments, individual preceptors and length of the clinical immersion on effectiveness, warrant further exploration.

3.8. Internships

Two papers describe internships, both implemented in the USA, where internships are an established element of the post-graduation year for newly qualified nurses, but relatively novel in undergraduate programmes. Steen, et al., (2011) used a cross sectional survey design to understand the effect of an internship on transition from student to registered nurse. Students reported increased confidence with nursing tasks and liaising with patients and families. This was reiterated by Dela Cruz et al., (2013), who also found increased competence with ethical and moral decision making following a 300-hour internship specifically for students undertaking nursing as a second career.

3.9. Capstone projects

Three papers report the implementation of a capstone project. Two were implemented in the USA and one in Australia. The American studies (Bay, et al., 2018; Epstein, 2007) describe positive outcomes with students achieving their choice of career following completion of the capstone and finding the experience positive and interesting. Usher, et al., (2015) reported a less positive outcome, as pre-registration students' perceptions of preparedness for practice did not increase significantly following participation in the capstone project. Instead, confidence decreased as students were assigned larger numbers of patients.

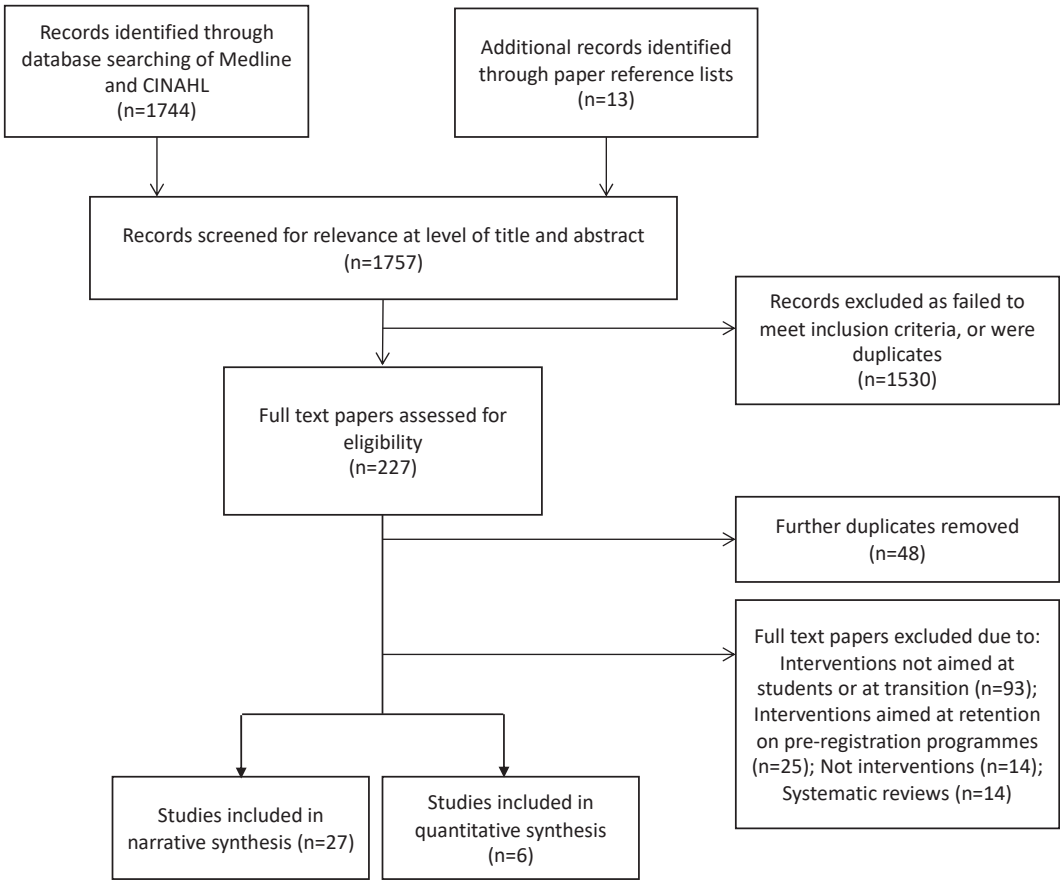

Fig. 1. PRISMA Flow diagram (Moher, et al., 2009) of literature search and results.

3.10. Preceptorships

Although several of the interventions included a preceptor element, only two were described as preceptorship programmes. Farooq, et al., (2015) described preceptorship as a novel intervention in pre-registration nursing programmes in Pakistan and evaluated its use as a model of supervision in the final year 6-week clinical placement. The model was well received by students and recognised as a helpful approach to bridge theory and practice, use role modelling to develop professionalism and as a mechanism for continuous support. Kim, (2007) reported a 160-hour preceptorship programme in the final year of study. They identified a correlation between participation in the programme and improvements in students' perception of their nursing competence, particularly around organising, collaborating, delegating, initiating nursing care, communicating and attainment of new knowledge.

3.11. Psychological wellbeing programmes

Two papers reported studies that offered students the opportunity to engage with psychological wellbeing programmes, with the intention that this would enable them to cope better with the challenges that they may face as qualified practitioners. Cheli, et al., (2020) conducted a non-randomised controlled trial to establish the effectiveness of a mindfulness-based education programme incorporated into an undergraduate nursing curriculum in Italy. After the six-week programme students demonstrated significant increase of dispositional mindfulness and a significant decrease in perceived burnout. Known links between burnout and attrition from the nursing profession (Epp, 2012; Borritz, et al., 2006), suggest utility for such interventions to promote early career nurse retention. The second study (Stacey, et al., 2017) was conducted in the UK and aimed at supporting students to develop resilience-based competencies that would help them to cope with stress and monitor their own wellbeing. The authors reported a positive impact on students' competency with self-care, which was maintained six months after graduation, despite the complexities of working as a qualified nurse. Participants were also able to externalise the limited resources they encountered in clinical areas as organisational failings, rather than personal inadequacy. Resilience-based competencies have the potential to support newly qualified nurses to recognise and appropriately deal with workplace stressors, with a positive impact on personal stress levels and potential impact on attrition from the role caused by stress-related factors in the workplace.

3.12. Other

Five papers reported individual interventions not easily defined under the previous headings. Two were from the UK, including a transition module delivered as a partnership between the university and clinical area (Broad, et al., 2011) and a peer learning partnership between first and final year students (Christiansen and Bell, 2009). Two were implemented in Canada, including a Collaborative Learning Unit, which again fostered a partnership between the university and the clinical area (Callaghan, et al., 2008) and a critical care bridging programme (King, et al., 2009), which aimed to prepare students to work in critical care areas once qualified. The final paper described revision of an Australian nursing curriculum (Nash, et al., 2009) with the aim of facilitating effective transition from student to qualified practitioner. All studies reported positive outcomes, particularly increases in confidence with nursing practice, increases in self-esteem and the development of significant relationships. Key to several of the studies was the collaborative development of the interventions by academic and clinical staff.

4. Discussion

The systematic review identified six studies that provided post-qualification retention data to evidence the effectiveness of interventions implemented to target final year student nurses. Variation in intervention type, outcome and components, coupled with missing data, made comparisons and conclusions difficult. The thematic review of the wider body of literature encompassing interventions aimed at easing transition from student nurse to qualified practitioner provided a more comprehensive view of the types of interventions aimed at student nurses.

Most of the interventions focused on exposing student nurses to the reality of the nursing role, with the intention of offering them the opportunity to gain competence and confidence with nursing skills and expertise. Student nurses spent time in the clinical environment, building relationships with qualified staff, observing role modelling of accountable practitioners and practising and developing skills in a supervised learning environment. This offers potential for the students to experience early socialisation into the nursing role. The findings from the review indicate this exposure to the clinical environment does, overall, support students to feel more prepared for qualified practice, however, there were notable exceptions as seven of the studies reported negative findings. One clinical immersion programme (Jiang, et al., 2012) and one externship (Cantrell and Browne, 2005) were found to increase students' anxiety and decrease confidence. Although the experiences provided meaningful opportunities to increase their knowledge base and skill level, students experienced reality shock (Kramer, 1974) much earlier by participating in the externship or clinical immersion. This led to feelings of inadequacy and raised students' anxiety about the transition they were about to undertake to qualified practice (Cantrell and Browne, 2005). Potentially, recent advances in clinical simulation allow students to gain confidence and competence in a safe environment with some exposure to the reality of a clinical environment, thereby reducing the impact of transition shock (Huston, et al., 2018; Rogers, et al., 2014).

The role of the preceptor, mentor, or supervisor is crucial to guide the student through this period of anxiety. Most of the studies reporting positive effects on transition to practice included elements of preceptorship, mentorship, or faculty supervision. In the studies where anxiety increased, it may be that cultural expectations in the clinical environment had potential to thwart student curiosity or eagerness to learn (Jiang, et al., 2012). In the UK, the preceptorship model is implemented widely for newly qualified nurses rather than students but is often challenged by lack of suitable preceptors due to workload pressures or staffing deficits (Whitehead, et al., 2013; Irwin, et al., 2018). Preceptorships implemented with early career nurses have positive effects on nursing competence (Ke, et al., 2017) and confidence (Irwin, et al., 2018), which suggests that preceptor or mentor support in undergraduate interventions may also be a useful component. Reviews of mentorship models (Nowell, et al., 2016; Zhang, et al., 2016) conclude that while mentorship can have a positive effect, mode of delivery and individual characteristics of clinical educators may have an impact on effectiveness. More research is required to establish which support models would be most helpful to students undertaking these interventions.

The finding that some interventions had no effect or a detrimental effect on perceptions of preparedness for practice, confidence, knowledge, or job satisfaction, suggests that careful consideration should be given to both the intervention model and the implementation context, especially the learning environment, during the undergraduate educational programme. This emphasises the need to evaluate not only the intervention but also the educational programme where it is embedded. Internationally, pre-registration nursing programmes differ in response to national professional statutory and regulatory body requirements, workforce requirements and higher education regulations. For programmes that include higher proportions of supervised clinical practice (for example, 50% or 2300 hours in the UK), socialisation into the nursing profession starts much earlier. Lack of studies from the UK implementing interventions that increase clinical exposure may be because this is not a pressing requirement for nursing students and reiterates the value of considering the whole curriculum, rather than the final year, to prepare students more adequately for practice as qualified practitioners (Meyer, et al., 2017).

The influence of the practice environment on decisions to stay or leave is well documented (Twigg and McCullough, 2014) and it may be that this influence becomes stronger at different periods of transition (Kenny, et al., 2021; Meyer, et al., 2017). During the undergraduate programme students may have been predominantly supernumerary in clinical settings. Interventions that require students to take a more active role in clinical care should incorporate strategies to enable students to learn in a supportive and inclusive team that fosters a sense of belonging (Nash, et al., 2009). A sense of belonging for students in a clinical area has been strongly linked to workplace satisfaction and workplace satisfaction is a key determinant of career decisions (Borrott, et al., 2016). Staff-student relationships are central to cultivating a sense of belonging, which is considered a prerequisite to active participation and learning (Levett-Jones and Lathlean, 2008) and may support students to maximise the benefits of mentor or preceptor relationship.

One mechanism for developing and enhancing a positive learning environment is to strengthen collaboration between the clinical area and the academic provider. This is a strategy endorsed by policy makers in the USA and UK (Altman, et al., 2016; Spector, 2015; Health Education England, 2018; NMC, 2020). In the reviewed papers, collaborative implementation was associated with positive impact on students' readiness for qualified practice and linking theory and practice.

Interventions that support newly qualified nurses to cope effectively with the inevitable challenges of novice practice in a clinical environment potentially compromised by suboptimal staffing resource and high patient acuity, have significant promise. The physical and emotional labour of the nursing role, coupled with stress and high workloads, suggests that resilience-building strategies would be of benefit to student nurses to prepare them for transition and to support them to maximise the potential of available support and supervision (Collard, et al., 2020). A review of intervention strategies to decrease anxiety and stress in student nurses (Turner and McCarthy, 2017), concluded that studies describing cognitive reappraisal had consistently positive outcomes, although further research is needed.

The findings indicate that consideration should be given to whether there is added value to implementing interventions during the undergraduate period if there are established and well-evaluated strategies already in place in the first few months following graduation. Finite resources in healthcare organisations necessitate careful allocation of funds and there is mixed evidence from this review that the inclusion of a pre-registration intervention in addition to an established post-graduation intervention offers long term positive effects on retention (Friday, et al., 2015). Conversely, there may be short term financial gains resulting from streamlined recruitment processes resulting from direct transition from undergraduate to postgraduate interventions (Courtney, 2005). It is worthy of note that all the reviewed research was undertaken prior to the global pandemic in 2020, which had a significant impact on psychological wellbeing of early career nurses (Brook, et al., 2023). It may be that post-pandemic, studies of interventions to support newly qualified nurse retention will indicate that additional strategies hold merit, especially given recent advances in clinical simulation that may prepare students more thoroughly for the reality of the nursing role.

4.1. Recommendations

Concerns about the quality of reporting and the absence of retention data limit recommendations about potentially successful interventions. For those studies that reported retention data in the systematic review,

the outcomes were mixed. The additional findings suggest interventions that incorporate preceptors, expose students to the reality of the clinical environment and involve collaboration between the academic and clinical institutions, in the main report positive outcomes related to transition to qualified practice.

Recommendations specific to nursing education centre on the need to consider the wider programme context, such as the level of exposure students currently have to clinical practice and the benefits that interventions with alternative approaches such as psychological wellbeing programmes may bring. It may be important to review the full duration of the educational programme rather than focus on the final year to thoroughly embed and maximise the effectiveness of interventions. The findings suggest that the clinical environment for internships, externships, or placements influences future career decisions, so collaborative implementation, with strong partnerships between education and clinical providers, will support opportunities for oversight and ongoing development. A welcoming, inclusive and supportive team, with knowledge of the implications of reality shock, will further enable positive student experiences and reflection to contextualise learning.

Future research should focus on identifying and evaluating the components of interventions implemented during the final year of undergraduate programmes that would have the greatest effect on retention. Specific areas of study could include evaluation of which mentor or preceptor models are most effective and which interventions that aim to reduce stress or anxiety for students and early career nurses, particularly those related to cognitive reappraisal, have the greatest effect on retention. Evaluations should consider both the intervention and the context in which it is implemented, as context appears to be influential. Carrying out this research with a focus on studies using rigorous methodology will allow for conclusions to be drawn about the effectiveness of an intervention and comparisons to be made across studies. Consideration should also be given to the economic benefits of implementing interventions prior to qualification, especially when there are established interventions available to newly qualified nurses. More research is required to determine the effects of these interventions on retention, including economic evaluation to help inform policy and practice in the context of limited fiscal resource.

4.2. Limitations, including methodological quality

The systematic review was conducted using processes aligned to methodological guidance for mixed methods systematic reviews (Stern, et al., 2021), however, heterogeneity of the wider body of literature was a limiting factor. This was mitigated by author collaboration to resolve questions and dilemmas about search terms, inclusion criteria and quality appraisal.

A small number of studies were identified that met the inclusion criteria and the six studies include inconsistent and incomplete description of the interventions, missing detail of some components of the intervention, variations in sample size and the method of evaluation. The conclusions that could be made were therefore necessarily limited by the quality of the available study reports. The quality appraisal identified areas of weakness, but all studies were included to provide a complete description of the body of work. The wider literature was not critically appraised due to the diversity of the content and presentation; therefore, quality cannot be assured and limits the inferences that can be made.

5. Conclusion

A large body of literature has been reviewed and greater understanding of the types of interventions that target student nurses with the goal of reducing likelihood of leaving once working as early career nurses has been achieved. There is some evidence of these interventions leading to increases in retention, but this is limited both by the quality of the reporting and the scarcity of data. Additional benefits to the experience of transition from student to early career nurse have been noted and interventions with successful outcomes incorporate preceptorship, exposure to the reality of clinical practice as a nurse, psychological wellbeing mechanisms and collaboration between academic and healthcare organisations. There is little evidence of student involvement in the design or implementation of the interventions.

Future research should focus on standardising the reporting of interventions and carrying out the research with rigorous methodology. An economic evaluation of the benefits of implementing interventions in the undergraduate period should also be conducted. Clinical practice and academic settings should consider the current clinical exposure of students during their undergraduate programmes and review proposed or actual interventions to maximise added value.

CRediT statement

Judy Brook was involved in Conceptualisation, Data curation, Analysis, Investigation, Methodology, Project Administration, Validation, Visualisation, Writing original draft, review and editing. Professor Leanne Aitken was involved in Conceptualisation, Analysis, Investigation, Methodology, Supervision, Validation, Visualisation, Writing - review and editing. Professor Debra Salmon was involved in Conceptualisation, Project Administration, Supervision, Validation, Visualisation, Writing - review and editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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