Mental health and dropout of nursing students

Ellen J.M. Bakker

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The studies presented in this thesis were conducted at Rotterdam University of Applied Sciences, Research Centre Innovations in Care, in collaboration with Amsterdam University Medical Center, Department of Public and Occupational Health, VU University Amsterdam, and Amsterdam Public Health Research Institute, The Netherlands, as part of the SPRiNG research project. The studies were funded by the Dutch Research Council (NWO) (grant number 2014-01-31 PRO) and Rotterdam University of Applied Research, who awarded a PhD grant (promotievoucher) to the author in 2016.

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For Lolín, Lindy and Lorelei; resilient and inquisitive women

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CHAPTER 1

General Introduction

Dropout from nursing education in the Netherlands

In 2014, the European Commission predicted that by 2020 one out of seven vacancies for nurses will not be fulfilled in Europe (de Jong et al., 2014). Recent estimates show that those shortages will persist through 2030 (WHO, 2020). Globally, the nursing profession faces an ageing workforce; a large group will retire in the next years and the inflow is insufficient to cover this (WHO, 2020). Besides that, more healthcare professionals are needed in many western countries, due to increasing healthcare demands in ageing populations (Wismar et al., 2018). In the Netherlands today, 1 in 7 employees works in the healthcare sector. Assuming healthcare continues to grow at the current rate, healthcare is expected to account for approximately 1 in 4 employees by 2040 (Ministry of Health, Welfare and Sport, 2018). Given the current growing number of job vacancies in the Dutch healthcare system (de Visser et al., 2021), it seems important to educate more nurses and to retain them.

In the Netherlands, registered nurses have either a vocational or a Bachelor's degree. In this thesis, we focus on students of a Bachelor of Nursing degree programme. In 2016, a national curriculum revision took place in response to the drastic changes in nursing practice due to demographic and political-societal developments, as well as developments in healthcare, science and technology. Nurses today face: (i) an ageing population, (ii) new technologies such as e-Health, (iii) healthcare reforms from traditional care to the support of self-management of people with chronic diseases, (iv) collaboration with informal caregivers, and (v) more healthcare delivery outside the hospital. This requires different knowledge and skills that have been translated in a new curriculum for the Bachelor of Nursing degree programme. The currently updated curriculum is based on seven CanMEDS (Canadian Medical Education Directions for Specialists) roles: care provider, communicator, collaboration partner, reflective evidence-based practice (EBP) professional, health promoter, organizer, and professionality and quality promoter (Lambregts, Grotendorst & van Merwijk, 2016).

In academic year 2019-2020, 4,460 Bachelor of nursing students graduated in the Netherlands (CBS StatLine, 2021). Between 2011-2015, the percentage of students who graduated nominally (meaning normal study duration plus one year) increased from 59.5% to 68.6%. Early dropout (withdrawal after 1 year studying) decreased from 13.4% in 2015 to 10.6% in 2019, and late dropout (cumulative percentage of students' dropout after 3 years studying) decreased from 20.5% in 2013 to 17.6% in 2017 (Vereniging Hogescholen, 2021).

Despite these positive trends, the necessary inflow of nurses to cover current and future healthcare demands requires further prevention of dropout from nursing education. Therefore, the SPRiNG (an acronym for Studying Professional Resilience in Nursing students and Graduates) research project was started in 2015. SPRiNG is a collaboration between Rotterdam University of Applied Sciences (RUAS), Amsterdam University Medical Center, the Netherlands Institute for Health Services Research (NIVEL) and Erasmus University Medical Center Rotterdam. The overall aim of this research project was to develop a scientifically based prediction model for early detection of dropout and recommendations for a (web) application with an overview of interventions to prevent dropout (Bakker et al., 2016). The research presented in this thesis, is a sub-study within this broader research project.

Alarmed about the ever-increasing demand for nurses and unfilled vacancies, the Ministry of Health, Welfare and Sport launched the Dutch action plan 'Working in Healthcare [Werken in de Zorg]' in 2018, three years after SPRiNG started. This action plan aims at higher inflow of students and less dropout and points at: (i) more students choosing for healthcare, (ii) more clinical placements, and (iii) better nursing educational programmes. A straightforward and ambitious plan for a global problem; as dropout of nursing students has been studied for decades already (e.g., Glossop, 2001; Jinks et al., 2014; Jeffries, 2015; Mooring, 2016) and remains unsolved (Mitchell et al., 2021). The complexity of the problem of nursing students' dropout, as confirmed by nursing scholars: "The wicked problem of healthcare student attrition" (Hamshire et al., 2019) and "Untangling the Gordian knot" (Sabin et al., 2012), is related to the very nature of the phenomenon. Dropout of nursing education is not an event that occurs at one point in the nursing educational programme. It can rather be seen: "… as a longitudinal concept that stretches from initial engagement and attraction to the profession, through the recruitment and selection process, across the learning experience in service and HEI [Higher Educational Institutes; EB] and through transition into employment and a sustained career in healthcare." (Sabin, 2012; p. 338).

Determinants of dropout from nursing education

Dropout from nursing education has been described not only as a longitudinal concept but also as a multifactorial phenomenon (Andrew et al., 2008; Eick et al., 2012; Glogowska et al., 2007; Fowler & Norrie, 2009; O'Donnell, 2011). Nursing students' dropout might partially be predicted by demographic factors, e.g., a relatively young age at entry (Mulholland et al., 2008, Pryjmachuk et al., 2008) and being male (Caponnetto et al., 2021; McLaughlin et al., 2010). Academic and cognitive factors have also been associated with dropout, e.g., low secondary school performance (Caponnetto et al., 2021) and academic difficulties and study load (Andrew et al., 2008; Fowler et al., 2009; Glossop, 2002). Furthermore, psychological and health-related factors have been described in previous research in relation to dropout, e.g., low ability to cope with stress (Deary et al., 2003), physical problems (e.g., injury) and mental health problems (Glogowska et al., 2007; Glossop, 2002; Kukkonen et al., 2016). In addition, factors related to the clinical placement environment have been described, e.g., theory-practice gap, and unpleasant experiences and lack of support during clinical placements (Eick et al., 2012; Ten Hoeve et al., 2017). Finally, social or economic factors, such as problems in the family and financial difficulties have been associated with dropout (Fowler et al., 2009; Glossop, 2002; Kukkonen et al., 2016).

These previous studies, however, mainly included dropping out in the first or second year of nursing education (Andrew et al., 2008; Fowler & Norrie, 2009; Griswold, 2014; Harvey and McMurray, 1994, 1997; O'Donnell, 2011; Rankin, 2009), mixed samples of students (Glogowska et al., 2007; Glossop, 2002; Hamshire et al., 2012; Kukkonen et al., 2016; Wilson & Levy, 1978) or involved prospective or retrospective studies in which early and late dropout were not distinguished (Dante et al., 2011; Deary et al., 2003; Fowler & Norrie, 2009; McLaughlin, 2008, 2010; Mulholland et al., 2008; Pryjmachuk, 2008). Hence, dropout from nursing education concerns many factors, but little is known specifically about reasons for dropping out in a late stage of the nursing educational programme.

Late dropout is especially problematic, since the student has studied for several years, investing time, energy and study funding, without a clear result. Furthermore, students dropping out late in the curriculum have already laid claim to a relatively large number of clinical training places. Early dropout might be partly considered as "natural attrition" of students who made the wrong study choice (O'Donnell, 2011) or did not possess the right intellectual, personal and motivational qualifications for becoming a nurse (Andrew, 2008; Harvey et al., 1994; Rankin, 2009). Late dropout, on the other hand, can be considered serious "waist" of human, educational, social and other resources. It therefore seems profitable to prevent late dropout of third-year nursing students who proved to have sufficient intellectual, personal and motivational qualifications and seem to have made the right study choice.

Improving mental health to prevent dropout from nursing education

As said before, there is evidence that mental health is associated with dropout in nurses. Various studies show that (novice) nurses frequently experience a high mental workload leading to emotional exhaustion and eventually to burnout (Monsalve-Reyes et al., 2018), productivity loss at work, sickness absence (de Jong et al., 2014; Ketelaar et al., 2014), and intention to leave the nursing profession (Hasselhorn et al., 2005; Moloney et al., 2018). Even student nurses suffer from mental health problems; several studies have reported significant levels of depression, anxiety, distress, or burnout in nursing students (e.g., Chatterjee et al., 2014; Deary et al., 2003; Pulido-Martos et al., 2012). Prospective studies have demonstrated an increase in levels of distress or burnout throughout nursing education (Deary et al., 2003; Watson et al., 2008; Edwards et al., 2010; Rudman et al., 2012). Furthermore, there is some evidence that developing burnout during nursing education is associated with intention to leave the nursing profession in an early stage (Rudman et al., 2012).

Hence, it seems to be important to protect the mental health of nursing students already during nursing education. There is potentially much to be gained by applying available interventions in nursing education and practice and by developing new interventions based on the understanding of the determinants and feasibility of the implementation. Current aggregated evidence for effective interventions to improve mental health in nursing students is based on two systematic reviews aimed at stress prevention (Galbraith & Brown, 2011; Jones & Johnston, 2000). It is, however, unclear whether those interventions decrease dropout as well (Galbraith & Brown, 2011).

Besides that, it is not only relevant to study what mental health promoting interventions targeted at nursing students to reduce dropout are available, but also which interventions are feasible to implement since nursing curricula are known to be over-packed already (e.g., Ball et al., 2015; Mansour et al., 2018).

Objectives and outline of this thesis

In conclusion, sufficient nurses have to be educated and retained to meet the future healthcare demands. Dropout from nursing education concerns many factors, but little is known about the reasons and determinants for dropping out in a late stage of the Bachelor of Nursing degree programme. Mental health is an important factor associated with dropout in nurses; whether this also applies

to nursing students is still unclear. Hence, additional insight was necessary into the experiences and reasons that contribute to late dropout from the perspective of (former) Dutch nursing students, who spend most time in clinical placements during their third and fourth year of education. Therefore, we needed more insight into the associations between modifiable psychosocial placement-related characteristics of mental health and late dropout from nursing education. In order to go beyond exploring, describing and explaining factors contributing to impaired mental health and late dropout, more knowledge about potentially feasible interventions to be implemented in over-packed nursing curricula was needed. Therefore, the overall aim of this thesis is threefold. Firstly, to give insight into nursing students' experiences and reasons that contribute to late dropout from nursing education. Secondly, to give insight into the associations between modifiable psychosocial work characteristics and mental health and late dropout from nursing education. Thirdly, to give insight in available interventions to improve mental health of student and novice nurses to prevent dropout. In this PhD thesis, the following research questions to this overall, threefold aim are addressed in various chapters:

1. **What are the reasons for nursing students to dropout late from nursing education?**
   This research question is addressed in **Chapter 2** using data from semi-structured, in-depth interviews with former nursing students from Bachelor of Nursing degree programmes from two Dutch Universities of Applied Sciences.

2. **What psychosocial work characteristics are associated with mental health and late dropout from nursing education?**
   This research question is addressed in **Chapters 3** presenting the protocol of the SPRiNG cohort study following third-year nursing students up to two and a half years after entry in the study. Using data of the SPRiNG project, different models were built to explain mental and physical health and dropout of student nurses. For this thesis, we used for **Chapter 4** subsets of the SPRiNG data to investigate the association between psychosocial work characteristics on the one hand and mental health and the intention to leave nursing education in a late stage of the programme on the other.

3. **Which preventive interventions aimed at improving mental health of student or novice nurses to prevent dropout are available and what is their effectiveness on dropout-related outcomes?**
   This research question is addressed in **Chapter 5** by presenting a systematic review.

4. **How feasible is a training based on connecting communication for implementation within the curriculum of a Bachelor of Nursing degree programme from the perspective of nursing students?**
   This last research question is addressed in **Chapter 6,** presenting the results of a feasibility study.

Finally, **Chapter 7** covers a summary of the main findings, methodological reflections, reflections on the main findings, implications of these findings for nursing education, and recommendations for future research.

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PART I

Exploring nursing students' mental health and dropout

CHAPTER 2

Late dropout from nursing education: an interview study of nursing students' experiences and reasons

Ellen J.M. Bakker
Kim J. Verhaegh
Jos H.A.M. Kox
Allard J. van der Beek
Cécile R.L. Boot
Pepijn D.D.M. Roelofs
Anneke L. Francke

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Abstract

The global shortages of nurses require a closer look at why nursing students stop in the later years of their degree programme. The purpose of this study is to explore nursing students' experiences and reasons that lead to this late dropout. Semi-structured interviews were held in 2017 with eleven former nursing students who dropped out in the third year of their Bachelor's Nursing degree programme in the Netherlands. Data was collected and analysed iteratively, following the principles of Thematic Analysis. Two core themes were identified: 'ending up in a downward spiral of physical, psychological and social problems' and 'experiencing an increasing mismatch between expectations and reality'. Reasons for late dropout from nursing education are diverse and interlinked. In contrast with studies on early dropout, academic difficulties did not play a major role in late dropout. Negative experiences during clinical placements led to dropout in both groups. One group lacked a safe learning environment in clinical placements, study coaching and psychological support. The other group missed realistic information provision about nursing education and the broad range of career opportunities in nursing.

Introduction

There is a growing shortage of healthcare professionals worldwide (e.g. Global Health Workforce Alliance, 2013; Wismar et al., 2018). For instance, in the USA, shortages of about 154,000 registered nurses (RNs) are expected by 2020 and of about 510,000 RNs by 2030 (Zhang et al., 2017). In the Netherlands too, there are significant shortages of nursing staff, particularly nurses with a Bachelor's qualification. Forecasts give about 4900 unfulfilled vacancies for nurses with a Bachelor's degree in nursing by 2020 (Joldersma et al., 2016).

The nursing profession therefore offers good job prospects in principle. Many young people initially feel attracted to the nursing profession and there is a substantial inflow of students in nursing programmes. However, dropout — in the sense of leaving the nursing degree programme before graduation — is a recognized problem in nursing education (Eick et al., 2012). The estimated percentages of nursing students leaving their programme before graduation varies between countries, e.g. 9% in Finland (Kukkonen et al., 2016), at least 20% in the UK (Willis, 2015) and between 10 and 42% in Australia (Gaynor et al., 2007). Cumulative dropout rates also vary according to the programme year. In the Netherlands, dropout before the second year of the programme (early dropout) fluctuated between 13.6% and 18.5% in the period 2009–2014, and dropout after three years of studying (late dropout) between 17.7% and 24.3%. Cumulative late dropout was on average 6% higher than early dropout (Vereniging Hogescholen, 2018).

Dropout from nursing education represents a loss of human capital as well as financial capital and is particularly problematic considering the severe shortage of nursing staff. Late dropout is most problematic: the student has studied for several years without a clear result, but has invested time, energy and study funding. Furthermore, they have already laid claim to a relatively large number of clinical training places. In the context of rising shortages of nursing staff and the limited number of clinical placements and clinical training places (Buchan and Seccombe, 2011; Smith et al., 2015; Young et al., 2014), it is especially important that students do not stop their nursing training in the later years.

However, previous studies mainly included dropping out of nursing education in the first- and/or second-year of nursing education (e.g. Andrew et al., 2008; Griswold, 2014; Harvey and McMurray, 1994; Harvey and McMurray, 1997; O'Donnell, 2011; Rankin, 2009), or mixed samples without performing separate analyses to differentiate between dropping out early or late (Dante et al., 2011; Glogowska et al., 2007; Glossop, 2002; Hamshire et al., 2012; Kukkonen et al., 2016; Wilson and Levy, 1978). These studies often concern quantitative survey research or qualitative interview studies and show that the risk of nursing students dropping out is often partially related to demographic factors. For instance, factors such as being relatively young on entry (Mulholland et al., 2008; Pryjmachuk et al., 2009) and being male (McLaughlin et al., 2010; Mulholland et al., 2008; Pryjmachuk et al., 2009) are associated with a higher risk of dropout. Academic and cognitive factors play a role in early dropout: poor secondary school performance (Pryjmachuk et al., 2009), being unprepared for university (Andrew et al., 2008), academic difficulties (Glossop, 2002), and low academic self-efficacy (Harvey and McMurray, 1994) have been associated with dropout.

Furthermore, associations between dropping out and personality traits and health factors have been described in previous research, e.g. poor ability to cope with stress (Deary et al., 2003), low emotional intelligence (Rankin, 2009), low score on two of five personality traits (agreeableness and conscientiousness) (Deary et al., 2003), high psychoticism scores (McLaughlin et al., 2008) and health problems (Glogowska et al., 2007; Glossop, 2002).

In addition, associations have been described with professional and educational characteristics: e.g. a feeling of having made a wrong choice (Glossop, 2002), and unmet or unrealistic expectations (O'Donnell, 2011), theory-practice gap (Ten Hoeve et al., 2017), lack of faculty support (Griswold, 2014), and unpleasant experiences and lack of support during clinical placements (Eick et al., 2012). Finally, social or economic factors, such as problems in the family and financial difficulties, have been associated with dropout (Glossop, 2002; Last and Fulbrook, 2003).

None of the abovementioned studies focused exclusively on late dropout. They mainly included formal first- and/or second-year nursing students (e.g. Andrew et al., 2008; Griswold, 2014; Harvey and McMurray, 1994; Harvey and McMurray, 1997; O'Donnell, 2011; Rankin, 2009), or mixed samples of early and late dropped out students, without performing separate analyses differentiating between these subgroups (Dante et al., 2011; Glogowska et al., 2007; Glossop, 2002; Hamshire et al., 2012; Kukkonen et al., 2016; Wilson and Levy, 1978). In contrast, recently a relevant study was performed in the Netherlands following a group of 17 third-year Bachelor of Nursing students (Ten Hoeve et al., 2017). That study concluded that support from lecturers and mentors as well as working in a pleasant team were important factors in ensuring students completed the programme. However, ten Hoeve et al.'s sample consisted of 15 students who continued with the programme and only two who dropped out. Therefore, the objective of the study presented in this paper was to give additional insight into students' experiences that contribute to late dropout in Bachelor of Nursing degree programmes in the Netherlands. Since the Dutch four-year programme might differ from other countries, context information is provided in Fig. 1 and Supplementary file 1. This qualitative study is part of a larger Dutch research project named SPRiNG, an acronym for Studying Professional Resilience in Nursing students and new Graduates (Bakker et al., 2018). Findings will be used to design tailored interventions for the prevention of late dropout in the Netherlands.

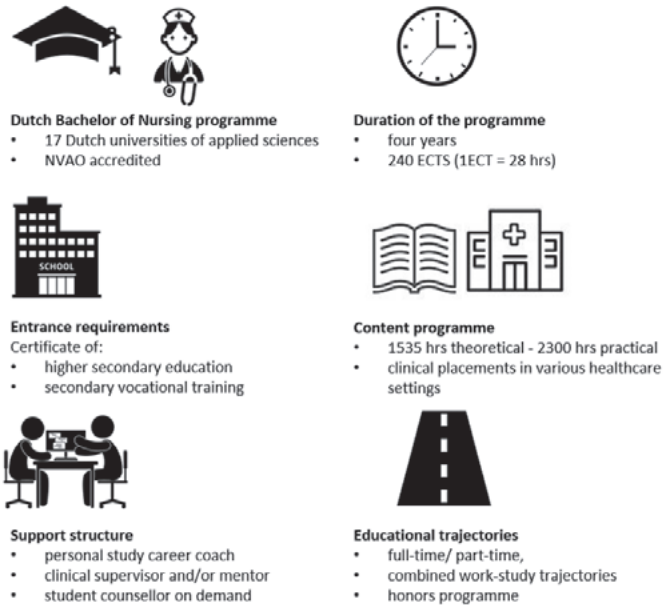

Figure 1: Characteristics of the Dutch Bachelor of Nursing degree programme.

Methods

Design

An exploratory qualitative study design was applied, using in-depth face-to-face interviews.

Sample and recruitment

A convenience sample of former students, based on their accessibility, was recruited from Bachelor of Nursing degree programmes at two Dutch universities of applied sciences. One university was situated in Rotterdam, the second largest city, in the west of the Netherlands. The other university was in a smaller city, namely Nijmegen, the tenth largest city in the Netherlands, situated in the south-eastern part of the country. Part of the interviewed participants (n=8) were recruited through current nursing students who participated in the cohort study of the broader SPRiNG research project (Bakker et al., 2018). These students were asked to act as an intermediary to contact and recruit former nursing students from their network. Another part of the interviewees (n=3) were recruited through invitation letters sent by the student administration desks to former nursing students. Only those who gave permission to be contacted by the researcher were approached by the main investigator (EB), using e-mail or telephone.

Two other Dutch universities of applied sciences, in Amsterdam and The Hague, were initially willing to recruit former students for us, but none of the former students approached by the administration

desks responded positively to the request. Only nursing students who voluntary quit the programme in the third or fourth year were eligible for inclusion. All participating former students (n=11) except one were female. Their ages ranged between 21 and 34 at the time of interviewing. All except one started their nursing training at a relatively young age (i.e. between 17 and 20) and had no previous work experience in nursing. Most of them lived in their own student house or room. None of them had children to look after. All except three came straight from secondary school. None of the students belonged to an ethnic minority and all had left nursing education during or at the end of their third year in the degree programme (see Supplementary file 2 for the characteristics of the study population).

Data collection

All interviews were performed by the first author (EB), a female registered nurse, medical anthropologist trained in qualitative research, nurse lecturer and PhD candidate in the 'SPRiNG study', which this interview study is part of. Her professional background enabled her to build up good rapport with the respondents. She did not know the participants beforehand, except for one student who had been following one of her classes (16 hrs in total).

Ten face-to-face interviews were conducted, and one interview using Skype. We used an interview guide with open questions (see Supplementary file 3). The themes and topics of the interview guide were derived from relevant literature (e.g. Dante et al., 2011; Glogowska et al., 2007; Glossop, 2002; Hamshire et al., 2012; Kukkonen et al., 2016; Ten Hoeve et al., 2017), and formulated in discussions with all co-authors. All the in-depth interviews took place at a location according to the preferences of the interviewees, mostly a quiet location at the university. One interview took place in the communal room of a student house, another interview took place in a public location, and one was a Skype interview with an interviewee who had moved to Australia. The duration of the interviews varied between 47 and 78 min, with an average of 59 min.

Observations and impressions were written down by the interviewer immediately after the interview to enable proper recall of the interviews and to support the analysis of the data. All interviews were audio recorded and transcribed verbatim. Member checking was applied: all interviewees received the transcribed interview and checked it for inaccuracies. No alterations were made.
The eleventh interview did not provide any new insights, which might be an indication of data saturation. However, to maximize variation in relevant background characteristics we tried to recruit male interviewees, of older age and with a non-Caucasian background. Eventually, we were unable to include participants of these groups, so recruitment was ended.

Data analysis

Data collection and analysis were done in an iterative process, following the six steps of Thematic Analysis (Braun and Clarke, 2006): 1) Becoming familiar with the data; 2) Creating codes; 3) Find common themes; 4) Review of themes; 5) Defining and naming definitive themes; 6) Reporting.

The first author (EB) analysed all interviews, while eight interviews were also independently analysed by other co-authors with various professional backgrounds, such as nursing, physiotherapy, and public and occupational health research. They all have expertise in qualitative research. The main steps in

the analyses were as follows. The first two authors (EB, KV) read and reread the initial four interviews several times to become familiar with the data. Secondly, they (EB, KV) inductively coded interview fragments and made a short analytic summary of each of these interviews. They discussed these summaries and the main codes given to interview fragments with the supervising co-author (AF), who co-analysed three interviews. Subsequently, the first author (EB) continued with the analyses of later interviews by assigning codes to interview fragments. During this stage in the analysis process, the first author (EB) sorted the main codes into categories, displayed as mind maps. The mind maps and coding were checked by returning to the interview transcripts, and were discussed in the broader team, which also included the other co-authors (AvdB, CB, PR, JK). A narrative approach was used to evoke the very nature of the subjective experiences and reasons of the former students for their dropout of nursing education.

Ethical considerations

Before participation in this interview study, all potential participants received written information about the study aim, and the protection of their privacy. In addition, the letter provided information about the voluntary character: participants could withdraw from the interview study at any time without further explanation. All participants signed informed consent forms before the interviews were conducted. The study complied with the Netherlands Code of Conduct for Scientific Practice from the Association of Universities in the Netherlands (2012) and was exempted from formal medical ethical review in accordance with the Dutch Medical Research Involving Human Subjects Act (see https://english.ccmo.nl/).

Findings

Two core themes were revealed by the analyses, namely 'ending up in a downward spiral' and 'increasingly experiencing a mismatch between expectations and reality'. These two main themes are related to the two groups of former nursing students that we identified: one group that found the programme — especially the clinical placements — very hard in combination with many other problems, and another group that eventually concluded that the training and professional prospects did not suit them. These findings will be explained in more detail as a narrative in the following sections. In the Dutch Bachelor Nursing degree programme, successive 18- to 20-week clinical placements take place in the second, third, and fourth year of the programme. During clinical placements, nursing students practise nursing roles in various healthcare settings under the guidance of a clinical supervisor (a Registered Nurse) and a faculty member from the Nursing degree programme. This faculty member monitors the quality of the learning climate and student progress and is responsible for the final assessment and grading.

Ending up in a downward spiral

Increasing problems with the toughness of the degree programme and clinical placements

The former students who were interviewed were positive on balance about their first academic year and had generally passed their end-of-year exams at the first attempt. The second year also generally went reasonably well. But in the third year they faced tougher requirements, in both the theoretical part and the clinical placements. Although a few still encountered academic difficulties, this was not

commonly mentioned as one of the main reasons for quitting. Some became exhausted from the combination of studying hard for the theoretical part of the programme and the demanding clinical placements. "…The results were good, but I had to work really hard for that…I had to work hard to keep myself together during the clinical placement…I was simply shattered, I was incredibly tired" (interviewee 1). If the pressure got too much, some of them made even more effort to do their best rather than taking things down a notch.

These students experienced the clinical placements to be more burdensome than the theoretical learning in-class and online. Lack of time for patients was mentioned by one interviewee as a major stressor: "I stood there with one colleague while someone was lying there dying…my colleague came back with tears in her eyes, she said: "Well, that man who is lying there dying, he said he was feeling so alone. And all we're doing is running around." So horrible…" (interviewee 6).

Losing their grip on the learning process

As the degree programme progressed, the former students increasingly felt unable to get a grip on the learning process. The lack of proper supervisory support and continuity in supervision during the clinical placement contributed to this problem. Sometimes there was a lack of clinical supervision at Bachelor level, for instance in nursing homes where most staff were certified nursing assistants, and the supervision was provided remotely. "But whenever I arrived on the ward, it was all really a case of right, how am I actually going to tackle this?" (interviewee 7). In one case there was no clinical supervisor at all due to staffing shortages. The lack of a role model and concrete supervision in the workplace led to delays in the learning process and eventually to failing the clinical placement.

One student with dyslexia received mainly distance supervision: she hardly worked together with her clinical supervisor from the hospital setting in practice: "…often there is contact via e-mail like forwarding assignments…that is all it takes, and then they just have to assess whether you have demonstrated your competence…And you have to prove that mainly through reporting." (interviewee 2).

In other cases, there was supervision, but the student did not `click' with the clinical supervisor, they felt positive feedback was lacking or they felt they were mainly being judged. "…then she stood there… quite literally looking over my shoulder and monitoring everything. And she said: "…make sure you read those names properly." But at that stage I couldn't read so well because I was thinking constantly: Oh, I can't fail. Well, I just felt incredibly stressed when I was around her. So, I simply couldn't properly remember what I'd read. And that's partly where it went wrong, because then she'd start asking things: "Did you pay attention to this and that. And how will you be tackling this and this", and so on. Well, then I froze and couldn't speak anymore…" (interviewee 9).

Lack of support from the programme organization

Some people tried to obtain help from their study career coach, a faculty member, but did not receive the expected support. "Well, this study career coach had a lot of problems at home, and he started comparing my situation with that of his [family member] and, well, that didn't really help, so…my feeling is I would simply have done better sorting it out myself, right, rather than going to him with it" (interviewee 2). "…having a chat with him is formally required, but I never had the feeling that I was getting anything

from this…" (interviewee 1). Faculty members, who were involved in the clinical placement did not always provide the back-up support students wanted. In one case the faculty member did not act upon problems related to the learning environment: "I did send her an e-mail once saying: Hey, I still haven't got a clinical supervisor. But well, I never got anything back, so then I thought, OK that's apparently how things are" (interviewee 6). Sometimes they did not feel supported by the faculty member during their clinical placement: "…the faculty member very much relied on what the clinical supervisor said…and not so much on what I said. So that also made me feel powerless." (interviewee 2). Some interviewees mentioned the lack of peer support during group sessions at school. One interviewee felt he was the only person who had unsatisfactory clinical placements: "…that is especially difficult when people pass their clinical placements with high grades, and you have to admit you didn't pass." (interviewee 7). Another interviewee felt it was not safe to talk about feelings and doubts in the classroom. "…So, one person was like: I'm better because I did clinical placements there and there and I'm working there and there. But right, that competitive atmosphere in class does make you feel less like…less like talking to an entire group, let's say…" (interviewee 11). But despite the lack of peer support in group sessions, most students found peer support in individual contact with fellow students. The lack of support from the degree programme organization meant that respondents were more likely to discuss programme or clinical placement problems with their family, their partner and/or friends or fellow students than with relevant professionals within the organization.

Character traits that impede the learning process

The former students who were interviewed also made a link between character traits and the stagnating learning process and their ultimate decision to leave the programme. The traits they mentioned were: being too insecure, too perfectionist, over-sensitive, reserved or depressed, tending to worry too much, or lacking the necessary flexibility or ability to talk about problems. "…I didn't manage to write the reflection reports either because I had too many doubts about them, I never found them good enough anyway, so then I simply didn't hand them in. Sometimes I did, but then I'd think, well, they aren't good enough…" (interviewee 10). Other mentioned difficulties were: standing up for yourself properly, setting limits, reflecting on situations, or dealing with the constant changes in patient care. They also sometimes felt too young or not ready to become a professional nurse dealing with dramatic events: "…The biggest thing was that I kind of felt I'm simply not yet ready to be a nurse because I took everything too personally and was just so sensitive to things and I couldn't deal with it…" (interviewee 1).

Increase in physical, psychological and social problems

Doubts and uncertainty about their own performance and a feeling that they could not get a grip on the learning process during the clinical placement increasingly led to worrying, insomnia and dreading the next day at the clinical placement. The interviewees described this as an insidious process that they only became aware of after some time.

Some also struggled with depressive feelings. A fail grade for a clinical placement, for example, could trigger a depression: "I didn't notice it myself at first, but as I said, there came a point when people around me said: "You know, this really isn't going well". But right, it was only when it became clear that well [I would get a fail grade for my clinical placement], that everything collapsed. Then I collapsed too…all I could do was cry…But this is something that apparently in my case…just occurred to be really

triggered by what happened" (interviewee 6). For most of the former students, the stress and pressure led to less care for themselves. The interviewees mentioned drinking red wine more often, poor diet, smoking a great deal, stopping sports, and giving up relaxing and enjoyable activities, hobbies and social contacts. They also spoke of "forgetting yourself" and "losing yourself". "I spent three whole weeks thinking about this an awful lot. I actually wrote down clearly for myself the reason why I simply couldn't keep it up. And won't be able to keep it up once I've graduated. And right, you know, I love giving care to people, but I lose myself in that" (interviewee 3). These former students became increasingly exhausted, took less and less care of themselves, postponed their study assignments more and more often, dreaded their clinical placements, became demotivated and eventually decided to throw in the towel. "Because then things really started getting worse and worse mentally. In the end, that's also the reason why I stopped. I simply couldn't cope anymore. It was simply so painful and difficult for me getting up every day and having to go to my clinical placement. And as a result, I couldn't function properly in my clinical placement" (interviewee 10). "But what I discovered in the third year was that I was really not ready for this; I just realized that I was too young in the sense that I took it all too much to heart…My final year was in psychiatry…All the stuff that happened there just made me feel really sad…" (interviewee 1).

Being permanently tired, not enjoying the clinical placement and not feeling in control of the learning process made them doubt whether they were suited to the profession. This also intensified the downward spiral they had ended up in, and that eventually led to their decision to stop.

Conclusion: I can't keep this up

During the third academic year, the students in question became increasingly aware of the downward spiral in which they had ended up. Most of them became more and more exhausted, two were clinically diagnosed with a depression. They put an early stop to their clinical placements, reported sick or took a time-out upon the advice of their study career coach. Some went to see their general practitioner and were referred to a psychologist. This period was used to recover, both physically and mentally, and to take stock of things. For most, a dread of the next clinical placement and a lack of confidence in the ability to get a pass grade for the next clinical placement played a major role in the final decision to stop. Curriculum reforms that led to the cancellation of credits could also be the final straw. A striking feature was that all the respondents mainly sought support in this process outside the programme organization: from their parents, other family members, partner, friends or professional bodies.

Increasingly experiencing a mismatch between expectations and reality

Degree programme different to what they expected

There was another group of nursing students who withdrew in a late stage of their programme for whom psychological, physical and social problems did not play a big role. Nor did they find the programme tough generally in terms of the cognitive or theoretical aspects. At first, they seemed to progress through the programme quite effortlessly. But the first clinical placements were disappointing because they differed from their expectations. Some interviewees were disappointed by the content of the degree programme and the prospects that were presented. For example, one student noticed during clinical placements that she was more interested in the medical and technical side of nursing.

"I soon realized that the questions I asked focused on the medical treatment…and that I often got the answer that this is something the doctor knows…that's not our job…Later on in the programme, that became one of the reasons for me to stop." (interviewee 4). In the nursing programme, she did hear something about the advanced nursing practice role, in which medical and nursing tasks are combined, but there was no clear information about this career prospect.

Increasing doubts about the profession

Various former students explained that they had originally a different impression of nursing as a profession. They gradually discovered that the profession did not fit with what they wanted in their lives and work, for example because it involved many non-complex caring tasks, they had to work according to illness-focused protocols and little attention was paid to the individual needs of the patients themselves. "…It wasn't really…focused on the patient…It was really, well, focused on the clinical picture and getting them back home as quickly as possible, you know…" (interviewee 8). One reason why they only discovered this in the third year is that they were always expecting that the ideal clinical placement was still to come. "Of course, I'd focused blindly on that hospital…Every time I just thought, this just isn't for me but the next one will be the right one…" (interviewee 5). "Well, I did go through it pretty easily. I didn't enjoy it that much, but I thought right, that hospital, it will turn up eventually. And you just have to have this as a basis…" (interviewee 8). But then that idealized clinical placement turned out to be disappointing too. "Right, I really thought, then you do all kinds of exciting things and so on, right, of course you do that too in a hospital. You certainly get that as well, but I'd developed a kind of aversion to all that morning care and all that washing and cleaning people…I kind of thought: do I have to do that every day?...I'd got it into my head that you don't have to do that anymore if you work in a hospital" (interviewee 5). Some interviewees could not cope with the irregular shifts either. "And it made me a bit, well, disorientated. In my behaviour too, becoming a bit moody. And that was also quite a major thing that made me think right, if you don't even feel good on that ward, or don't feel good in the hospital…And also, those irregular hours…which you also get…Well, how does that affect you?" (interviewee 8). Finally, the nurses' subordinate position with respect to the doctor was also mentioned. "I mean, I'm not a doctor so I understand that I can't make the decisions. But I do feel you really notice that you are ranked below them" (interviewee 5). What the participants cited above had in common, were their doubts about whether this was the kind of work they wanted to do as their future career. They were aware of this feeling in their contacts with fellow nurses. "When I looked at them, at what they did. And then I basically thought, well, this isn't what I really want for my life, let's say" (interviewee 5).

Taking stock: this isn't what I want

During the third year, the interviewees in question gradually lost faith that the programme would ever be able to satisfy their expectations. They became increasingly aware that the degree programme and the future professional prospects did not match their wishes and expectations, and they eventually concluded: "This is not what I want in my life". They took stock and decided to stop. The difference with the previous group is that this decision was not made in a situation involving increasingly serious problems; it was far more a conscious choice and an awareness that nursing work and the associated training programme did not fit with what they wanted in their professional lives.

Discussion

Two core themes were revealed by the analyses of the interviews with the formal nursing students in this study: ending up in a downward spiral of increasing physical, mental and social problems; and becoming increasingly aware of a mismatch between expectations and reality. Late dropout from nursing education, particularly in the group of students who ended up in a downward spiral, involved a variety of different experiences and reasons: increasing problems with the toughness of the degree programme and clinical placements, losing grip of the learning process due to a lack of coaching and support, character traits leading to increasing physical, psychological and social problems, and the ultimate decision to quit the degree programme.

Dropout has also been described as a multifactorial phenomenon in, previous studies among nursing students who dropped out in their first or second year of study and mixed groups of formal nursing students (e.g. Andrew et al., 2008; Eick et al., 2012; Glogowska et al., 2007; O'Donnell, 2011). For instance, Andrew et al. (2008) interviewed Australian formal nursing students who were already suffering from various physical, mental and social problems in their first year that are comparable to the problems experienced by our group of students who ended up in a downward spiral in their third year of study. The mismatch between expectations and reality has also been described as unmet or unrealistic expectations in studies of early dropout (Harvey and McMurray, 1997; O'Donnell, 2011). However, other factors in studies of early dropout differed from those described in our study and the study by Ten Hoeve et al. (2017) on late dropout. In nursing students who withdraw in an early stage of the programme, being unprepared for university (Andrew et al., 2008), low academic self-efficacy (Harvey and McMurray, 1994) and academic difficulties (Glossop, 2002) often play a prominent role in the decision to stop. Such factors did not play a major role in the decision to stop in the later years of the nursing degree programme. Some previous studies (e.g. Glossop, 2002; Kukkonen et al., 2016) also found that geographical circumstances, viz. a long distance between home and university or clinical placement, played a role in the decision to stop. We did not find indications for this in our study, which might be related to the fact that the Netherlands is a small country. In addition, unlike in some previous studies (e.g. Andrew et al., 2008; Glossop, 2002; Hamshire et al., 2012), none of the former students stopped because of financial reasons. This might be related to the Dutch context where students can take out interest-free loans provided by the government to finance their studies. The effect was rather the reverse, in fact: the accumulated study debt had initially been a reason for some students to continue despite doubts.

A strength of this study is that we gained in-depth, detailed information about reasons specifically for late dropout. This adds to previous studies that mainly focused on early dropout or that did not differentiate between early and late dropout. We reached data saturation after interviewing eleven female, non-migrant former nursing students. However, findings cannot automatically be generalized to the diverse population of Dutch former nursing students because of some limitations. We only included former students from two universities of applied sciences, despite attempts to recruit former students from other applied universities. Another limitation is that – although we tried – we were not able to recruit more than one male interviewee, and one interviewee older than 23 years. In addition, we were not able to recruit former nursing students with a migrant background.

Conclusions and recommendations

Two groups can be distinguished among the nursing students who withdrew in a late stage of their programme. One group consisted of those who found the training and especially the clinical placements difficult, and who ended up in a downward spiral of increasing problems ultimately leading to them dropping out of nursing education. The second group consisted of those who increasingly realized that the training and the future profession did not match their expectations and wishes.

To prevent late dropout resulting from a downward spiral of increasing problems, we recommend creating a safe learning environment in clinical placements, offering proper study coaching and making psychological support available. To prevent the late dropout of students who experience a mismatch between expectations and reality, we recommend creating more realistic expectations by providing proper information. Realistic information should be provided about the degree programme and nursing practice before the start and during the earliest information and introduction days. To keep nursing students motivated in their third year, it is recommended that specific attention should be paid to the broad range of career opportunities and specialties within the nursing profession.

It is recommended that such measures are accompanied by further research. For instance, future research is needed to develop and evaluate intervention programmes that contribute to a safe learning environment with tailored support and coaching opportunities, to enable nursing students to direct their own learning and health. Moreover, in the context of rising shortages of nursing staff further research into late dropout is necessary and should include nursing students in all their diversity.

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Supplementary information

Supplementary file 1. Characteristics of the Bachelor of Nursing degree programme in the Netherlands.

Setting: The Bachelor of Nursing programme in the Netherlands is offered by 17 universities of applied sciences.

Duration of the programme: Four years (equal to 240 ECTS according to the European Credit Transfer and Accumulation System; one ECTS represents 28 hours of students' work). A shorter programme is possible for students who already have a certificate of vocational nursing training.

Entrance requirements: A certificate of higher secondary education (in Dutch: HAVO or VWO) or secondary vocational training (in Dutch: MBO).

Different educational trajectories: Full-time; part-time (for students with a secondary vocational nursing certificate who can combine the programme with paid work in a healthcare institution); combined work and study trajectories (possible from year 3); honours programme (for students who require an extra challenge through extra-curricular modules and/or opportunities to graduate in less time).

Nature and content of the programme: Students are trained for various healthcare settings, such as mental healthcare, community-based healthcare, hospital care, nursing-home care and disabled care. The broad programme is based on the principles of competency-based learning and contains a combination of theoretical training (1535 hours), practical skills training and clinical training in various settings (2300 hours in total).

Main content of the full-time study programme per year, for the two included universities:

- Year 1: theoretical training and practical skills training, including a short introductory clinical placement (between 1 and 10 weeks)
- Year 2: theoretical training and practical skills training, including one long or two short clinical placements (18-20 weeks in total)
- Year 3: long internships (18-20 weeks), supported by theoretical training and minor subject or long clinical placements (18-20 weeks)
- Year 4: minor subject or long clinical placement (18-20 weeks), one long clinical placement (18-20 weeks) and/or graduation assignment

Support structure: During their four years of study nursing students receive coaching regarding their study progress from a faculty member, mostly a master prepared RN, in the role of study career coach. In case of special needs students can apply for counselling on demand. During the internships, every student is supervised by a registered nurse, preferably with a Bachelor's degree, and is assigned to a faculty staff member who monitors the progress in the clinical training, the quality of the learning climate, and is responsible for the final assessment and grading.

Supplementary file 2. Characteristics of the study population

Respondent	Gender	Educational background	Age at start/age at withdrawal	Domestic situation year 3	Educational trajectory
1.	f	higher secondary education (HAVO)*	17/21	Independent	Full-time
2.	f	higher secondary education (HAVO)	18/22	Independent	Full-time/combined paid work and study trajectory
3.	f	higher secondary education (HAVO)	18/22	Independent	Full-time
4.	f	higher secondary education (VWO)*	19/23	Independent	Full-time/honours programme
5.	f	higher secondary education (HAVO)	18/21	Independent	Full-time/combined paid work and study trajectory
6.	f	Bachelor's in Social Sciences degree	30/34	With partner	Part-time/combined paid work and study trajectory
7.	m	higher secondary education (HAVO)	18/22	With parents	Full-time
8.	f	higher secondary education (HAVO)	18/21	With parents	Full-time/combined paid work and study trajectory
9.	f	higher secondary education (VWO)	19/23	Independent	Full-time/honours programme
10.	f	higher secondary education (HAVO)	18/21	Independent	Full-time
11.	f	secondary vocational training	20/21	Independent	Full-time

*In the Netherlands, the entrance requirements for the Bachelor's Nursing degree programme is higher secondary education (in Dutch: HAVO or VWO) or secondary vocational training.

Supplementary file 3. Interview guide

Topic 1: Experiences in the Bachelor of Nursing degree programme
How did you arrive at the decision to do a degree in nursing?
Subtopics:

- Expectations of nursing education/nursing profession
- Experiences from year 1 on
- Experiences theoretical programme
- Experiences clinical placements
- Role of clinical supervisor/co-workers/nursing staff and coach/fellow students
- Experienced support
- Learning environment during clinical placements/university
- Link between education and practice
- Match between training and ambition
- Expectations versus experienced reality
- Experienced physical and mental health
- Financial situation

Topic 2: Coping with training challenges
You have just sketched how your degree programme went; you have faced some challenges. Can you tell me how you dealt with them?
Subtopics:

- Dealing with challenges (coping)
- Personal situation
- Ways to relax after clinical placements/classes

Topic 3: Received support concerning training challenges
Which people or roles could you turn to for support with the academic and practical elements of the degree programme?
Subtopics:

- Nature of the support
- Satisfaction with support
- Experience with help-seeking

Topic 4: Reasons for leaving nursing education
You unenrolled in year 3. Can you say something about the reasons why you quit the programme?
Subtopics:

- Reasons related to theoretical part of the training (university)
- Reasons related to the clinical placements
- Reasons related to the nursing profession
- Personal reasons
- Private circumstances (e.g., family circumstances, financial situation)

Topic 5: Decision-making process regarding stopping the study program
Can you tell me how you arrived at the decision to stop?
Subtopics:

- Moment of considering stopping
- Persons involved
- Different steps in decision-making

Topic 6: Prevention of dropout from nursing education from the perspective of formal nursing students
What did you personally feel was lacking in your degree programme that perhaps could have prevented you from stopping?
Subtopics:

- Preferred changes in educational programme (at university/in clinical placements)
- Preferred support (at university/in clinical placements)

Final questions
Looking back to the period when you were studying nursing, what do you remember most?
Is there anything else you would like to share that could be important for this research?
Do you have any further questions and/or comments about the interview?

CHAPTER 3

Physical and mental determinants of dropout and retention among nursing students: protocol of the SPRiNG cohort study

Ellen J.M. Bakker
Jos H.A.M. Kox
Harald S. Miedema
Sita Bierma-Zeinstra
Jos Runhaar
Cécile R.L. Boot
Allard J. van der Beek
Pepijn D.D.M. Roelofs

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Abstract

Background: The shortage of nursing professionals is of growing concern. The causes of this include the demanding physical and mental workload, leading to a dropout of nurses that may start during their education. However, it is unclear to what extent nursing students already perceive a physical and mental workload leading to health problems during their nursing education and placement, and to what extent these health problems cause students to dropout from nursing education. Very few prospective cohort studies have investigated protective and risk factors in relation to dropout and retention among nursing students.

Main aims of this study are to determine: 1) the prevalence and incidence rates of dropout, 2) the protective and risk factors, and early indicators of dropout, and 3) the interaction between these factors and the indicators.

Methods: Three cohorts of third-year nursing students will be followed for 2.5 years. Students will be enrolled from the Bachelor of Nursing program of the Rotterdam University of Applied Sciences. At baseline, students will receive a self-administered questionnaire. Primary outcome is dropout from nursing education and dropout from the nursing profession. Data on dropout from nursing education will be retrieved from the student administration on a yearly basis. Dropout from the nursing profession will be measured one year after graduation, using the self-reported questionnaire. Secondary outcomes are presenteeism and sick leave (during internship/work). In addition to student characteristics, the questionnaire asks about physical and mental internship/work characteristics, personal and behavioral factors, and experienced physical and mental burden.

Discussion: Data analysis of a large, prospective cohort study with regard to determinants of dropout and retention of nursing students and newly graduated nurses is in progress. Findings emerging from this study can be used to develop a predictive model to identify the first indicators of dropout from nursing education and nursing profession, for which targeted interventions can be deployed.

Background

In an aging population, a shortage of nurses poses a serious threat to the continuity and quality of health care. This shortage often results from increased demand combined with a declining number of new workforce entrants (Clark et al., 2006). In the Netherlands, the number of registered nurses has decreased since 2013 (CBS, 2017) and there is a shortage of specialized nurses (i.e. emergency and intensive care, oncology, neonatology nurses) (van der Velden & Batenburg, 2016). Moreover, the demand for nurse practitioners in the Netherlands is expected to double by 2028 (Capaciteitsorgaan, 2016).

The shortage of nursing professionals is also a growing concern in the European Union (Eurostat., 2017). The European Commission Health workforce acknowledges that there is a significant employee turnover in some fields of health care due to the demanding working conditions (European Commission, 2012). Dropout of nursing students and the early exit of nurses starting their career contribute to this shortage. Research in Australia (Mitchell et al., 2008), the USA (Menzel et al., 2016), Canada (Jourdain & Chenevert, 2010), the UK (Barnes, 2009; Last & Fulbrook, 2003), Finland (Flinkman et al., 2008), Ghana (Abledu & Offei, 2015), Japan (Smith et al., 2003) and Sweden (Lovgren et al., 2014) has shown that, among nurses, physical and mental health problems can lead to dropout and early exit, and that this is a global problem.

The numbers of dropout differ between countries. For example, in the UK in 2015 the average dropout rate for student nurses at universities was ≥ 20% (Health et al., 2015). In Italy in 2011 the nursing students' academic failure rates were 35-37% (Dante et al., 2011). In the Netherlands, the dropout rate among nursing students increased slightly between 2002 and 2012 from 21.2% to 22.3%, respectively (Vereniging Hogescholen, 2017).

Dropout is a complex issue involving a wide range of factors. In Europe, two studies investigated the early exit of nurses, and both reported that a considerable proportion of nurses considered giving up nursing (Aiken et al., 2013; Hasselhorn et al., 2003). In 2003, the multinational NEXT study (Hasselhorn et al., 2003) showed that the proportion of participants considering leaving nursing (several times per month, or more often) ranged from 8.8-36.2% in the participating countries (Hasselhorn et al., 2003, 2008). In the RN4CAST study (a cross-sectional study including 12 European countries), the percentage of nurses that intended to leave their current job ranged from 19-49% (Aiken et al., 2013). In the LANE study, the career pathways in three cohorts of Swedish nursing students were prospectively followed for the first three years of their working life (Rudman et al., 2014). The intention to leave the profession one year after graduating ranged from 10-20% and was more common among younger nurses; in the 2002 cohort, about 2% of the participants had actually left the nursing profession within five years after graduation (Rudman et al., 2014). This indicates that the intention to leave does not necessarily lead to actual turnover.

The intention to leave nursing education or the nursing profession is associated with determinants of study burnout (Rudman & Gustavsson, 2012), job satisfaction, organisational commitment (de Gieter et al., 2011), job demands and work engagement (Schaufeli et al., 2009). In 2003 the determinants of stress, burnout and attrition in nursing students, and the relationships between these determinants, were measured in a prospective longitudinal cohort study; the results show that stress, burnout and attrition might be indirectly associated (Deary et al., 2003).

In the Netherlands, research among 11,000 healthcare employees (including 3,057 nurses) revealed that many suffered from physical or mental health complaints due to work-related issues (Bronkhorst et al., 2014). Nurses reported problems related to the locomotor system, severe fatigue, and feelings of frustration or burnout. In the latter study, half of the nurses reported to have visited a healthcare professional for physical problems, and one out of six for mental problems (Bronkhorst et al., 2014).

It is unclear to what extent (student) nurses already perceive these health problems during their nursing education and/or at the beginning of their career, and to what extent these health problems cause students to dropout from nursing education or their profession. Therefore, the SPRiNG (Studying Professional Resilience in Nursing students and Graduates) project was started. SPRiNG is a collaboration between Rotterdam University of Applied Sciences (RUAS), Erasmus University Medical Center, VU University Medical Center, and the Netherlands Institute for Health Services Research (NIVEL). This article describes the protocol of the SPRiNG cohort study. The aim of this prospective study is to examine dropout and retention of nursing students during their education and/or at the start of their career, and the related protective and risk factors.

Methods

Study design

This is a prospective cohort study including three consecutive cohorts of third-year nursing students from RUAS, followed until one year after graduation.

Setting

Rotterdam is the second largest city in the Netherlands, with ≥ 600,000 inhabitants. The RUAS has ≥ 36,000 students and offers a wide variety of programs in almost all educational sectors. The Bachelor of Nursing is their accredited four-year nursing educational program. According to the Netherlands Association of Universities of Applied Sciences (NAUAS) (Vereniging Hogescholen, 2017), the inflow of nursing student varies between the 15 Dutch universities of applied sciences and per year. In 2015 the Bachelor of Nursing program of RUAS had the largest inflow with 443 nursing students starting their first year. In 2016, RUAS had dropped to the eighth place, with 345 students.

In recent years, the majority of nursing students has failed to finish the program within four years. The graduation rate after five years of study among fulltime students dropped from 56.9% in 2007 to 39.8% in 2011. Students with a non-western migrant background had the lowest graduation rate, i.e. 33.3% in 2007 and 19.8% in 2011. Within the RUAS nursing program, dropout rates between 2002 and 2012 increased from 20% to 26.5%.

Study population

For the present study, three cohorts of third-year nursing students will be followed for three years. They will receive a self-administered questionnaire in the third (t0) and fourth (final) year of their nursing study (t1), and again in their first year as a graduate nurse (t2). The first and the second cohort will be followed for three years, and we plan to continue monitoring the third and fourth cohort (Fig. 1).

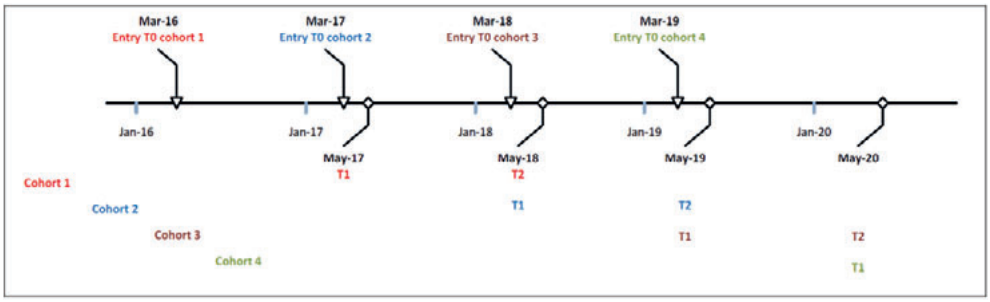

Fig. 1. Timeline of the SPRiNG cohort study.

Participation by the nursing students is facilitated within the educational program, by offering questionnaires as part of the curriculum during lessons that address their professional development. Students can choose whether or not to make their data available for this research. All students who complete the questionnaire at t0 and give informed consent will be followed yearly.

Alumni and social networks will be used to restore lost contacts after the student has left the university. Non-respondents will be contacted by telephone to try and retrieve their job status.

The inclusion of students started in May 2016 (Fig. 2). Based on the response rate at t0 from the first two cohorts, and at t1 from the first cohort, we estimated the numbers expected to be included in this study.

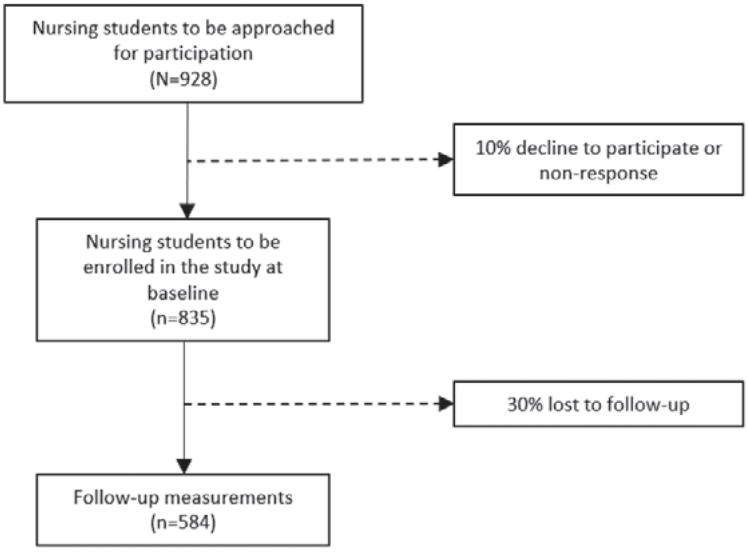

Fig. 2. Flowchart of recruitment, study procedures and the expected response.

Primary outcome

The primary outcome is dropout from nursing education in the second half of the educational period and dropout from the nursing profession during the first year of their career. Dropout from education will be retrieved from the student administration on a yearly basis. In addition, one year after graduation (t2), dropout among working nurses will be measured using a self-reported questionnaire.

Secondary outcomes

Sickness presenteeism

Presenteeism is defined as 'Going to work despite judging one's current state of health as such that sick leave should be taken' and will be measured by the following question: '*During your current internship/ work, have you ever gone to the internship/work despite the feeling that you really should have taken sick leave because of your state of health?*' (Aronsson & Gustafsson, 2005). This is a translation of the question used in the original Dutch-language questionnaire 'Healthy Working in Healthcare' (i.e., *Gezond werken in de zorg*) (Bronkhorst et al., 2014).

Sick leave

Absenteeism due to illness will be measured by three questions included in the Netherlands Working Conditions Survey 2014 (Hooftman et al., 2015): '*Have you ever been on sick leave during this academic year*? (Yes/No), '*How often have you been absent due to sickness*?' (number of times), and '*How many days of work, all together, do you estimate that you have been on sick leave*?' (number of days).

Absenteeism due to physical and mental health complaints

A question on absenteeism due to physical health complaints was taken from the Dutch Questionnaire on Experience and Evaluation of Work (VBBA) 1994 (van Veldhoven & Meijman, 1994). In 1999, the Commission Testing Affairs Netherlands (COTAN) of the Dutch Association of Psychologists (NIP) judged the VBBA to be good in terms of reliability and construct validity (van Veldhoven & Meijman, 1994). Five questions were used to measure physical health symptoms from neck, back and limbs; responses were scored on a 4-point Likert scale ranging from 'always' to 'never'.

The Labour Monitor Municipalities (Arbomonitor Gemeenten) (SAOF Gemeenten, 2006) will be used to measure absenteeism due to work pressure/work stress. The questions on absenteeism due to work pressure/work stress were developed in collaboration with AStri, an independent policy research agency in the field of work and income (SAOF Gemeenten, 2006).

Six specific questions will be used to measure absenteeism due to mental health complaints, with response options: Yes/No.

Professional support regarding physical health problems, mental health problems and social problems, will be measured with three items of the Healthy Working in Health Care questionnaire (Bronkhorst et al., 2014). 1) Physical: '*In the current internship/work period did you look for help regarding the previously mentioned physical complaints*?' Response options are: 'No'; 'Yes, a general practitioner/ company doctor'; 'Yes, a physiotherapist'; or 'Yes, another healthcare professional'.

2) Mental: '*In the current academic year did you visit a healthcare professional for mental help or support?'* Response options are: 'No'; 'Yes, a general practitioner'; 'Yes, a psychologist/psychiatrist'; 'Yes, a university counsellor'; or 'Yes, another'.

3) Social: '*At this moment, due to social problems (e.g., financial/housing problems) do you have a referral to/contact with…*?' Response options are: 'No'; 'Yes, a social worker; 'Yes, a psychologist'; 'Yes, a debt counsellor'; or 'Yes, another.

The composite questionnaire will include the secondary outcomes (sickness presenteeism and sickness absenteeism), and various general, physical and mental health items. Specific areas include: demographics, internship/work characteristics, personal and behavioural factors, and mental and physical health. Table 1 presents an overview of the instruments to be used for the measurements at t0, t1 and t2.

The digital questionnaire ensures standardized responses to questions and eliminates out-of-range responses. As backup, a paper version of the questionnaire will be available for students. Whenever available, validated constructs will be used. If necessary, questions are rephrased to fit the target group. For example, when the original question is about paid work, it is rephrased as 'internship/ work', to address a student.

Population characteristics

Questions on respondent characteristics include: gender (male/female), age (years), body height and weight (BMI), educational background (secondary vocational education/higher professional education/university), nursing educational pathway (fulltime, part-time, in-service), ethnicity (Dutch/ western migrant/non-western migrant), Dutch as first language (yes/no), and housing circumstances (living with parents or caregivers/ living on one's own/ living on one's own with kids/living on one's own with partner/living on one's own with partner and child(ren)). Information on these characteristics will be collected at t0 only.

Determinants

Internship/work-related physical and psychosocial risk factors

For these determinants, six subscales of the validated Dutch version of the Job Content Questionnaire (JCQ) will be used (Karasek et al., 1998), i.e. skill discretion, decision authority, psychological job demands, physical exertion, social support from supervisor, and social support from co-workers. The JCQ measures the physical and psychological characteristics of an imbalance between job demands and resources within an organization. Four self-formulated questions regarding feedback and guidance from the instructor and colleagues will be added ('*My instructor gives me constructive feedback*'; '*My colleagues give me constructive feedback'; 'When I got stuck in my learning process I have somebody to discuss this with'*, and '*My instructor has enough time for my guidance'*). Responses are on a 4-point Likert scale ranging from 'totally disagree' to 'totally agree'.

Lifting and bending, Visual Display Units work

For these determinants, 13 questions related to lifting and bending were taken from the NEXT study (Kümmerling et al., 2003). A scale assessing lifting and bending was developed by the NEXT Study Group on the basis of own validity measurements including pre-tests, in order to quantify the specific physical demands in the nursing profession. The scales were translated from English into Dutch and back to English by four independent native English/Dutch speakers, in order to validate the scales in Dutch language for the SPRiNG study.

Two questions on Visual Display Unit work were taken from the Dutch Questionnaire on the Experience and Evaluation of Work (VBBA) (van Veldhoven & Meijman, 1994).

Aggression and violence, bullying, slander, discrimination

Three single-item questions on aggression and violence, bullying, and slander were taken from the second version of the Copenhagen Psychosocial Questionnaire (COPSOQ II) (Pejtersen et al., 2010). The Dutch translation was obtained from the Healthy Working in Healthcare questionnaire (Bronkhorst et al., 2014) and was used among healthcare professionals, including nurses. Discrimination will be measured by one question from the Netherlands Working Conditions Survey 2014 (21).

Work-family conflict, family-work conflict

Work-family conflict and family-work conflict will be measured using the Netemeyer, Boles scales (Netemeyer et al., 1996). These authors defined work-family conflict as: "A form of interrole conflict in which the general demands of time devoted to and strain created by the job interfere with performing family-related responsibilities"; and family-work conflict as *"*A form of interrole conflict in which the general demands of time devoted to and strain created by the family interfere with performing work-related responsibilities*."* (Netemeyer et al., 1996).

Personal and behavioral factors

Work engagement

Schaufeli & Bakker (Schaufeli & Bakker, 2010) defined work engagement as *"…*a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption." Work engagement will be measured with the 9-item short version of the Utrecht Work Engagement Scale-Short (UWES-S) (Schaufeli et al., 2006).

Occupational self-efficacy

Occupational self-efficacy refers to the confidence a worker has in his/her perceived ability to successfully perform job tasks . This will be measured with the six-item short version of the Occupational Self-efficacy scale (Rigotti et al., 2008).

Physical activity

The Short QUestionnaire to ASses Health enhancing physical activity (SQUASH), will be used to measure

physical activity (Wendel–Vos et al., 2003). SQUASH is a fairly reliable (r=0.58) and reasonably valid (r=0.45) questionnaire to measure physical activity. SQUASH will assess the activities during a regular week in the past month with regard to the duration, frequency, and intensity of leisure time activities, household activities, activity at work and school, and commuting activities (Wendel–Vos et al., 2003).

Table 1. Overview of the study outcomes and scales.

Outcomes	Instrument and source
Primary outcome	
• dropout	(retrieved from student administration)
Secondary outcomes	
• presenteeism (during internship/work)	Sickness Presenteeism, (Aronsson & Gustafsson, 2005)
sick leave (during academic year)	Sickness Absenteeism, NEA, (Hooftman et al., 2015)
Determinants*/Potential predictors*	
Internship/work characteristics (general)	
• decision latitude (skill discretion + decision authority) • psychological job demands • physical exertion • social support from supervisor • social support from co-workers	JCQ, (Karasek et al., 1998)
Internship/work characteristics (physical)	
• lifting and bending	NEXT, (Kümmerling et al., 2003)
• monitor work	VBBA, (van Veldhoven & Meijman, 1994)
Internship/work characteristics (mental)	
• aggression and violence • bullying • slander	COPSOQ II, (Pejtersen et al., 2010)
• discrimination	NEA, (Hooftman et al., 2015)
Personal and behavioural factors	
• work engagement • vigor • dedication • absorption	UWES-S, (Schaufeli et al., 2006)
• occupational self-efficacy	Occupational Self-Efficacy Scale short version (Rigotti et al., 2008)
• work-family conflict, family-work conflict	WFC scale and FWC scale (Netemeyer et al., 1996)
• physical activity	SQUASH (Wendel–Vos et al., 2003)
Experienced physical burden	
• musculoskeletal symptoms	DMQ, (Hildebrandt, 2001)
• use of support for physical health problems	'Gezond werken in de zorg' [Healthy Working in Healthcare] questionnaire, (Bronkhorst et al., 2014)
Experienced mental burden	
• distress	Distress Screener, (Braam et al., 2009)
• need for recovery	NFR scale, (van Veldhoven & Broersen, 2003)
• use of support for mental health problems	VBBA, (van Veldhoven & Meijman, 1994)

Mental and physical health

Distress

To measure non-specific distress we will use the Distress Screener, which comprises three items of the 4DSQ distress subscale. The 4DSQ is a self-report 50-item questionnaire that measures non-specific distress, depression, anxiety and somatization. For the purpose of this study a short questionnaire, and a sensitive instrument able to detect early signs of mental health problems, are needed. The Distress Screener (developed for early identification of non-specific distress) has three items; we will use a cut-off point > 4 to detect moderate distress (Braam et al., 2009). The Distress Screener is a valid instrument for early identification of distress in employees on sick leave as well as for non-sick listed employees at risk of future mental sickness absence (van Hoffen et al., 2016).

Need for recovery

Need for recovery has been conceptualized as the experience of accumulating work-induced fatigue and is an early indicator of risk of depression (Nieuwenhuijsen et al., 2016). The Need for Recovery after work (NFR) scale (van Veldhoven & Broersen, 2003) is a part of the VBBA (van Veldhoven & Meijman, 1994). The NFR scale consists of 11 dichotomous items (Yes/No) and has good reliability, concurrent validity and sensitivity to change (de Croon et al., 2006).

Musculoskeletal symptoms

Questions related to health (particularly musculoskeletal symptoms) from the Dutch Musculoskeletal Questionnaire (DMQ) will be used (Hildebrandt, 2001). The phrasing of these questions regarding prevalence is comparable with the Nordic Questionnaire on Musculoskeletal Disorders (Kuorinka et al., 1987), including definition of the areas of the body using a mannequin. The DMQ enables global assessment of physical workload and other potentially hazardous working conditions. Most indices show significant associations with low back and/or neck-shoulder symptoms; therefore, these indices can be used as one of the means to identify risk groups (Hildebrandt, 2001). In the t0 questionnaire this will be asked two times (for the current training and the previous practical training), since most third-year students do a practical training in the first semester of the academic year and another in the second semester. This type of retrospective measurement will give an indication about the accumulation of musculoskeletal symptoms.

Expectations regarding the nursing program and nursing profession

Expectations about the nursing program and profession will be measured using seven self-formulated questions: [My internship/work corresponds with my expectations of the nursing profession]; [My internship/work corresponds with what I learn at the university]; [I expect to stay working in the healthcare sector after graduation]; [I expect to finish nursing school with a diploma]; [I expect to stay working as a nurse after graduation]; [I am expecting a study delay]; and [I am considering quitting my study]. Answers are rated on a 10-point Likert scale ranging from ‘definitely not’ to ‘definitely yes’.

Data handling and statistical analyses

Key aims of this study are to determine: 1) incidence rates of dropout, 2) protective and risk factors, and early indicators of dropout, and 3) interactions between these factors and indicators.

Data handling

Data will be collected using Limesurvey (Version 2.06lts Build 160524). Data will be exported to a secured SPSS database for management and analyses. To avoid potential conflict of interest, the principle researchers will be blinded from any results that can relate data back to the individual respondents; therefore, this work will be done by independent researchers. Personal data will be extracted from the dataset before analysis takes place. Analyses will be carried out using IBM SPSS Statistics, version 24 or higher (IBM Corp., NY, USA).

Preliminary analysis and transformation of variables

First, for each cohort the differences in demographics (age, gender, educational level at entrance, and study route) and the primary outcome 'dropout' between students included and not included (non-responders) in the cohort will be compared. For students in the cohort, data from the student administration will be used.

Second, descriptive statistics of outcomes and determinants will be provided and quantitative variables will be depicted graphically using histograms and normal probability plots.

Assessment of prevalence and incidence

In the study population, point prevalence will be estimated for mental and physical health problems, absenteeism, presenteeism, and sick leave at baseline (t0), after one year (t1), and one year after graduation (t2), in order to characterize the cohort. Incidence in the study population will be calculated for mental and physical health problems, absenteeism, presenteeism, and dropout after one year (t1) and also one year after graduation (t2).

Regression and covariate adjustment

To relate dropout and retention to potential determinants and covariates, regression analyses will be conducted. First we will analyse the univariate relationships between all potential determinants (protective and risk factors, and early indicators) and outcomes (dropout, absenteeism, presenteeism, retention). Then, a multivariate model will be constructed for all determinants with an association of $p < 0.05$. To study the relation between one or more independent variables with the continuous dependent variables (absenteeism, presenteeism), linear regression analyses will be used. Logistic regression analyses will be conducted to study the relation with dependent dichotomous variables (intention to leave nursing school or profession, actual dropout).

A latent class analysis (Jung & Wickrama, 2008) will be performed to identify subgroups. This analysis will focus on the relations between individual participants, instead of the relations between variables. Response patterns can be revealed that might be distinctive for a subgroup and will differ from response patterns in other subgroups.

Missing data

We expect to have follow-up data (determinants and secondary outcomes) from at least 80% of all students. Primary outcome data (dropout) will be available for all students from the student administration. We will anticipate to the possible missing values (MCAR & MAR). For statistical analysis techniques will be used that are robust for missing values (modelling to collected data) and sensitivity analyses will be performed on multiple imputed data sets (Rubin & Schenker, 1991).

Discussion

This study will provide information on 1) the prevalence and the incidence rates of dropout, 2) the protective and risk factors, and early indicators of dropout, and 3) the interactions between these factors and indicators. This article describes the protocol and methodology of the study.

Strengths and limitations

Few longitudinal studies are available on nursing students and recently graduated nurses. The actual shortage of nurses necessitates the prevention of avoidable dropout. Implementation of effective preventive interventions with regard to physical and mental resilience may help to ensure a sufficient number of nurses, which is an essential condition to guarantee adequate quality of care. Therefore, we need to know which determinants play an important role and which of these determinants are modifiable.

A potential limitation of the present study is that respondents originate from RUAS only. To generalize our results to the national population of nursing students and new graduates, we will investigate to what extent the population characteristics of our Rotterdam sample differ from the national population of nursing students and new graduates, as available through the National Association of Universities of Applied Sciences (Vereniging Hogescholen, 2017).

The findings of this study can be used to develop a predictive model that identifies early signals for dropout from nursing education and nursing profession, for which potentially targeted interventions can be deployed. Plans within the SPRiNG project include exploring yet unknown reasons for dropout through qualitative research, systematic reviews of effective preventive interventions, and testing of the most feasible interventions in a pilot study. These steps will provide an additional toolbox with targeted interventions that can be implemented in nursing education or nursing practice to prevent dropout.

Abbreviations

BMI, body mass index; **CBS**, Centraal Bureau voor de Statistiek [Statistics Netherlands]; **COPSOQ**, Copenhagen Psychosocial Questionnaire; **COTAN**, Commissie Testaangelegenheden Nederland [Commission Testing Affairs Netherlands]; **DMQ**, Dutch Musculoskeletal Questionnaire; **FWC**, Family-work conflict; **JCQ**, Job Content Questionnaire; **NAUAS**, Netherlands Association of Universities of Applied Sciences; **NEA**, Nationale Enquête Arbeidsomstandigheden [National Questionnaire Working Conditions]; **NEXT**, Nurses' Early Exit Study; **NFR**, Need For Recovery; **NIP**, Nederlands Instituut van Psychologen [Dutch Association of Psychologists]; **NIVEL** Nederlands instituut voor onderzoek van de gezondheidszorg [Netherlands institute for health services research]; **NWO**, Netherlands Organisation for Scientific Research; **RUAS**, Rotterdam University of Applied Sciences; **SPRiNG**, Studying Professional

Resilience in Nursing students and Graduates; **SQUASH**, Short QUestionnaire to ASses Health enhancing physical activity; **UWES-S**, Utrecht Work Engagement Scale – Short; **VBBA**, Vragenlijst Beleving en Beoordeling van de Arbeid [Questionnaire Experience and Evaluation of Work]; **VDU**, Visual display Unit; **WFC**, Work-family conflict; **4DSQ**, Four-Dimensional Symptom Questionnaire.

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CHAPTER 4

Psychosocial work characteristics associated with distress and intention to leave nursing education; a one-year follow-up study

Ellen J.M. Bakker
Pepijn D.D.M. Roelofs
Jos H.A.M. Kox
Harald S. Miedema
Anneke L. Francke
Allard J. van der Beek
Cécile R.L. Boot

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Abstract

Background: Dropout in later years of the nursing degree programme involves lost investment and is a particular problem for both students and educators. Reasons for late dropout seem to be related to the work and learning environment of the clinical placement.

Objectives: The aim of this study was to investigate associations between psychosocial work characteristics and distress and intention to leave nursing education among third-year nursing students.

Design: A prospective cohort study.

Setting: A Bachelor of Nursing programme of a University of Applied Sciences in Rotterdam.

Participants: 363 third-year nursing students**.**

Methods: Baseline and one-year follow-up measurements were used from a prospective cohort study. Third-year nursing students were invited annually in May between 2016 and 2018. Psychosocial work characteristics were psychological demands, supervisor and co-worker support, and acts of offensive behaviour. Logistic regression analyses were used to build multivariate models.

Results: Frequent exposure to violence (OR = 2.52, 95% CI: 1.29–4.92) was univariately associated with distress. In the multivariate model for distress, psychological demands (OR = 1.63, 95% CI: 1.05–2.52) and frequent exposure to violence (OR = 3.02, 95% CI: 1.48–6.19) were associated with distress. Supervisor support (OR = 0.54, 95% CI: 0.36-0.80) and co-worker support (OR = 0.41, 95% CI: 0.24–0.72) were negatively associated with intention to leave (i.e. were protective) in the univariate model. In the adjusted multivariate model, only co-worker support (OR = 0.50, 95% CI: 0.25–0.97) was a protective factor for an intention to leave.

Conclusion: Psychological demands and frequent exposure to violence are risk factors for distress, and co-worker support is a protective factor reducing the intention to leave nursing education in the last stage of the programme. Improving the psychosocial working climate of nursing students may reduce the intention to leave at a late stage in nursing education, and hence actual late dropout.

Introduction

Dropout among nursing students is a multifactorial phenomenon and has been examined in previous studies, mainly focusing on early dropout or dropout in general (e.g., Hamshire et al., 2019; Eick et al., 2012; O'Donnell, 2011; Andrew et al., 2008; Glogowska et al., 2007). Dropout occurs in different stages of the nursing educational programme; dropout in later years of the nursing degree programme involves lost investment and is a particular problem for both students and educators. Reasons for late dropout seem to be related more to the clinical placement than to the academic programme (Bakker et al., 2019; Ten Hoeve et al., 2017). Clinical placements form a major part of the nursing educational programme (Eick et al., 2012). In the systematic review of Eick et al. (2012) on placement-related dropout, unpleasant experiences, lack of acceptance and lack of support in the workplace were found to be major factors for nursing student dropout. It may be possible to reduce late dropout among nursing students by making changes to the work and learning environment in their clinical placements.

Background

The association between nurses' work environment and dropout and dropout-related outcomes (e.g., intention to leave, sickness absence, distress and burnout) has been explored in several studies using influential psychosocial models, such as the Job Demands-Resources model (Demerouti et al., 2001) or the Job Demand-Control (-Support) model (Karasek et al., 1998). In these models, psychosocial work characteristics, such as psychological job demands, job control and co-worker and supervisor support, are aspects of the psychosocial work environment. These characteristics play a role in predicting developments in job-related illnesses, psychological distress, job engagement and early exit. For instance, in a study by Moloney et al. (2017) higher workload and higher work-life interference were the strongest predictors of intentions to leave the healthcare organisation and the nursing profession. Support from colleagues, and supervisor and organisational support were indirectly linked, via burnout and work engagement, to the intention to leave the organisation and the nursing profession. Acts of offensive behaviour can be seen as contributors to job demands and include verbal and physical violence, bullying, gossip and slander, sexual harassment, and discrimination (Pejtersen et al., 2010). Clausen et al. (2012, 2016) conducted two studies among staff in residential care settings and found associations between threats of violence, physical violence, bullying, and sexual harassment increased long-term sickness absence.

However, information regarding whether and to what extent psychosocial work characteristics contribute to dropout from nursing education is scarce. Although this was examined in some qualitative and cross-sectional quantitative studies, longitudinal quantitative research is limited (Eick et al., 2012). Only a few longitudinal studies have been performed on student nurse dropout: three retrospective studies (Pryjmachuk et al., 2009; Wray et al., 2012, 2016) and one prospective study (Deary et al., 2001). Deary et al. (2001) found associations between personality traits and dropout; those who discontinued their training scored lower on the traits of agreeableness and conscientiousness. No associations were found between sex, age, cognitive ability, coping strategies and psychological distress. Pryjmachuk et al. (2009) found associations between dropout and age, prior education, gender, migrant status, clinical placement and specialty branch, and Wray et al. (2012, 2016) discovered associations for demographic characteristics such as age, distance from the nursing programme and having previous care experiences.

In order to intervene early and to avoid nursing students dropping out at a late stage in their training, it is important to know which modifiable psychosocial work characteristics are associated with dropout from nursing education. Distress and intention to leave nursing education are linked to dropout (Deary et al., 2001). Therefore, the aim of our study was to investigate the association for students of psychosocial work characteristics with distress and intention to leave nursing education.

Methods

Design and participants

This prospective cohort study consisted of three consecutive cohorts of third-year nursing students who participated in the larger SPRiNG cohort study at the Rotterdam University of Applied Sciences in the Netherlands. SPRiNG is an acronym for Studying Professional Resilience in Nursing students and new Graduates. This study aims to examine health-related protective and risk factors for dropout and retention of nursing students during their education and at the start of their career (Bakker et al., 2018). The university's Bachelor of Nursing programme has an average annual intake of approximately 500 first-years and offers an accredited four-year educational programme. During training, a minimum of four 20-week clinical placements take place; one in the second year, two in the third year and one in the fourth year of the programme. Students with part-time or study-work trajectories have clinical placements during the entire third and fourth years of training. During clinical placements, nursing students practice nursing roles in various healthcare settings, guided by a clinical supervisor (a registered nurse) and a faculty member from the Nursing degree programme. This faculty member monitors the quality of the learning climate and study progress.

Procedure

In this prospective cohort study, psychosocial work and background characteristics were measured at baseline, and outcomes were measured follow-up. A conceptual framework is presented in Figure 1. To perform an analysis on participants with missing data at follow-up, the outcomes distress and intention to leave were also measured at baseline.

Third-year nursing students were invited annually in May between 2016 and 2018. Participation by the third-year nursing students was facilitated within the educational programme by offering a self-administered (baseline) questionnaire in the second part of semester two in the third year of the programme and another (follow-up) questionnaire a year later in their final (fourth) year. The questionnaires were offered as part of the curriculum during lessons that address their professional development (baseline) and their research skills (follow-up). They were informed about the study before being approached for participation. Students could choose whether to make their data available for the SPRiNG research project. Besides data from the questionnaires, data was used from the Rotterdam University of Applied Sciences' record systems to determine the study status of the participants. All students who completed the questionnaire at baseline and gave their informed consent were followed (N=711).

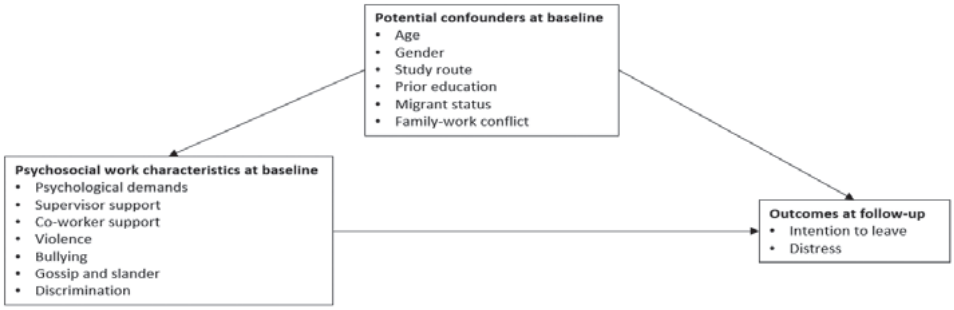

Figure 1. Conceptual framework of the relationship between psychosocial work characteristics, potential confounders and outcomes.

Measurement instruments

To measure non-specific distress, the Distress Screener (Braam et al., 2009) was used. It comprises three items from the 4DSQ distress subscale. The 4DSQ is a self-report 50-item questionnaire that measures non-specific distress, depression, anxiety and somatisation. The Distress Screener is a valid instrument for early identification of distress in employees on sick leave as well as for employees not on sick leave but at risk of future absence due to mental illness (van Hoffen et al., 2016). The Distress Screener contains the following three items: (1) "Did you suffer from worrying in the last week?" (2) "Did you suffer from listlessness in the past week?" (3) "Did you feel tense in the last week?" The answer categories for the questions were: 'no' (score 0), 'sometimes' (score 1), or 'regularly/very often' (score 2). The scores of the three questions were added together; a total score of 4 or higher was used to detect moderate distress (Braam et al., 2009). The Cronbach's alpha (0.83) showed good internal consistency of the scale at baseline and follow-up.

Intention to leave nursing education, was measured by one self-formulated statement: "I am considering quitting my study." Answers were rated on a 10-point Likert scale ranging from 'definitely not' (score 1) to 'definitely yes' (score 10). A cut-off point of >1 was used to detect an intention to leave, given the distribution of the scores. Finally, actual dropout at follow-up was measured through data on student status, retrieved from the university's student administration. This data was classified in two categories: dropped out or not dropped out.

Measurement instruments psychosocial work characteristics

Psychological demands, supervisor support and co-worker support were measured using three subscales of the validated Dutch version of the Job Content Questionnaire [JCQ] (Karasek et al., 1998). The JCQ measures the physical and psychological characteristics of an imbalance between job demands and resources within an organisation. Responses are on a 4-point Likert scale ranging from 'totally disagree' to 'totally agree'. The psychological demands scale contains five items: "work fast", "work hard", "no excessive work", "enough time", and "conflicting demands". In the supervisor support subscale, 'supervisor' was replaced by 'clinical supervisor' (referring to the teaching nurse). This subscale contains four items; the clinical supervisor: "is concerned", "pays attention", "is helpful" and "is a good organizer". Co-worker support contains four items; co-workers: "are competent", "take

an interest in me", "are friendly" and "are helpful". The internal consistency of the scales is good with Cronbach's Alphas ranging from 0.71 (psychological demands) to 0.87 (clinical supervisor).

Acts of offensive behaviour (threats of and physical violence; bullying; gossip and slander) were measured by single-item questions taken from the second medium and long version of the Copenhagen Psychosocial Questionnaire [COPSOQ II] (Pejtersen et al., 2010). The Dutch translation was obtained from the Healthy Working in Healthcare questionnaire (Bronkhorst et al., 2014). All three items contain one question with five answer categories: (1) 'never', (2) 'a few times', (3) 'every month', (4) 'every week' and (5) 'every day'. Threats of and physical violence were measured by two items of the COPSOQ II, which follow the World Health Organisation's definition of violence, which includes actual and threatened use of physical force: "Have you been exposed to threats of violence or physical violence at your workplace during the last 12 months?". To address the target group directly, 'workplace' was replaced by 'clinical placement' and 'the last 12 months' by 'the current academic year'. Bullying was defined as repeated exposure to unpleasant or degrading treatment where the person involved finds it difficult to defend himself or herself against this.

Discrimination was measured by one question from the Netherlands Working Conditions Survey 2014: "Have you been personally discriminated against during your clinical placement/work this academic year?" (Hooftman et al., 2015). The answering categories were: (1) 'no' and (2) 'yes'.

Measurement instruments potential confounders

Based on other studies (Deary et al., 2001; Watson et al., 2009; Eick et al., 2012; Pryjmachuk et al. 2009; Wray et al., 2012, 2016), the following potential confounders were selected: age, gender, migrant background, prior education, study route and family-work conflict. Migrant background was measured using the definition of Statistics Netherlands (CBS, 2016): "a person with a migration background is someone of whom at least one parent was born abroad". Prior education originally consisted of five categories. We merged these into three categories: (1) 'higher general secondary education', (2) 'secondary vocational nursing training', and (3) 'pre-university education, higher vocational education or university education'. The study route was dichotomized into: (1) 'full-time' and (2) 'part-time or study-work combination'. Family-work conflict was measured using the Netemeyer and Boles scale (Netemeyer et al., 1996). In this scale, family-work conflict is defined as: "a form of interrole conflict in which the general demands of, time devoted to, and strain created by the family, interfere with performing work-related responsibilities." (p. 401). Reliability analysis of this scale revealed a Cronbach's Alpha of 0.87.

Data analysis

At first, descriptive analyses for the study sample were performed for all outcomes, psychosocial work characteristics and potential confounders. For reasons of statistical power (to avoid nearly empty categories) the answer categories for violence, as well as for gossip and slander, were merged in the analysis to create three categories: (1) 'never', (2) 'occasionally (a few times)', and (3) 'frequently (every month, every week, or every day)'. For the same reason, bullying was dichotomized into (1) 'no' and (2) 'yes (a few times, every month, every week, or every day)'.

A check was performed on whether the variables were normally distributed. Correlations between all variables (outcomes, psychosocial work characteristics and confounders) were calculated using Spearman's rho to check for multicollinearity ($r>0.7$). Then a comparison between all outcomes, psychosocial work characteristics and confounders was made between groups with a baseline measurement and follow-up measurement on the one hand and those without a follow-up measurement (baseline measurement only) on the other hand.

We used a three-step procedure to build logistic regression models, with separate models for distress and intention to leave nursing education. Firstly, for each psychosocial work characteristic, the univariate association with the outcome measures was examined (crude effect sizes). Secondly, the potential confounders were added to the univariate models in a stepwise procedure. If the regression coefficient of the psychosocial work characteristics changed by more than 10%, the confounder was considered relevant and kept in the adjusted model. Finally, a multivariate model was constructed that included all psychosocial work characteristics, correcting for all relevant confounders. All analyses were performed using IBM SPSS version 26.0.

Ethical considerations

This study was conducted according to the principles of the Declaration of Helsinki, 64th World Medical Association General Assembly, Fortaleza, Brazil, October 2013, and in accordance with the Dutch Medical Research Involving Human Subjects Act. The Medical Ethical Review Committee of the Erasmus Medical Centre in Rotterdam, the Netherlands approved the study (MEC number: FMS/sl/273789). The study complies with the Dutch Code of Conduct for Scientific Practice drawn up by the Association of Universities in the Netherlands (VSNU). Participants were informed about the study orally and in writing, before being approached for participation. All participants gave written informed consent.

Results

Characteristics of participants

Of the total of 995 third-year nursing students who were invited, 169 did not give permission and 115 did not respond to the invitation to participate in the cohort study. Of the total study population (N=711), 51.1% (n=363) responded at both baseline and follow-up (Figure 2).

Table 1 shows that the group with a baseline measurement only, i.e. the nonresponse group, were significantly younger, were more likely to have started nursing education with the minimum requirements (higher general secondary education) and were more likely to be studying full-time. They scored significantly higher on intention to leave at baseline (35.5 (n=129) versus 44.5 (n=155), *p*-value = 0.01) and actual dropout at follow-up (1.9% (n=7) versus 4.9% (n=17), *p*-value = 0.03) but did not differ in distress scores at baseline.

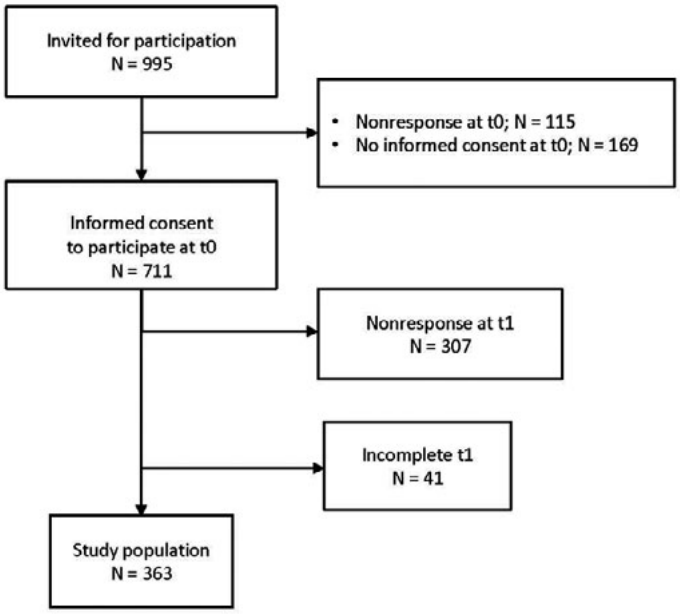

Figure 2. Flow chart of included participants.

Table 1. Outcomes, psychosocial work characteristics and potential confounders of study and nonresponse group.

	Study group (N = 363)[a]		Nonresponse group (N=348)[b]		
	% (n)		*% (n)*		*p*-value[d]
Outcomes at baseline[c]					
Distress (% moderate to high distress)	44.1 (160)		47.1 (164)		0.41[f]
Intention to leave (% intended to leave)	35.5 (129)		44.5 (155)		**0.01**[g]
Outcomes at follow-up					
Distress (% moderate to high distress)	47.9 (174)		-		-
Intention to leave (% intended to leave)	27.8 (101)		-		
Actual dropout (% dropped out)	1.9 (7)		4.9 (17)		**0.03**[h]
Psychosocial work characteristics at baseline	**mean (SD)**	**min-max**	**mean (SD)**	**min-max**	
Psychological demands	2.8 (0.5)	1.3 – 4	2.9 (0.5)	1.5 - 4	0.08[e]
Supervisor support	3.0 (0.6)	1 – 4	2.9 (0.7)	1 - 4	0.30[e]
Co-worker support	3.1 (0.5)	1.8 – 4	3.1 (0.5)	1.5 - 4	0.29[e]
Violence (never/occasionally/frequently)	***% (n)***		***% (n)***		
% occasionally	53.2 (193)		49.7 (173)		0.71[f]
% frequently	15.4 (56)		16.4 (57)		
Bullying (% yes) no/yes	6.9 (25)		7.8 (27)		0.66[f]
Gossip and slander					
% occasionally	40.2 (146)		40.2 (140)		0.09[f]
% frequently	20.9 (76)		25.9 (90)		
Discrimination no/yes (% yes)	12.1 (44)		12.1 (42)		0.98[f]
Potential confounders at baseline	**mean (SD)**	**min-max**	**mean (SD)**	**min-max**	
Age	24.0 (6.2)	19 - 55	23.0 (4.6)	19 - 53	**0.02**[g]
Gender (% female)	***% (n)***		***% (n)***		
	91.2 (331)		89.1 (310)		0.35[f]
Ethnicity (% migrant)	27.0 (98)		33.0 (115)		0.08[f]
Prior education					**0.005**[f]
% secondary vocational nursing training	31.4 (114)		26.2 (91)		
% higher general secondary education	49.6 (180)		61.2 (213)		
% pre-university education, higher vocational education, university education or other	19.0 (69)		12.6 (44)		
Study route (% full-time)	57.6 (209)		66.1 (230)		**0.02**[f]
	mean (SD)	**min-max**	**mean (SD)**	**min-max**	
Family-work conflict 1-5 low-high	1.9 (0.8)	1- 5	2.0 (0.8)	1 - 4.4	0.32[e]

[a] The study group contained baseline and follow-up measurements.

[b] The nonresponse group contained only baseline measurements; respondents were lost to follow-up. At follow-up, we were only able to collect data on study status.

[c] To perform a study dropout analysis, the outcomes distress and intention to leave were also measured at baseline.

[d] We measured whether the differences between the study and nonresponse groups scores were statistically significant (p-value < 0.05).

[e] Independent sample t-test

[f] Chi-squared test

[g] Mann-Whitney U test

[h] Fisher's exact test

Results for distress and intention to leave

In the crude univariate model for distress (Table 2) high psychological demands (OR = 1.58, CI: 1.05–2.37) and frequent exposure to violence (OR = 2.66, 95% CI: 1.37–5.16) were significantly associated with distress. In the adjusted models, after including family-work conflict, only frequent exposure to violence (OR = 2.52, 95% CI: 1.29-4.92) was significantly associated with distress, while high psychological demands was not. In the multivariate model for distress, high psychological demands (OR = 1.63, 95% CI: 1.05–2.52) and frequent exposure to violence (OR = 3.02, 95% CI: 1.48–6.19) were significantly associated with distress. Supervisor support, co-worker support, occasional exposure to violence, bullying, occasional and frequent exposure to gossip and slander, and discrimination were not significantly associated with distress.

In the crude univariate model for intention to leave (Table 3), supervisor support (OR = 0.52, 95% CI: 0. 0.35–0.76), co-worker support (OR = 0.39, 95% CI: 0.23–0.69) and being discriminated against (OR = 1.97, CI: 1.03–3.78) were significantly associated with intention to leave. After including family-work conflict in the adjusted model, supervisor support (OR = 0.54, 95% CI: 0.36–0.80) and co-worker support (OR = 0.41, 95% CI: 0.24–0.72) still showed a significant association with intention to leave (i.e. both reduced the intention to leave), but being discriminated against (OR = 1.87, CI: 0.97–3.61) did not. Finally, in the multivariate model, only co-worker support (OR = 0.50, 95% CI: 0.25–0.97) remained significantly associated, as a protective factor, with an intention to leave one year later. Psychological demands, violence, gossip and slander, and bullying were not significantly associated with intention to leave.

Table 2. Crude univariate, adjusted univariate and adjusted multivariate models for distress by logistic regression analysis (N = 363).

	Distress after one-year follow-up					
	Crude univariate		Adjusted[a] univariate		Adjusted multivariate	
Psychosocial work characteristics	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**
Psychological demands	**1.58***	**1.05 - 2.37**	1.48	0.98 - 2.24	**1.63***	**1.05 - 2.52**
Supervisor support	0.96	0.68 - 1.35	1.04	0.73 - 1.48	0.99	0.64 - 1.52
Co-worker support	1.21	0.76 - 1.91	1.34	0.84 - 2.14	1.47	0.82 - 2.63
Violence (ref = no violence)						
occasionally	1.35	0.84 - 2.15	1.30	0.81 - 2.09	1.28	0.79 - 2.07
frequently	**2.66****	**1.37 - 5.16**	**2.52****	**1.29 - 4 .92**	**3.02****	**1.48 - 6.19**
Bullying (ref = not being bullied)						
being bullied	0.71	0.31 - 1.62	0.53	0.22 - 1.28	0.45	0.16 - 1.26
Gossip/slander (ref = no gosp./sl.)						
occasionally	1.20	0.76 - 1.91	1.18	0.74 - 1.89	1.19	0.73 - 1.94
frequently	1.00	0.57 - 1.75	0.93	0.53 - 1.65	0.95	0.49 - 1.84
Discrimination (ref = no discrim.)						
being discriminated against	0.89	0.47 - 1.68	0.82	0.43 - 1.56	0.95	0.46 - 1.96

Abbreviations: OR, odds ratio; CI, confidence interval; ref, reference group.

*p<0.05

**p<0.01

[a]Adjusted for family-work conflict

Table 3. Crude univariate, adjusted univariate and adjusted multivariate models for intention to leave by logistic regression analysis (N=363).

	Intention to leave after one-year follow-up					
	Crude univariate		Adjusted[a] univariate		Adjusted multivariate	
Psychosocial work characteristics	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**
Psychological demands	0.87	0.55 - 1.35	0.81	0.52 - 1.28	0.65	0.40 - 1.08
Supervisor support	**0.52****	**0.35 - 0.76**	**0.54****	**0.36 - 0.80**	0.62	0.39 - 1.00
Co-worker support	**0.39****	**0.23 - 0.69**	**0.41****	**0.24 - 0.72**	**0.50***	**0.25 - 0.97**
Violence (ref = no violence)						
occasionally	0.86	0.51 - 1.46	0.84	0.49 - 1.42	0.86	0.50 - 1.47
frequently	1.87	0.95 - 3.66	1.77	0.90 - 3.50	1.70	0.81 - 3.55
Bullying (ref = not being bullied)						
being bullied	2.17	0.95 - 4.94	1.89	0.81 - 4.42	1.24	0.44 - 3.53
Gossip/slander (ref = no gosp./sl.)						
occasionally	0.89	0.53 - 1.50	0.87	0.52 - 1.48	0.72	0.42 - 1.25
frequently	1.28	0.70 - 2.35	1.22	0.67 - 2.26	0.64	0.31 - 1.33
Discrimination (ref = no discrim.)						
being discriminated against	**1.97***	**1.03 - 3.78**	1.87	0.97 - 3.61	1.66	0.79 - 3.50

Abbreviations: OR, odds ratio; CI, confidence interval; ref, reference group.

*p=<0.05

**p=<0.01

[a]Adjusted for family-work conflict

Discussion

This prospective cohort study reveals that psychosocial work characteristics are associated with both distress and intention to leave. Psychological demands and frequent exposure to violence are risk factors for distress, and co-worker support is a protective factor reducing the intention to leave nursing education in year four, the last stage of the programme.

Distress

Previous research revealed that nursing students, despite their supernumerary status, are sometimes deployed as workers (e.g., Eick et al., 2012). This seems to be a short-term solution for nursing shortages. In the long run this might have an unfavourable effect, as our study shows; high psychological demands in the third year of study were significantly associated with distress a year later.

In the present study, supervisor support and co-worker support were not associated with feelings of distress. This is not in line with the findings of Karaca et al. (2019), who found in their case-control study among 516 nursing students that social support was a protective factor for the maintenance of mental health, which is a broader concept. However, in that study mental health was measured using the General Health Questionnaire [GHQ] (Goldberg and Hillier, 1979). Furthermore, a different concept of social support was used: support from family, friends and significant others rather than support at work.

According to the Job Demands-Resources model, (Bakker & Demerouti, 2007), support is a resource that can counteract the negative effects of psychological demands. In our multivariate model of distress, we found no indication of a unique contribution by social support in explaining distress in addition to psychological demands. Future research is needed into the interaction effect or buffer effect of social support in the association between psychological demands and nursing students' distress.

The impact of offensive behaviours (exposure to threats or violence, bullying, gossip and slander, and discrimination) on employee wellbeing within healthcare organisations has been studied extensively. Our findings regarding the association between violence and distress are consistent with previous studies (Clausen et al., 2012; Hogh & Viitasara, 2005; Moloney et al., 2008) but not for bullying (Clausen et al., 2012). In the retrospective longitudinal study of Clausen et al. (2012) among 9,520 female employees in the Danish care services for the elderly, employees frequently exposed to threats, violence and bullying had a significantly increased risk of long-term sickness absence, an outcome related to distress. The systematic review of Hogh and Viitasara (2005) demonstrates in 5 of the 16 included studies that being subjected to violence at work (mainly nurses in psychiatric hospitals) have mental health consequences such as psychological distress or symptoms of Posttraumatic Stress Disorder. Moloney et al. (2008) found in a cross-sectional study surveying 2,876 registered nurses in New Zealand that an exposure to aggressive and troublesome patients resulted in increases in burnout, a condition related to distress. An explanation for not finding an association between bullying and distress might be the low prevalence of bullying at baseline or the fact that nursing students only spend a short time in their clinical placement.

Intention to leave

The crude and adjusted univariate models suggest that both supervisor support and co-worker support are protective factors for intending to leave. However, in the multivariate model only the co-worker support effect remained. A methodological explanation might be that supervisor support and co-worker support explain in part the same variation in intention to leave. A practical explanation might be that nowadays nursing students in the Netherlands do not work on a daily basis with their supervisor, making the support of co-workers a more important factor for staying in the programme. Alternatively, the supervisor role may be fulfilled by more than one colleague. The importance of support in clinical placements in preventing an intention to leave corresponds with the cross-sectional study of Ujváriné et al. (2011) among 381 fourth-year Hungarian nursing students. In their model for intention to graduate as a nurse (the opposite of an intention to leave nursing education), they found a significant association with supervisor support and co-worker support (in their study referred to as preceptor support and clinical staff support). Ujváriné et al. (2011) found an even stronger association for faculty support, which was not measured in the present study.

The systematic review of Eick et al. (2012) on dropout in nursing students confirms that support at clinical placement is an important factor (Brodie et al. 2004, Glogowska et al. 2007, Last & Fulbrook 2003, Ujváriné et al. 2011, and Wray et al. 2010). Although this review only included qualitative or cross-sectional study designs, more recent qualitative studies point in the same direction (e.g., Bakker et al. 2019, Ten Hoeve et al. 2017).

We did not find associations between exposure to violence and bullying and intention to leave. This is not consistent with earlier studies among graduate nurses. Both Bambi et al. (2019) and Moloney et al. (2008) found in their cross-sectional studies among health workers (nurses, head nurses and nurse managers) that bullying by peers or violence by patients were associated with an intention to leave. Hogh et al. (2011, 2012) found associations between bullying and dropout of health care trainees (assistants and helpers). An explanation for not finding an association between bullying or violence and intention to leave might be the difference in research population, outcomes and used measurement instruments.

Limitations

As described in the protocol paper, the main outcome of the SPRING study was actual dropout (Bakker et al., 2018). As the occurrence of dropout in the present study population was low (1.9%), we were unable to investigate associations between actual dropout and psychosocial work characteristics. Instead, distress and intention to leave nursing education were chosen as proxies for actual dropout. Nonresponse analyses revealed that both having an intention to leave and the actual dropout rate of nursing students in our study group were significantly lower compared to those without data for the one-year follow-up. This selective nonresponse might have led to an underestimation of the strength of the association between psychosocial work characteristics and intention to leave.

The questionnaires on psychosocial work characteristics were validated for employees in health care, among others for nurses, but not for nursing students. Since nursing students in their final phase of their training are comparable to employees, the influence is expected to be limited.

In contrast to previous retrospective cohort studies on nursing student dropout (e.g. Pryjmachuk et al. 2009, Wray et al. 2012), a strength of this study was its prospective design, which enabled us to focus on modifiable psychosocial work characteristics. Furthermore, the longitudinal design enabled us to rule out reverse causation. Lastly, the rather high participation rate of nursing students at baseline (71.5%) was a strength, but the selective nonresponse at follow-up was a limitation. In the SPRiNG cohort study, demotivated students, students who were behind with their degree programme or students with an intention to leave nursing education might have been less willing to participate. The statistically significant higher actual dropout and intention to leave at baseline in the nonresponse group, compared to the study group, points in this direction. Hence, in this study we might have suffered from the so-called ‘healthy worker effect’ (Last, 2001). This might have led to an underestimation of the effects because the study group was a relatively well-functioning group compared to the nonresponse group.

Conclusion

This prospective cohort study reveals that some psychosocial work characteristics are associated with distress and others with intending to leave nursing education at a late stage of the educational programme. High psychological demands, which means working fast, hard, without enough time and with conflicting demands and frequently experiencing threats of and physical violence, are risk factors for distress. For intention to leave nursing education, co-worker support in particular might be a protective factor.

Implications

The present study provides useful information for universities of applied sciences and healthcare organisations involved in nursing education or clinical placements; this information can help them improve the psychosocial work environment of nursing students. In future research it might also be interesting to look at changes in distress and intention to leave over time.

Nurses involved in guiding and mentoring nursing students in a clinical setting could consider ways to further improve co-worker support alongside supervisor support. In order to prevent anxiety and depression due to high levels of distress, attention should be paid to the psychological demands on nursing students during clinical placements and offensive behaviours such as nursing students' exposure to violence. Nurse managers must be made aware of the long-term effects of high psychological demands on nursing students in terms of developing distress during clinical placements.

In the multivariate model for intention to leave, supervisor support was no longer a statistically significant factor. This does not imply that supervisor support is less important than co-worker support; it might imply that the psychosocial safety climate within a clinical ward or nursing team is important in preventing intended or actual dropout in nursing students. Improving psychosocial work characteristics, through interventions to improve co-worker and supervisor support for nursing students, seems to be necessary.

In this study we looked at several forms of offensive behaviours, from patients and their relatives but also from co-workers (nurses, nurse managers, nursing assistants or medical doctors). General training in the prevention and handling of conflicts, aggression and violence, might improve the psychosocial work climate for nursing students, as well as more specific training in recognising and handling agitation related to work stress in supervisors, co-workers and patients' relatives, or disease-related aggression from patients (e.g., Gilley et al., 1997).

In the present study, presenting the SPRING questionnaire as part of the curriculum during lessons that address student's professional development and research skills gave a better response than would probably have been obtained if the questionnaire had been sent separately from the educational programme. In order to include nursing students experiencing study delays, who are absent due to sickness or who are demotivated — a group that might be less willing to participate in research on study dropout — we recommend starting up the cohort earlier in the programme, preferably at the beginning of the first year. For students lost to follow-up, at least data recorded in the administrative systems can be used.

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PART II

Interventions for improving mental health
to prevent dropout

CHAPTER 5

Improving mental health of student and novice nurses to prevent dropout: a systematic review

Ellen J.M. Bakker
Jos H.A.M. Kox
Cécile R.L. Boot
Anneke L. Francke
Allard J. van der Beek
Pepijn D.D.M. Roelofs

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Abstract

Aims: To provide: (1) an overview of interventions aimed at improving mental health of student or novice nurses; and (2) an evaluation of their effectiveness on dropout-related outcomes.

Design: Systematic review.

Data sources: Research papers published between January 1971 - February 2019 were identified from the following databases: Embase, Medline, PsycInfo, CINAHL, ERIC, the Cochrane Library, Web of Science and Google Scholar.

Review Methods: We followed the procedures recommended by the Editorial Board of the Cochrane Collaboration Back Review Group. We included peer-reviewed articles with a quantitative research design, examining interventions aimed at improving mental health of student and novice nurses and their effect on dropout-related outcomes. The large variation in studies prohibited statistical pooling and a synthesis without meta-analysis of studies was performed.

Results: We identified 21 studies with three areas of focus: managing stress or stressors (N=4); facilitating the transition to nursing practice (N=14); and a combined approach (N=3). Five studies showed a statistically significant effect on dropout-related outcomes. The overall risk of bias was high.

Conclusion: A wide range of interventions are available, but the evidence for their effectiveness is limited. There is a need for high-quality studies in this field, preferably with a randomized controlled design.

Introduction

More healthcare professionals are needed in many western countries, due to increasing healthcare demands in ageing populations plus a declining working population (Wismar et al., 2018). The European Commission expects that by 2020 one in seven vacancies for nurses in Europe will not be filled (Jong et al., 2014) and estimates show those shortages will persist through 2030 (WHO, 2020). Besides these population trends, work-related factors cause shortages of nurses. Various studies unambiguously show that (novice) nurses frequently experience not only a high physical workload (e.g., Lövgren et al., 2014; Andersen et al., 2014), but also a high mental workload leading to emotional exhaustion and eventually to burnout (Monsalve-Reyes et al., 2018), productivity loss at work, sickness absence (Jong et al., 2014, Ketelaar et al., 2014) and intention to leave the nursing profession (Moloney et al., 2018; Hasselhorn et al., 2005).

Background

Substantial dropout (i.e., voluntary or involuntary exit) among student nurses is found in various countries: e.g., 9% in Finland (Kukkonen et al., 2016), 17% in the Netherlands (Vereniging Hogescholen, 2020) and up to 42% in Australia (Gaynor et al., 2007). Similarly, dropout can be high among novice nurses; e.g., 13% in the USA (Kovner et al., 2007). Many student and novice nurses suffer from mental health problems; several studies report significant levels of depression, anxiety, distress, or burnout (e.g., Rathnayake & Ekanayaka 2016; Chatterjee et al., 2014; Rudman & Gustavsson 2011; Pulido-Martos et al., 2012; Deary et al., 2003; Jones & Johnston 1997). To prevent dropout, it seems important to focus on the mental health of student and novice nurses and to teach them how to maintain their mental health during their initial training and at the beginning of their career. According to the broad definition of the World Health Organization [WHO] (2001), mental health is defined as: “a state of well-being where the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully and is able to make a contribution to his or her community.” (p. 1).

Four reviews examining interventions to improve mental health of student nurses and nurses have been conducted (Galbraith & Brown, 2011; Jones & Johnston, 2000b; Ruotsalainen et al., 2008; Ruotsalainen et al., 2015). All contained stress-reduction interventions, but only Galbraith and Brown (2011) and Jones and Johnston (2000b) reported on their effect on dropout-related outcomes. Likewise, several reviews have been published on retention strategies and interventions to improve the transition from novice to qualified nurse (e.g., Van Camp & Chappy, 2017; Zhang et al., 2016; Edwards et al., 2015; Park & Jones, 2010; Salt et al., 2008; Hayman-White et al., 2007; Levett-Jones & FitzGerald, 2005). These reviews, however, did not pay attention to the mental health of novice nurses — other than skill competency and self-confidence. An overview shows a lack of interventions aimed at improving the mental health of student and novice nurses to prevent dropout during training/work and their effects. Therefore, in this systematic review, we searched for interventions aimed at distress reduction to apply to student and novice nurses to retain them for the nursing profession.

The Review

Aims

The aim of this systematic review is to provide: (1) an overview of interventions aimed at improving mental health of student or novice nurses to prevent dropout during nursing education or work; and (2) evaluate their effectiveness on dropout-related outcomes.

Design

A systematic review was conducted to comprehensively search, appraise and synthesize research evidence (Grant & Booth, 2009) on interventions focusing on the improvement of the mental health of student or novice nurses to prevent dropout during education or work. To ensure consistency and rigour, the Cochrane handbook (Higgins et al., 2011), the Preferred Reporting Items for Systematic Reviews and Meta-Analyses [PRISMA] guideline (Moher et al., 2009) and the Synthesis Without Meta-analysis [SWiM] guideline (Campbell et al., 2019) were followed.

Search methods

Research papers published between January 1971 and February 2019 were identified from the following databases: Embase, Medline, PsycInfo, CINAHL, ERIC, the Cochrane Library, Web of Science and Google Scholar. For the literature searches we consulted information specialists. Specific search strategies were developed for each database (Bramer et al., 2017) to identify studies for this review (Supplementary file 1). We took account of the differences between databases in controlled vocabulary and syntax rules.

All the included studies' reference lists were examined to identify additional studies. In addition, the reference lists of previous relevant reviews were examined (Anderson et al., 2012; Awa et al., 2010; Edwards et al., 2015; Franklin & Lee,2014; Galbraith & Brown, 2011; Heckemann et al., 2015; Irving et al., 2009; Jones & Johnston, 2000b; Michie & Williams, 2003; Missen et al., 2014; Moscaritolo, 2009; Ruotsalainen et al., 2008; Ruotsalainen et al., 2015; Van Daele et al., 2012; Van der Hek & Plomp, 1997; Walter et al., 2013; Wardell & Weymouth, 2004).

Search outcome

Studies were included if they met the following criteria: (i) full-text, peer-reviewed article written in English; (ii) experimental quantitative or mixed-methods research design; (iii) sample of student or novice nurses (≤2 years after graduation); (iv) the intervention focused on improving mental health (i.e., reducing psychological distress, burnout, anxiety or depression, or improving coping, mental resilience or problem solving); and (v) the outcome measures included dropout from nursing education, leaving the nursing profession in the first two years after graduation, or early indicators of dropout, such as sickness absence and intention to stay/leave. Studies that only looked at academic stressors, such as exam anxiety, or had an exclusive focus on academic self-efficacy or academic performance were excluded.

First, two review authors (EB, JK) independently screened the titles and abstracts of all references using Covidence software (Covidence, 2019). Next, full texts of all potentially eligible studies were

appraised independently by the two review authors to determine whether all the inclusion criteria were met. Disagreements were resolved if possible, by discussion between these review authors and otherwise a third review author (PR) was consulted to reach consensus.

In total, 15,566 records were identified. After removing duplicates, 8,463 were left for screening. After screening titles and abstracts, 8,235 records were excluded, leaving 228 potentially relevant studies. Full-text screening of these articles showed that 212 did not meet the inclusion criteria, leaving 16 studies. Figure 1 illustrates the selection process using a modified version of the PRISMA flow diagram (Moher et al., 2009). Five additional studies (Bailey, 1984; Delaney et al., 2016; Hu et al., 2015; Owens et al., 2001; Scott & Smith, 2008) were identified by scrutinising reference lists of 16 selected studies and 17 previous reviews (see above). Finally, 21 studies were included in this review.

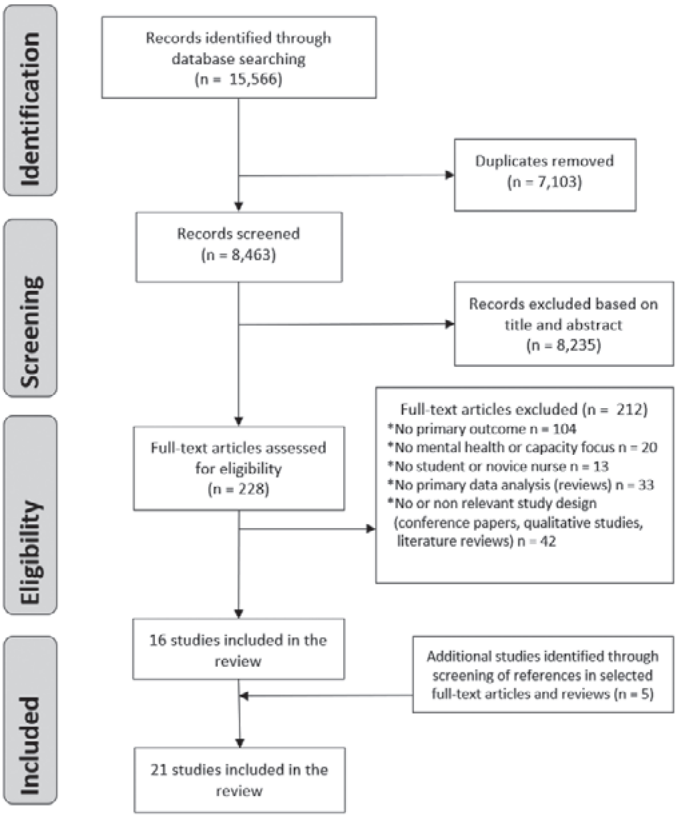

Figure 1. Modified PRISMA flow diagram of the inclusion and exclusion of articles.

Quality appraisal

The modified Cochrane Risk of Bias tool for the quality assessment of randomized controlled trials (RCTs) (Higgins et al., 2011) was used by three reviewers (EB, CB, PR) to independently appraise the methodological quality of the included articles and compare the results. Differences in judgements were discussed to reach consensus on the risk of bias.

Data extraction

Data were extracted by the first author using a pre-structured data extraction sheet in Excel regarding: (1) study characteristics (country of study, number of participants, design, evaluation method, results, outcomes); (2) intervention characteristics (intervention duration, participants' characteristics (age, gender, year of study, ethnic group), intervention components, the professionals involved); and (3) primary outcome measures as described above. Two co-authors (EB, CB) checked the extracted data. Effectiveness of the interventions in improving the primary outcome measures was rated independently by three researchers (EB, CB, PR). These ratings were compared with the conclusions by the authors of the included studies.

Synthesis

Statistical pooling was not feasible due to the large variation in interventions, settings and outcome measures of the studies. Therefore, a synthesis without meta-analysis was performed (Campbell et al., 2019). To draw conclusions about the effectiveness of the interventions, the evaluated outcome measures were classified and related to the content of the interventions.

To provide an overview of interventions aimed at improving mental health of student or novice nurses to prevent dropout during nursing education or work, the studies were first grouped by target group and type of intervention and presented in a table. To evaluate the effectiveness of the interventions, the effect sizes of the outcomes (differences in means), including the *p*-value with the associated statistical test, were extracted from the studies and summarized in tables.

Results

Characteristics of the studies

Of the 21 included studies, as summarized in Table 1, most were conducted in the US (N=15), followed by the UK (N=4), Australia (N=1) and Taiwan (N=1). Study design used were uncontrolled longitudinal studies (N=7), controlled trials (N=6), a controlled post-test measurement only (N=1), uncontrolled post-test measurement only (N=3) and cross-sectional designs (N=2); only two randomized controlled trials were included.

Sample sizes of the studies ranged from 16 (Cubit & Ryan, 2011) - 3,484 (Williams et al., 2018) participants. A total of 7,067 participants were included in 19 studies; two studies did not report the exact number of participants (Krugman et al., 2006; Newhouse et al., 2007). Most studies focused on novice nurses (N=16); five examined student nurses. Twenty studies included primarily participants without mental health problems; one other study included student nurses who previously reported

significant distress (Jones & Johnston, 2000a). Hu et al., (2015) included preceptors — nurses who offer a formal period of support to newly registered nurses (Nursing & Midwifery Council, 2002).

Student nurses were mostly female first-year Bachelor students aged between 18-23 with a Caucasian ethnic background. One study had excluded male students (Bailey 1984).

Novice nurses were mostly female nurses with a bachelor's or an associate's degree and with a Caucasian ethnic background aged 23 and older, without previous work experience. Three studies did not report background characteristics (Newhouse et al., 2007; Owens et al., 2001; Scott & Smith 2008).

All interventions for student nurses were conducted in Bachelor of Nursing programmes at institutions for higher education (N=5). Most interventions for novice nurses were hospital based (N=15). Roxburgh et al. (2010) targeted 97 newly graduated nurses currently practising in different settings in 14 Health Boards, with the largest number working on wards and five practising in the community.

Table 1. Characteristics of the included studies.

First author and year of publication, country	Study design	Participants	Intervention	Comparison	Dropout-related outcomes	Results†
Interventions aimed at managing stress						
Bailey 1984, UK	controlled trial	45 first-year student nurses	six weekly sessions with lectures on stress, and autogenic regulation training	lectures on stress	sickness absence[P] (total days off) (register data)	intervention (64 days) vs. control group (92 days) $p<0.001$ (Chi-square analysis)
Delaney 2015, US	controlled trial	37 junior student nurses	two 2½ hour sessions on developing stress management plans	a case study on communication/ stress information	attrition (academic records)	NS (no numbers reported)
Jones 2000a, UK	randomized controlled trial	79 student nurses with distress	six two-hours sessions on reducing distress with training in coping skills including relaxation	no intervention	sickness, absence (archival sources)	sickness: intervention (34%) vs. control (34%) NS aabsence: intervention (30%) vs. control (34%) NS
Wernick 1984, US	controlled trial	130 practical nursing students	nine weekly 1-hour sessions stress inoculation training, a cognitive behavioural approach	no intervention	attrition[P] (data source NR)	total attrition: intervention (29.2%) vs. control group (52.3%) $p<0.05$ (Chi-square analysis)
Interventions facilitating the transition to nursing practice						
Cubit 2011, Australia	uncontrolled longitudinal study	16 novice nurses	a formal 1-year graduate nurse program with a strong focus on support and socialisation	not applicable	retention[P] (data source NR)	intervention group (88%) vs. the year before (64%)
Hu 2015, Taiwan	controlled trial	107 novice nurses	a 10-minute preceptor model to decrease work stress, intention to leave and increase work experience	traditional preceptor model (TMP) orientation	turnover intention[P] (self-reported, self-formulated question)	intervention (mean=3.87) vs. control group (mean 5.06) $p = 0.003$ (independent samples t-test)
Jones 2006, UK	controlled trial	853 first-year student nurses	a student-centred problem-based curriculum to improve well-being, performance and reduce sickness absence	traditional course	number of days sickness absence (register data)	intervention 1 (7.56) vs. control (5.71), intervention 2 (8.31) vs. control (5.71) $p=0.003$ (One-way ANOVA)
Kowalski 2010, US	uncontrolled longitudinal study	55 novice nurses	1-year residency programme to increase the level of clinical competency, assist transition, decrease turnover	not applicable	retention[P] (data source NR)	intervention cohort 1 (78%) vs. figures as reported in the literature (90-94%); intervention cohort 2 (96%) (incomplete data)
Krugman 2006, US	uncontrolled longitudinal study	novice nurses (numbers NR)	1-year national post-baccalaureate program to provide a consistent, uniform transition into practice	not applicable	retention[P] (data source NR)	turnover: intervention group (8%) vs. figures as reported in the literature (20-40%)

First author and year of publication, country	Study design	Participants	Intervention	Comparison	Dropout-related outcomes	Results†
Newhouse 2007, US	controlled post-test only study	-/+ 492 novice nurses (total NR)	1-year internship program aimed at social and professional reality integration	not participating in the intervention	retention[P] (administrative data), anticipated turnover[P] (validated instrument)	retention: intervention (88.9%) vs. control (80%) p=0.014 (Chi-square analysis); anticipated turnover: (3.38) vs. (3.60) p=0.022 One-way ANOVA)
Olson-Sitki 2012, US	uncontrolled longitudinal study	31 novice nurses	1-year nurse residency program to support graduate nurses as they assume the professional role	not applicable	turnover[P] (data source NR)	turnover: Intervention group 2008 (7%), 2009 (11%) vs. group 2006 (15%), 2007 (12%)
Owings 2016, US	uncontrolled longitudinal study	121 novice nurses	1-year nurse residency programme to support a successful transition into practice, develop EBP and leadership skills	not applicable	turnover[P] (records maintained by nurse residency coordinator)	turnover: intervention group 2012-2015 (15.9%) vs. non-participant novice nurses 2012-2015 (29.3%)
Pelletier 2019, US	uncontrolled longitudinal study	34 novice nurses	1-year new graduate nurse residency programme, combining a curriculum with a social support system	not applicable	turnover[P] (data supplied by Human Resources)	turnover: Year 1 intervention group (11.7%), Year 2 intervention group (2.9%) vs. figures reported in the literature (17.5% and 33.5%)
Roxburgh 2010, UK	uncontrolled post-test only study	97 novice nurses	online programme to support transition from student to novice nurse by increasing confidence and competence in first year	not applicable	intention to stay[P] (self-reported; self-formulated)	intention to stay: 89.9% (no comparison)
Scott 2008, US	uncontrolled post-test only study	25 novice nurses	1-year group mentoring program to gain confidence and competence in the first year	not applicable	intention to stay (self-formulated), turnover[P] (data source NR)	intention to stay: 62% (no comparison); turnover: 2005 (20%) vs. 2002 (30.7%), 2003 (21.7%), 2004 (26.9%)
Spector 2015, US	randomized controlled design	1,088 novice nurses from 94 hospitals	1-year transition to practice (TTP) model programme: orientation program, support from preceptors, clinical online education	other than TTP programmes	turnover (tracked by site coordinators)	turnover: TTP (15%) vs. control (16.7%) NS (p=0.212) (Chi-square analysis); post hoc analysis: TTP (14.7%) vs. limited programs (25%) (p<0.001) (Chi-square)
Williams 2007, US	uncontrolled longitudinal study	679 novice nurses in acute care	1-year postbaccalaureate residency program to develop decision-making skills related to clinical judgement/performance	not applicable	turnover[P] (data source NR)	turnover: intervention group (12%) vs. figures reported in the literature (35% to 55%)
Williams 2018, US	cross-sectional study	3,484 novice nurses from 102 hospitals	One-to-one mentoring within Versant registered nurse residency program	group mentoring	turnover intention (self-reported; self-formulated question)	turnover intention: one-to-one mentoring (4.7%) vs. group mentoring (6.2%) NS

First author and year of publication, country	Study design	Participants	Intervention	Comparison	Dropout-related outcomes	Results†
Interventions facilitating the transition to nursing practice combined with a stress management programme component						
Beecroft 2001, US	controlled trial	78 novice nurses	1-year RN Internship in paediatrics programme to improve confidence, competence, safe patient, increase commitment/retention	not reported	turnover[p] (data source NR), anticipated turnover[p] (validated instrument	anticipated turnover: intervention (30.98%) vs. control (39.72%) at 12 months p=0.01; turnover: intervention group (14%) vs. control group (36%)
Messmer 2011, US	uncontrolled post-test only study	33 novice paediatric nurses	one 2 or 3-hour session to help new nurses to adjust to a new environment with role-playing/problem solving/stress reduction	not applicable	turnover rate[p] (data source NR), intention to stay[p] (self-formulated questions)	turnover: intervention group (8%) vs. figures reported in the literature (20-40%); Intention to stay: 88% (no comparison)
Owens 2001, US	uncontrolled post-test only study	75 novice nurses	8-week new graduate RN internship with didactic information, precepted clinical experience, competency-based learning	not applicable	retention[p] (data source NR)	retention: July group (88%) and September group (88%) vs. figures reported in the literature (35%-60%)

† When available, p-values and statistical test used are given from the original studies.
[p] = Primary outcome of study
NS = no statistically significant difference
NR = not reported

Quality appraisal

The methodological quality assessment of the 21 studies was assessed; all studies had considerable sources of bias (Supplementary file 2). Figure 2 summarizes the assessed risk of bias of the studies.

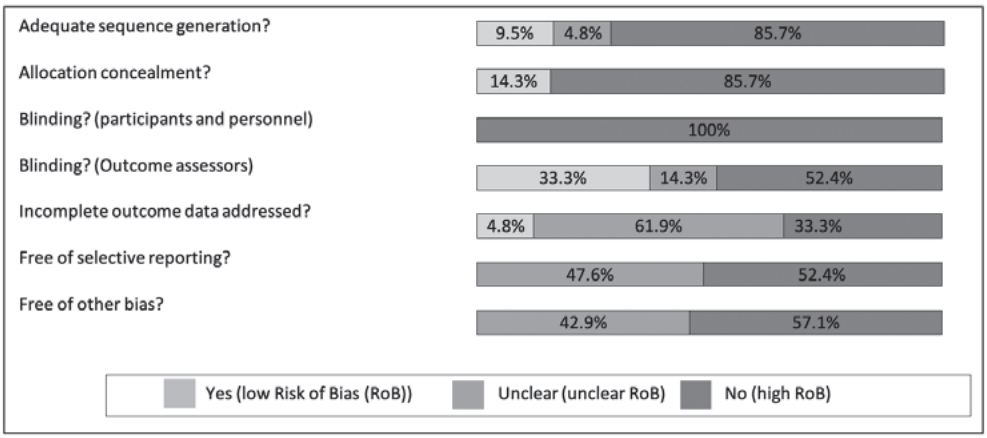

Figure 2. Assessment of the methodological quality of each item, presented as percentages across all 21 studies.

Types of interventions

The 21 studies described three different types of interventions aimed at: (i) managing stress; (ii) facilitating the transition to nursing practice; (iii) a combined approach (Table 2).

Table 2. Intervention characteristics and components.

	Stress management focus			Transition focus		
	Cognitive-behavioural	Relaxation	Self-care/ Coping	Clinical education	Professional support	Peer support
Studies with interventions aimed at student nurses						
Bailey, 1984		x				
Delaney, 2016	x	x	x			
Jones, 2001a	x	x	x			
Jones, 2006				x	x	x
Wernick, 1984	x	x	x			
Studies with interventions aimed at novice nurses						
Beecroft, 2001			x	x	x	x
Cubit, 2011				x	x	x
Hu, 2015					x	
Kowalski, 2010				x	x	x
Krugman				x	x	
Messmer, 2011			x			x
Newhouse, 2007				x	x	x
Olson-Sitki, 2012				x	x	x
Owens, 2001			x	x	x	
Owings, 2016				x	x	x
Pelletier, 2019				x	x	
Roxburgh, 2010				x		
Scott, 2008					x	x
Spector, 2015				x	x	
Williams, 2007				x	x	
Williams, 2018					x	

Interventions aimed at managing stress

All four interventions aimed at managing stress targeted nursing students only (Bailey, 1984; Delaney et al., 2016; Jones & Johnston, 2000a; Wernick, 1984). All stress management programmes were carried out in an educational setting and included group sessions, but they differed in content, duration, intervention provider and outcomes. One intervention contained relaxation skill training including education, discussion and practical training (Bailey, 1984). The other three involved education and skill training in coping with stress and stressors combined with relaxation skills training and cognitive-behavioural therapy techniques, such as cognitive reappraisal. The duration varied from two 2.5-hour sessions (Delaney et al., 2016) to six 2-hour sessions (Jones & Johnston, 2000a). Interventions were provided by nursing faculty members (Delaney et al., 2016), psychology interns, social workers and graduate students (Wernick, 1984), autogenic relaxation therapy practitioners (Bailey, 1984), or were not reported (Jones et al., 2000).

Interventions facilitating the transition to nursing practice

This type of interventions was mostly redesigned internship, new-graduate, retention or residency programmes aimed at supporting novice nurses in the first period of nursing practice to improve retention. These interventions were programmes where support from a professional (mentor, preceptor, nurse facilitator) and/or support from peers was combined with clinical nursing education (mainly classroom, skill training and/or simulation) (Cubit & Ryan, 2011; Kowalski & Cross, 2010; Krugman et al., 2006; Newhouse et al., 2007; Olson-Sitki et al., 2012; Owings, 2016; Pelletier et al., 2019; Scott & Smith, 2008; Spector et al., 2015; Williams et al., 2007; Williams et al., 2018). Most interventions were broad programmes with different components. Two consisted of a single component: a 10-minute preceptorship intervention with professional support (Hu et al., 2015); and a digital educational programme for novice nurses (Roxburgh et al., 2010). Only one intervention was found for nursing students; this was a student-centred problem-based curriculum with professional and peer support (Jones & Johnston, 2006). Interventions varied in duration between six months and one year. They were mostly applied at both the individual and group level. Two interventions just addressed individuals (Hu et al., 2015; Roxburgh et al., 2010). Most interventions were provided by nurses or nurse specialists in the role of mentor, preceptor, coach and/or lecturer.

Interventions with a combined approach

Of the 17 interventions facilitating the transition to nursing practice, three contained a clear stress management component with educational group sessions for skill training in coping with stress and stressors (Beecroft et al., 2001; Messmer et al., 2011; Owens et al., 2001). All interventions targeted novice nurses. They varied in duration from one 2-3-hour session to several sessions over one year. One intervention was applied at the group level (Messmer et al., 2011); the other two were applied at both the individual level and the group level (Beecroft et al., 2001; Owens et al., 2001). Two interventions were provided by nurses or nurse specialists in the role of mentor, preceptor, coach and/or lecturer (Beecroft et al., 2001; Owens et al., 2001); one by a clinical psychologist (Messmer et al., 2011).

Outcomes

Dropout-related outcomes

Found primary outcomes of interest were: retention (Cubit & Ryan, 2011; Kowalski & Cross, 2010; Krugman et al., 2006; Newhouse et al., 2007), turnover in the nursing workforce (Beecroft et al., 2001; Messmer et al., 2011; Olson-Sitki et al., 2012; Owings, 2016; Pelletier et al., 2019; Scott & Smith, 2008; Spector et al., 2015; Williams et al., 2007) and attrition from nursing education (Delaney et al., 2016; Wernick, 1984). Other outcomes of interest were early indicators of dropout such as: absence (Jones & Johnston, 2000a), sickness absence (Bailey, 1984; Jones & Johnston, 2000a; Jones & Johnston, 2006) and self-reported intention to stay/leave (Bailey, 1984; Hu et al., 2015; Newhouse et al., 2007; Roxburgh et al., 2010; Scott & Smith, 2008; Williams et al., 2018). In the following sections and Table 3 the outcomes ‘retention’, ‘attrition’ and ‘turnover’ have been converted into dropout figures and ‘intention to stay’ into ‘intention to leave’.

Other outcome measures

Besides dropout-related outcomes, five other types of outcomes were presented in the included studies: mental health/well-being, behavioural characteristics, academic performance, professional performance and job/work environment.

Effectiveness of the interventions

Table 3 summarizes the effectiveness of the interventions. Five studies (Bailey, 1984; Beecroft et al., 2001; Hu et al., 2015; Newhouse et al., 2007; Wernick, 1984) showed a statistically significant effect on one of the dropout-related outcomes.

Dropout

Eleven studies measured the effect of the intervention on dropout. Of these 11 studies, two concerned interventions aimed at managing stress or stressors for student nurses. A programme including three components (cognitive-behavioural therapy techniques; relaxation skill training; and skill training in self-care/coping with stress and stressors) led to a decrease in total attrition and attrition for personal reasons, but not in attrition due to academic reasons (Wernick, 1984). The other programme, only including skill training in coping with stress and stressors, showed no statistically significant effect on attrition (Delaney et al., 2016).

Most of the interventions aimed at facilitating the transition to nursing practice for novice nurses showed an unclear effect on retention (Cubit & Ryan, 2011; Kowalski & Cross, 2010; Krugman et al., 2006; Olson-Sitki et al., 2012; Owings, 2016; Pelletier et al., 2019; Newhouse et al., 2007). Six studies lacked a control group and compared dropout or retention rates with numbers reported in the literature (Kowalski & Cross, 2010; Krugman et al., 2006; Pelletier et al., 2019; Williams et al., 2007; Messmer et al., 2011; Owens et al., 2001). Four studies (Cubit & Ryan, 2011; Olson-Sitki et al., 2012; Owings, 2016; Scott & Smith, 2008) compared post-test dropout or retention rates with rates in previous years without comparing the characteristics of the groups in question (e.g., age, gender, educational background, work experience) and/or describing clearly which changes were made in the intervention programme. An exception was the study by Newhouse et al. (2007), reporting a statistically significant difference in retention in the intervention group at 12 months, but no statistically significant difference in retention at 18 and 24-month. In a multicentre study of Spector et al. (2015), no statistically significant differences in turnover were found between hospitals with an evidence-based Transition to Practice (TTP) Model programme and hospitals with other programmes. Only after additional post-hoc analyses - hospitals in the control group were categorized as having established or limited programmes - some differences were detected.

Three interventions facilitating the transition to nursing practice with a stress management component targeting novice nurses (Beecroft et al., 2001; Messmer et al., 2011; Owens et al., 2001) showed unclear effects on retention and differed substantially in content and duration, which impeded comparing one with another. The intervention studied by Beecroft et al. (2001) contained all three components (clinical education, professional support, peer support) plus a stress management component; the turnover rate for the control group (36%) was two and a half times higher than that of the intervention group (14%), statistical significance of differences between intervention and control group was not

calculated. Finally, Messmer et al. (2011) compared the turnover rate of 8% with rates reported in the literature (20-40%). Owens et al. (2001) compared a retention rate of 88% with rates reported in the literature (35-60%).

Table 3. Overview of the effectiveness of the interventions.

First author (year)	Dropout	Sickness absence	Intention to leave	Effectiveness as described in studies
Stress management focus, student nurses				
Bailey, 1984		+		+
Delaney, 2016	NS			NS
Jones, 2000a		NS		NS
Wernick, 1984	+			+
Transition focus, student nurses				
Jones, 2006		-		-
Transition focus, novice nurses				
Cubit, 2011	?			+
Hu, 2015			+	+
Kowalski, 2010	?			+
Krugman, 2006	?			+
Newhouse, 2007	?		+	+
Olson-Sitki, 2012	?			+
Roxburgh, 2010			?	+
Scott, 2008			?	+
Williams, 2008	?			+
Owings, 2016	?			+
Pelletier, 2019	?			+
Spector, 2015	NS/+			NS/+
Williams, 2018			NS	NS
Transition focus with stress management component, novice nurses				
Beecroft, 2001	?		+	+
Messmer, 2011	?		?	+
Owens, 2001	?			+

+ Positive significant effect

- Negative significant effect

NS No statistically significant effect

? Unclear effect; statistical significance not measured/no comparison/no numbers reported

Sickness absence

Three studies measured the effect of the intervention on sickness absence. Bailey (1984) reported a statistically significant difference of 28 days (total days off) in favour of the intervention group (student nurses who were offered relaxation skill training only). No statistically significant differences in sickness absence were reported by Jones & Johnston (2000a), who studied the effect of their multicomponent intervention (cognitive-behavioural therapy techniques, relaxation and self-care/coping skill training) on 79 student nurses previously reporting significant distress. Their intervention, however, had statistically significant beneficial effects on emotional distress and increased adaptive coping use in both clinical and academic settings.

In the third study (Jones & Johnston, 2006), with an intervention aimed at facilitating the transition to nursing practice through curriculum redesign (from traditional to student-centred problem-based) with professional and peer support targeting 853 first-year nursing students, a statistically significant adverse effect of about 2 days on sick leave was detected, despite a statistically significant decrease in distress. The authors' explanation of this adverse effect is that the new curriculum may have partly removed the need for students to attend classes. It also can be explained by an increased awareness about the importance of not attending classes when feeling unwell.

None of the studies with interventions facilitating the transition to nursing practice with a stress management component targeting novice nurses measured sickness absence.

Intention to leave

Seven of 21 studies measured the effect on intention to leave; two with a combined approach and five with a transition focus. Of these five, two found a beneficial effect on intention to leave among novice nurses in a hospital setting. One was an intervention targeting 107 novice nurses and consisting of 10 minutes' support from a preceptor at the beginning and end of every shift for one year (Hu et al., 2015). The other was a two-year new-graduate programme with clinical education, peer support and guidance from a mentor (Newhouse et al., 2007).

An unclear effect was found in two of the five nursing transition interventions. One was a web-based CD-ROM programme to improve clinical, professional, interpersonal and stress management skills, targeting 97 novice nurses in various settings (Roxburgh et al., 2010). The other was a one-year group mentoring programme with professional and peer support (Scott & Smith 2008). Both studies lacked a control group and a pre-test measurement of intention to leave.

The fifth study (Williams et al., 2018) showed no statistically significant difference on intention to leave between individual and group mentoring, one component of a retention programme for novice nurses.

In the uncontrolled post-test study by Messmer et al. (2011), we found an unclear effect of a two-three-hour session, consisting of self-care/coping skill training with special attention to stress and stressors among novice nurses, since a baseline measurement was missing. A controlled trial on a one-year pilot programme with clinical education, mentor and preceptor support, peer support and debriefing and self-care sessions for discussing difficulties encountered during the internship and for

providing strategies to deal with them, showed a beneficial effect on intention to leave (Beecroft et al., 2001). No studies on interventions aimed at managing stress or stressors measured this outcome.

Discussion

This systematic review identified three types of interventions: interventions aimed at managing stress, interventions facilitating the transition to nursing practice and interventions with a combined approach. Most of the studies targeting student nurses involved interventions aimed at managing stress, including cognitive-behavioural therapy techniques, relaxation and self-care/coping skill training. Studies targeting novice nurses mainly involved interventions aimed at facilitating the transition to nursing practice, including education, professional and peer support. Although the authors of most these studies clearly underlined the importance of decreasing stress and anxiety among novice nurses, only three programmes contained a stress management component: self-care/coping skill training.

We found some indications that a stress management intervention with a relaxation component (Bailey 1984) might be effective in reducing sickness absence and a stress management intervention including cognitive-behavioural therapy techniques, relaxation and self-care/coping skill training (Wernick 1984) might be effective in preventing dropout among nursing students. However, these studies were published in 1984 (36 years ago). Although there is more recent evidence for the effectiveness of these mechanisms in managing stress (e.g., Galbraith & Brown, 2011), nursing educational programmes, the intervention population itself (Morin, 2014; Barren Mc Bride, 1999) and consequently the stressors such as work pressure due to unfulfilled job vacancies (Wismar et al., 2018; Jong et al., 2014) faced by student and novice nurses likely have changed. So, these interventions would not necessarily be effective if implemented as such today.

Furthermore, we found some indications that interventions aimed at facilitating the transition to nursing practice with or without a stress management component are effective in improving retention or intention to stay (Newhouse et al., 2007; Beecroft et al., 2001; Hu et al., 2015; Spector et al., 2015). Most of the studies however, showed no, an unclear or an adverse effect. Besides, most of these interventions were developed for the clinical setting, mostly general and one psychiatric hospital (Pelletier et al., 2019). We found no interventions for novice nurses working in long-term mental health, disability, elderly or home care, or healthcare for the homeless. Only one study (Roxburgh et al., 2015) included novice nurses from non-hospital-based settings such as community care. However, a recent study indicated that intended and actual dropout among younger nurses in home and elderly care is higher than in hospital care (Bratt & Gautun 2018). These groups deserve more attention in future intervention studies.

Risk of bias in included studies

In general, an overall high risk of bias was found in all studies. Design problems included: recruitment of small samples leading to lack of statistical power (Delaney et al., 2016) and poor comparisons due to the absence of baseline measurements and control groups (Cubit & Ryan, 2011; Kowalski & Cross, 2010; Krugman et al., 2006; Messmer et al., 2011; Olson-Sitki et al., 2012; Roxburgh et al., 2010; Scott & Smith, 2008; Owens et al., 2001; Owings, 2016; Pelletier et al., 2019; Williams et al., 2007).

In some articles the statistical test used was not reported, or *p*-values were not reported or reported without indicating the effect size, therefore making the *p*-value not easily interpretable. Besides, in most studies no comparison was made between groups with complete and groups with incomplete data. This is in line with previous reviews on strategies and interventions to improve the transition from student to newly qualified nurse (e.g., Brook et al., 2019; Edwards et al., 2015; Salt et al., 2008), where limitations were also reported in the methodological quality of the included studies.

Most of the studies included in this review measured one of our outcomes of interest (intention to leave/stay) with self-formulated questions, which may be prone to response bias. Although measures of our main outcome of interest (attrition, turnover and retention) were generally based on more objective data, such as register data and academic records, not all studies reported the data source. Besides, there were differences in the definition and operationalisation of our main outcome of interest, dropout. In studies among student nurses the term 'attrition' was commonly used to refer to dropout. Some studies distinguished between voluntary attrition (exit due to personal reasons) and involuntary attrition (forced exit, e.g., due to academic failure). None of the studies reported whether dropout meant leaving this nursing programme or a future nursing career. For the availability of nurses in the field, this distinction is relevant. The study of Wernick (1984) also shows the importance of this distinction; the intervention was effective in decreasing dropout for personal reasons but not for academic reasons. In studies conducted in the US, involuntary turnover usually meant failing the national NCLEX-RN exam, which is taken within the first six months of work as a newly graduated nurse. Some studies excluded cases of involuntary dropout (Beecroft et al., 2001, Williams et al., 2007) and other studies solely focused on retention. The study of Wernick (1984) highlights the need for not excluding these respondents but to include different aspects of dropout when investigating an intervention effect, such as voluntary or involuntary dropout and to monitor academic and clinical performance in addition to dropout. Moreover, since not all studies distinguish voluntary and involuntary attrition or turnover, dropout numbers and intervention effect sizes are difficult to compare between studies, programmes and countries. This problem has been reported before (e.g., Glossop, 2001; Urwin et al., 2010), but still applies.

Strengths and limitations

This study gives a systematic overview and assessment of interventions aimed at improving the mental health of student and novice nurses to prevent dropout from nursing education and work. We looked at both student and novice nurses; two vulnerable groups for dropout (e.g., Eick et al., 2012; Galbraith & Brown, 2011; Edwards et al., 2015; Salt et al., 2008) and stress, anxiety and burnout (e.g., Jones & Johnston, 2000b; Pulido-Martos et al., 2012; Spence Laschinger & Fida, 2014). This systematic and sensitive search is a potential strength. On the other hand, to structure our results, we grouped together interventions that were heterogeneous in content. The diversity of the interventions and evaluation study designs hindered a comparison of the studies, data pooling and meta-analysis. Furthermore, we included all studies with some mental health focus that also measured dropout-related outcomes. However, these outcomes were not necessarily the primary outcome of the study intervention. We might therefore have underestimated the effect of the intervention, because the reason for finding no statistically significant effect could also be that the study had limited focus or power for that. We searched for interventions aimed at improving mental health to reduce dropout. We know, however, that dropout can be related to factors other than poor mental health, for example academic failure,

physical health and family-work imbalances. Another limitation was that we restricted to articles published in English, which might have resulted in relevant studies being missed.

Conclusion

Three different types of interventions were found. The evidence for the effectiveness of these interventions is limited. Due to the large variation in interventions, intervention populations, settings and outcome measures, we were unable to compare groups of interventions and the effects on our outcomes of interest. Five studies reported significant effects on dropout or dropout-related outcomes, but they also showed a high risk of bias.

There is a need for high-quality studies characterized by sufficient statistical power and controlled designs, with a clear description of the theoretical foundations, working mechanisms and components of the interventions. It is therefore recommended that the methods and measures used in this field should be harmonized. There is a need for more evidence on interventions aimed at retaining student and novice nurses in their profession by improving their mental health. Any evaluation of programmes aimed at facilitating the transition from novice nurse to advanced beginner needs to involve a controlled study design and larger study populations. To compare the effects of different interventions, uniform definitions of educational/work dropout should be used, along with validated instruments.

To support the transition from novice nurse to advanced beginner in non-hospital settings, interventions should be developed for and tested on novice nurses in long-term mental health, disability, elderly or home care or healthcare for the homeless. Considering the high demand for nurses globally, interventions with a focus on the mental health of student nurses should also include measures for preventing dropout when being developed.

For education and practice it is necessary to be aware of the gaps of knowledge on this topic and opportunities to improve the curricula and transition to work. Addressing the complex "Gordian knot" of retention and dropout (Sabin, 2012; Bakker et al., 2018, 2019) requires multiple strategies. An example of a strategy is one where students, educators, researchers and health care staff cooperate in longitudinal monitoring of student and novice nurses' mental and physical wellbeing beyond graduation to deploy targeted interventions.

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Supplementary information

Supplementary file 1. Overview of the complete search strategy

The databases EMBASE, MEDLINE, PsycINFO, CINAHL, ERIC, the Cochrane Library, Web of Science, and Google Scholar were searched systematically up to 19 February 2019.

Table 1: Overview of the consulted databases with number of hits.

Databases	Number of hits including duplicates	Number of hits excluding duplicates
Embase.com	3385	3348
Medline ovid	3908	1101
Web of science	4246	2495
Cochrane CENTRAL	310	89
CINAHL Ebsco	1777	361
PsycINFO ovid	1327	637
Google scholar	300	228
ERIC ovid	313	204
Total	**15566**	**8463**

Embase.com

('nursing student'/exp OR ('graduate student'/exp AND nurse/de) OR ((nurs* NEAR/3 (student* OR studying OR graduate*)) OR (nurs*-school*) OR ((new OR novice OR young*) NEXT/1 nurse*)):ab,ti) AND ('mental health'/de OR 'psychological well being'/de OR stress/exp OR depression/de OR emotion/de OR 'emotional attachment'/de OR fear/de OR anxiety/de OR frustration/de OR happiness/de OR unhappiness/de OR helplessness/de OR 'mental irritation'/de OR nervousness/de OR 'mental performance'/de OR 'self concept'/exp OR empowerment/de OR 'coping behavior'/exp OR disability/de OR 'coping behavior assesment'/exp OR 'mental function assessment'/exp OR fatigue/de OR 'adaptive behavior'/de OR (((mental* OR psycholog*) NEAR/3 (health OR capacit* OR irritat* OR performan* OR fit OR fitness* OR vitalit* OR symptom* OR discomfort OR disease* OR disorder* OR pain*)) OR disabilit* OR well-being OR wellbeing OR stress* OR distress* OR burnout* OR burn-out* OR depressi* OR emotion* OR fear OR anxi* OR frustrat* OR happines* OR unhappines* OR helpless* OR nervousnes* OR ((work OR occupation* OR job) NEAR/3 engage*) OR (self NEXT/1 (concept* OR control* OR esteem* OR efficac* OR imag*)) OR confiden* OR ((interprofession* OR profession*) NEAR/3 attitude*) OR empower* OR coping OR runaway OR run-away OR resilien* OR mastery OR ((prepared* OR unprepared* OR competen* OR incompeten*) NEAR/6 (practice* OR clinical OR profession*)) OR fatigue OR adaptive-behav*):ab,ti) AND ('observational study'/exp OR 'cohort analysis'/exp OR 'longitudinal study'/exp OR 'retrospective study'/exp OR 'prospective study'/exp OR 'health survey'/de OR 'health care survey'/de OR 'epidemiological data'/de OR 'case control study'/de OR 'cross-sectional study'/de OR 'correlational study'/de OR 'population research'/de OR 'family study'/de OR 'major clinical study'/de OR 'multicenter study'/de OR 'comparative study'/de OR 'follow up'/de OR 'clinical study'/de OR 'clinical article'/de OR 'clinical trial'/exp OR 'randomization'/exp OR 'intervention study'/de OR 'open study'/de OR 'community trial'/de OR 'review'/exp OR 'systematic

review'/exp OR (((observation* OR epidemiolog* OR famil* OR comparativ* OR communit*) NEAR/6 (stud* OR data OR research)) OR cohort* OR longitudinal* OR retrospectiv* OR prospectiv* OR population* OR (national* NEAR/3 (stud* OR survey)) OR (health* NEAR/3 survey*) OR ((case OR cases OR match*) NEAR/3 control*) OR (cross NEXT/1 section*) OR correlation* OR multicenter* OR multi-center* OR follow-up* OR followup* OR (clinical* NEAR/3 (stud* OR article* OR research*)) OR trial OR random* OR review* OR meta-analy*):ab,ti) AND ('prevention'/exp OR 'vocational guidance'/de OR counseling/de OR 'education program'/de OR 'program evaluation'/exp OR 'prediction and forecasting'/exp OR (prevent* OR intervention* OR guidance* OR counsel* OR program* OR effectiv* OR evaluat* OR support* OR predict*):ab,ti) NOT ([Conference Abstract]/lim OR [Letter]/lim OR [Note]/lim OR [Editorial]/lim) AND [english]/lim

Medline ovid

("Students, Nursing"/ OR (("Student Dropouts"/) AND Nurses/) OR ((nurs* ADJ3 (student* OR studying OR graduate*)) OR (nurs*-school*) OR ((new OR novice OR young*) ADJ nurse*)).ab,ti.) AND ("Mental Health"/ OR "Stress, Psychological"/ OR depression/ OR emotions/ OR "Object Attachment"/ OR fear/ OR anxiety/ OR frustration/ OR happiness/ OR "Helplessness, Learned"/ OR "self concept"/ OR "Power (Psychology)"/ OR "Adaptation, Psychological"/ OR fatigue/ OR (((mental* OR psycholog*) ADJ3 (health OR capacit* OR irritat* OR performan* OR fit OR fitness* OR vitalit* OR symptom* OR discomfort OR disease* OR disorder* OR pain*)) OR disabilit* OR well-being OR wellbeing OR stress* OR distress* OR burnout* OR burn-out* OR depressi* OR emotion* OR fear OR anxi* OR frustrat* OR happines* OR unhappines* OR helpless* OR nervousnes* OR ((work OR occupation* OR job) ADJ3 engage*) OR (self ADJ (concept* OR control* OR esteem* OR efficac* OR imag*)) OR confiden* OR ((interprofession* OR profession*) ADJ3 attitude*) OR empower* OR coping OR runaway OR run-away OR resilien* OR mastery OR ((prepared* OR unprepared* OR competen* OR incompeten*) ADJ6 (practice* OR clinical OR profession*)) OR fatigue OR adaptive-behav*).ab,ti.) AND ("observational study"/ OR "Cohort Studies"/ OR exp "Health Surveys"/ OR exp "Nursing Research"/ OR "Epidemiological Monitoring"/ OR "Epidemiologic Studies"/ OR "Case-Control Studies"/ OR "Cross-Sectional Studies"/ OR "multicenter study"/ OR "comparative study"/ OR "clinical study"/ OR exp "clinical trial"/ OR "Random Allocation"/ OR "review"/ OR "Meta-Analysis"/ OR (((observation* OR epidemiolog* OR famil* OR comparativ* OR communit*) ADJ6 (stud* OR data OR research)) OR cohort* OR longitudinal* OR retrospectiv* OR prospectiv* OR population* OR (national* ADJ3 (stud* OR survey)) OR (health* ADJ3 survey*) OR ((case OR cases OR match*) ADJ3 control*) OR (cross ADJ section*) OR correlation* OR multicenter* OR multi-center* OR follow-up* OR followup* OR (clinical* ADJ3 (stud* OR article* OR research*)) OR trial OR random* OR review* OR meta-analy*).ab,ti.) AND ("prevention and control".xs. OR "Primary Prevention"/ OR "Vocational Guidance"/ OR Counseling/ OR "Education, Nursing, Diploma Programs"/ OR "education"/ OR "Program Evaluation"/ OR (prevent* OR intervention* OR guidance* OR counsel* OR program* OR effectiv* OR evaluat* OR support* OR predict*).ab,ti.) NOT (letter OR news OR comment OR editorial OR congresses OR abstracts).pt. AND english.la.

PSYCinfo ovid

("Nursing Students"/ OR ((nurs* ADJ3 (student* OR studying OR graduate*)) OR (nurs*-school*) OR ((new OR novice OR young*) ADJ nurse*)).ab,ti.) AND ("Mental Health"/ OR "Stress"/ OR "distress"/ OR "Depression (Emotion)"/ OR emotions/ OR fear/ OR anxiety/ OR frustration/ OR happiness/ OR "Learned

Helplessness"/ OR "Self-Concept"/ OR "Power (Psychology)"/ OR "Adaptation, Psychological"/ OR fatigue/ OR (((mental* OR psycholog*) ADJ3 (health OR capacit* OR irritat* OR performan* OR fit OR fitness* OR vitalit* OR symptom* OR discomfort OR disease* OR disorder* OR pain*)) OR disabilit* OR well-being OR wellbeing OR stress* OR distress* OR burnout* OR burn-out* OR depressi* OR emotion* OR fear OR anxi* OR frustrat* OR happines* OR unhappines* OR helpless* OR nervousnes* OR ((work OR occupation* OR job) ADJ3 engage*) OR (self ADJ (concept* OR control* OR esteem* OR efficac* OR imag*)) OR confiden* OR ((interprofession* OR profession*) ADJ3 attitude*) OR empower* OR coping OR runaway OR run-away OR resilien* OR mastery OR ((prepared* OR unprepared* OR competen* OR incompeten*) ADJ6 (practice* OR clinical OR profession*)) OR fatigue OR adaptive-behav*).ab,ti.) AND ("Cohort Analysis"/ OR exp "Longitudinal Studies"/ OR "Retrospective Studies"/ OR "Followup Studies"/ OR "Epidemiology"/ OR exp "Clinical Trials"/ OR "literature review"/ OR "Meta Analysis"/ OR (((observation* OR epidemiolog* OR famil* OR comparativ* OR communit*) ADJ6 (stud* OR data OR research)) OR cohort* OR longitudinal* OR retrospectiv* OR prospectiv* OR population* OR (national* ADJ3 (stud* OR survey)) OR (health* ADJ3 survey*) OR ((case OR cases OR match*) ADJ3 control*) OR (cross ADJ section*) OR correlation* OR multicenter* OR multi-center* OR follow-up* OR followup* OR (clinical* ADJ3 (stud* OR article* OR research*)) OR trial OR random* OR review* OR meta-analy*).ab,ti.) AND (exp "Primary Prevention"/ OR "Occupational Guidance"/ OR Counseling/ OR "education"/ OR "Program Evaluation"/ OR (prevent* OR intervention* OR guidance* OR counsel* OR program* OR effectiv* OR evaluat* OR support* OR predict*).ab,ti.) NOT (letter OR news OR comment OR editorial OR congresses OR abstracts OR books).pt. AND english.la.

CINAHL Ebsco

(MH "Students, Nursing" OR TI ((nurs* N2 (student* OR studying OR graduate*)) OR (nurs*-school*) OR ((new OR novice OR young*) N1 nurse*)) OR AB ((nurs* N2 (student* OR studying OR graduate*)) OR (nurs*-school*) OR ((new OR novice OR young*) N1 nurse*))) AND (MH "Mental Health" OR MH "Stress, Psychological" OR MH depression OR MH emotions OR MH fear OR MH anxiety OR MH frustration OR MH happiness OR MH "Helplessness, Learned" OR MH "self concept" OR MH "Empowerment" OR MH "Adaptation, Psychological" OR MH fatigue OR TI (((mental* OR psycholog*) N2 (health OR capacit* OR irritat* OR performan* OR fit OR fitness* OR vitalit* OR symptom* OR discomfort OR disease* OR disorder* OR pain*)) OR disabilit* OR well-being OR wellbeing OR stress* OR distress* OR burnout* OR burn-out* OR depressi* OR emotion* OR fear OR anxi* OR frustrat* OR happines* OR unhappines* OR helpless* OR nervousnes* OR ((work OR occupation* OR job) N2 engage*) OR (self N1 (concept* OR control* OR esteem* OR efficac* OR imag*)) OR confiden* OR ((interprofession* OR profession*) N2 attitude*) OR empower* OR coping OR runaway OR run-away OR resilien* OR mastery OR ((prepared* OR unprepared* OR competen* OR incompeten*) N5 (practice* OR clinical OR profession*)) OR fatigue OR adaptive-behav*) OR AB (((mental* OR psycholog*) N2 (health OR capacit* OR irritat* OR performan* OR fit OR fitness* OR vitalit* OR symptom* OR discomfort OR disease* OR disorder* OR pain*)) OR disabilit* OR well-being OR wellbeing OR stress* OR distress* OR burnout* OR burn-out* OR depressi* OR emotion* OR fear OR anxi* OR frustrat* OR happines* OR unhappines* OR helpless* OR nervousnes* OR ((work OR occupation* OR job) N2 engage*) OR (self N1 (concept* OR control* OR esteem* OR efficac* OR imag*)) OR confiden* OR ((interprofession* OR profession*) N2 attitude*) OR empower* OR coping OR runaway OR run-away OR resilien* OR mastery OR ((prepared* OR unprepared* OR competen* OR incompeten*) N5 (practice* OR clinical OR profession*)) OR fatigue OR adaptive-behav*)) AND (MH "Nonexperimental Studies" OR MH "Prospective Studies +" OR MH

"Surveys" OR MH "Epidemiological Research" OR MH "Case Control Studies" OR MH "Cross Sectional Studies" OR MH "Multicenter Studies" OR MH "Comparative Studies" OR MH "Clinical Trials+" OR MH "Random Assignment" OR MH "Systematic Review" OR TI (((observation* OR epidemiolog* OR famil* OR comparativ* OR communit*) N5 (stud* OR data OR research)) OR cohort* OR longitudinal* OR retrospectiv* OR prospectiv* OR population* OR (national* N2 (stud* OR survey)) OR (health* N2 survey*) OR ((case OR cases OR match*) N2 control*) OR (cross N1 section*) OR correlation* OR multicenter* OR multi-center* OR follow-up* OR followup* OR (clinical* N2 (stud* OR article* OR research*)) OR trial OR random* OR review* OR meta-analy*) OR AB (((observation* OR epidemiolog* OR famil* OR comparativ* OR communit*) N5 (stud* OR data OR research)) OR cohort* OR longitudinal* OR retrospectiv* OR prospectiv* OR population* OR (national* N2 (stud* OR survey)) OR (health* N2 survey*) OR ((case OR cases OR match*) N2 control*) OR (cross N1 section*) OR correlation* OR multicenter* OR multi-center* OR follow-up* OR followup* OR (clinical* N2 (stud* OR article* OR research*)) OR trial OR random* OR review* OR meta-analy*)) AND (MH "Vocational Guidance" OR MH Counseling OR MH "Education" OR MH "Program Evaluation" OR MH "Forecasting" OR TI (prevent* OR intervention* OR guidance* OR counsel* OR program* OR effectiv* OR evaluat* OR support* OR predict*) OR AB (prevent* OR intervention* OR guidance* OR counsel* OR program* OR effectiv* OR evaluat* OR support* OR predict*)) NOT PT (letter OR news OR comment OR editorial OR congresses OR abstracts) AND LA english

ERIC Ovid

(((nurs* ADJ3 (student* OR studying OR graduate*)) OR (nurs*-school*) OR ((new OR novice OR young*) ADJ nurse*)).ab,ti.) AND ("Mental Health"/ OR "Anxiety"/ OR "Depression (Psychology)"/ OR "Psychological Patterns"/ OR fear/ OR "self concept"/ OR "Self Concept Measures"/ OR exp "Empowerment"/ OR "Fatigue (Biology)"/ OR (((mental* OR psycholog*) ADJ3 (health OR capacit* OR irritat* OR performan* OR fit OR fitness* OR vitalit* OR symptom* OR discomfort OR disease* OR disorder* OR pain*)) OR disabilit* OR well-being OR wellbeing OR stress* OR distress* OR burnout* OR burn-out* OR depressi* OR emotion* OR fear OR anxi* OR frustrat* OR happines* OR unhappines* OR helpless* OR nervousnes* OR ((work OR occupation* OR job) ADJ3 engage*) OR (self ADJ (concept* OR control* OR esteem* OR efficac* OR imag*)) OR confiden* OR ((interprofession* OR profession*) ADJ3 attitude*) OR empower* OR coping OR runaway OR run-away OR resilien* OR mastery OR ((prepared* OR unprepared* OR competen* OR incompeten*) ADJ6 (practice* OR clinical OR profession*)) OR fatigue OR adaptive-behav*).ab,ti.) AND (exp "Cohort Analysis" OR "Surveys"/ OR "Epidemiology"/ OR "Case Studies"/ OR "Comparative Analysis"/ OR (((observation* OR epidemiolog* OR famil* OR comparativ* OR communit*) ADJ6 (stud* OR data OR research)) OR cohort* OR longitudinal* OR retrospectiv* OR prospectiv* OR population* OR (national* ADJ3 (stud* OR survey)) OR (health* ADJ3 survey*) OR ((case OR cases OR match*) ADJ3 control*) OR (cross ADJ section*) OR correlation* OR multicenter* OR multi-center* OR follow-up* OR followup* OR (clinical* ADJ3 (stud* OR article* OR research*)) OR trial OR random* OR review* OR meta-analy*).ab,ti.) AND ("Vocational Guidance"/ OR Counseling/ OR "Education"/ OR "Program Evaluation"/ OR "Forecasting"/ OR (prevent* OR intervention* OR guidance* OR counsel* OR program* OR effectiv* OR evaluat* OR support* OR predict*).ab,ti.) NOT (letter OR news OR comment OR editorial OR congresses OR abstracts).pt. AND english.la.

Cochrane CENTRAL

(((nurs* NEAR/3 (student* OR studying OR graduate*)) OR (nurs* NEXT/1 school*) OR ((new OR novice OR young*) NEXT/1 nurse*)):ab,ti) AND ((((mental* OR psycholog*) NEAR/3 (health OR capacit* OR irritat* OR performan* OR fit OR fitness* OR vitalit* OR symptom* OR discomfort OR disease* OR disorder* OR pain*)) OR disabilit* OR (well NEXT/1 being) OR wellbeing OR stress* OR distress* OR burnout* OR (burn NEXT/1 out*) OR depressi* OR emotion* OR fear OR anxi* OR frustrat* OR happines* OR unhappines* OR helpless* OR nervousnes* OR ((work OR occupation* OR job) NEAR/3 engage*) OR (self NEXT/1 (concept* OR control* OR esteem* OR efficac* OR imag*)) OR confiden* OR ((interprofession* OR profession*) NEAR/3 attitude*) OR empower* OR coping OR runaway OR (run NEXT/1 away) OR resilien* OR mastery OR ((prepared* OR unprepared* OR competen* OR incompeten*) NEAR/6 (practice* OR clinical OR profession*)) OR fatigue OR (adaptive NEXT/1 behav*)):ab,ti) AND ((prevent* OR intervention* OR guidance* OR counsel* OR program* OR effectiv* OR evaluat* OR support* OR predict*):ab,ti)

Web of science

TS=((((nurs* NEAR/2 (student* OR studying OR graduate*)) OR (nurs*-school*) OR ((new OR novice OR young*) NEAR/1 nurse*))) AND ((((mental* OR psycholog*) NEAR/2 (health OR capacit* OR irritat* OR performan* OR fit OR fitness* OR vitalit* OR symptom* OR discomfort OR disease* OR disorder* OR pain*)) OR disabilit* OR well-being OR wellbeing OR stress* OR distress* OR burnout* OR burn-out* OR depressi* OR emotion* OR fear OR anxi* OR frustrat* OR happines* OR unhappines* OR helpless* OR nervousnes* OR ((work OR occupation* OR job) NEAR/2 engage*) OR (self NEAR/1 (concept* OR control* OR esteem* OR efficac* OR imag*)) OR confiden* OR ((interprofession* OR profession*) NEAR/2 attitude*) OR empower* OR coping OR runaway OR run-away OR resilien* OR mastery OR ((prepared* OR unprepared* OR competen* OR incompeten*) NEAR/5 (practice* OR clinical OR profession*)) OR fatigue OR adaptive-behav*)) AND ((((observation* OR epidemiolog* OR famil* OR comparativ* OR communit*) NEAR/5 (stud* OR data OR research)) OR cohort* OR longitudinal* OR retrospectiv* OR prospectiv* OR population* OR (national* NEAR/2 (stud* OR survey)) OR (health* NEAR/2 survey*) OR ((case OR cases OR match*) NEAR/2 control*) OR (cross NEAR/1 section*) OR correlation* OR multicenter* OR multi-center* OR follow-up* OR followup* OR (clinical* NEAR/2 (stud* OR article* OR research*)) OR trial OR random* OR review* OR meta-analy*)) AND ((prevent* OR intervention* OR guidance* OR counsel* OR program* OR effectiv* OR evaluat* OR support* OR predict*))) AND DT=(article) AND LA=(english)

Google scholar

First 200:
“nurse|nursing student|students”|”new|novice|young |student nurses” “mental|psychological health|capacity|performance|symptoms|wellbeing|resilience”|stress|burnout|depression prevention|intervention|program cohort|longitudinal|”follow up”|prospective

First 100:
allintitle:nurses|nursing “mental|psychological health|capacity|performance|symptoms|wellbeing|resilience”|stress|burnout|depression prevention|intervention|program

Supplementary file 2. Assessment of the methodological quality of each study.

First author, year	Research design	Random sequence generation	Allocation concealment	Blinding of participants and personnel	Blinding of outcome assessment	Incomplete outcome data	Selective outcome reporting	Other sources of bias
Bailey, 1984	Controlled trial	-	-	-	+	?	-	?
Beecroft, 2001	Controlled trial	-	-	-	+	?	-	?
Cubit, 2011	Uncontrolled longitudinal study	-	-	-	-	?	-	?
Delaney, 2016	Controlled trial	?	?	-	-	?	-	?
Hu, 2015	Controlled trial	-	-	-	-	?	-	?
Jones, 2000a	Randomized controlled trial	+	?	-	+	?	-	?
Jones, 2006	Controlled trial	-	-	-	+	?	-	?
Kowalski, 2010	Uncontrolled longitudinal study	-	-	-	-	-	?	?
Krugman, 2006	Uncontrolled longitudinal study	-	-	-	+	?	?	-
Messmer, 2011	Uncontrolled post-test only study	-	-	-	-	?	?	-
Newhouse, 2007	Controlled post-test only study	-	-	-	+	-	?	-
Olson-Sitki, 2012	Uncontrolled longitudinal study	-	-	-	-	-	?	-
Owens, 2001	Uncontrolled post-test only study	-	-	-	-	-	?	-
Owings, 2016	Uncontrolled longitudinal study	-	-	-	-	-	-	-
Pelletier, 2019	Uncontrolled longitudinal study	-	-	-	+	-	-	-
Roxburgh, 2010	Cross-sectional study	-	-	-	-	-	?	-
Scott, 2008	Uncontrolled post-test only study	-	-	-	-	?	?	-
Spector, 2015	Randomized controlled trial	+	?	-	?	+	-	?
Wernick, 1984	Controlled trial	-	-	-	-	?	?	-
Williams, 2007	Uncontrolled longitudinal study	-	-	-	?	?	?	-
Williams, 2018	Cross-sectional study	-	-	-	?	?	-	-

+	Low risk of bias
?	Unclear risk of bias
-	High risk of bias

CHAPTER 6

Conflict or Connection? Evaluating the feasibility of a connecting communication training for nursing students

Ellen J.M. Bakker
Connie M. Dekker-van Doorn
Jos H.A.M. Kox
Harald S. Miedema
Anneke L. Francke
Pepijn D.D.M. Roelofs

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Abstract

Background: Nursing students frequently experience offensive behaviour and communication problems with patients, clinical supervisors, and nursing and faculty staff. A communication training was developed based on connecting communication to prevent and manage conflict and build interpersonal trust-based relationships.

Objectives: Feasibility study to evaluate the acceptability, demand, implementation, integration, and limited efficacy of a training based on connecting communication within a nursing curriculum.

Design: Mixed method design.

Participants: Third-year nursing students (n=24).

Setting: A Dutch Bachelor of Nursing degree programme in Rotterdam.

Methods: Between November 2019 and March 2020, data were collected from students and trainers, using quantitative and qualitative methods. Feasibility aspects, including limited efficacy testing, were measured with pre- and post-training surveys. Descriptive statistical analyses and (non)parametric tests were used to analyse feasibility aspects and baseline and follow-up scores for empathy, self-compassion, and exposure to violence. In addition, reflection reports of students and two paired interviews with the two trainers were analysed using qualitative content analysis with a deductive approach.

Results: The post-training survey and reflection reports showed a positive assessment of the training on acceptability, demand, and integration. Students rated the training as helpful in improving their communication skills and in dealing with conflict situations. Furthermore, they recommended to implement the training in earlier years of the educational programme. According to the trainers, miscommunication, students' lack of preparation for lessons, and the timing of the training prohibited full participation in the training. The pretest-posttest survey results show statistically significant improved self-compassion (3.77 vs. 4.10; p=0.03) and decreased self-judgement (4.21 vs. 3.50; p=0.03). Empathy and exposure to violence did not change.

Conclusions: From the perspective of nursing students and trainers involved, this 10-week training based on connecting communication is feasible to implement in the Bachelor of Nursing degree programme, preferably before clinical placements.

Background

High prevalence of offensive behaviour at the workplace against nurses and nursing students is associated with impaired mental health and well-being, intention to leave and actual dropout, as well as with a decline in quality of care and patient safety (Spector et al., 2014; Bambi et al., 2018; Magnavita et al., 2020). According to Pejtersen et al. (2010), offensive behaviour includes verbal and physical violence, bullying, unpleasant teasing, conflicts and quarrels, gossip and slander and sexual harassment. Offensive behaviour in the workplace can take place between patients, and patients' relatives, students and healthcare professionals.

During clinical placements, nursing students are a potentially vulnerable group for offensive behaviour by patients and patients' relatives, because of their limited experience, high client contact time, frequent ward changes, and the challenge to work and build up relationships in a new environment (Ferns and Meerebeau, 2009; Magnavita and Heponiemi, 2011). Besides, spending much time in clinical practice environments with known high work pressure (Bakker et al., 2021) and strong hierarchical relationships (Eick et al., 2012), makes them vulnerable to offensive behaviour by nursing staff, clinical supervisors and physicians. In a study among 1,394 nursing students, Birks et al. (2017) found that students identified nursing staff as the main perpetrators, and patients were a source of physical acts of bullying too.

The impact of offensive behaviour on mental health and intention to leave nursing education was studied in observational research in Italy among 346 nursing students by Magnavita and Heponiemi (2011). They revealed that verbal violence was associated with high levels of psychological problems, job strain, low social support, and little organisational justice. In addition, a recent prospective cohort study among 363 Dutch nursing students (Bakker et al., 2021) revealed frequent exposure to violence as a risk factor for distress. In that study, nursing staff's support was a protective factor for intention to leave nursing education in the last stage of the programme. Improving the psychosocial working and learning environment for nursing students may reduce distress, the intention to leave at a late stage in nursing education, and hence actual late dropout.

Effective interventions for nurses and nursing students to deal with occupational violence in the clinical setting is lacking (Spelten et al., 2020). However, a systematic review by Stagg et al. (2010) showed that bullying and violence prevention programmes, based upon principles of cognitive rehearsal of responses, can be effective in reducing bullying at work. Furthermore, Kang et al. (2017) showed in a randomised controlled trial among South Korean nurses that a cognitive rehearsal training programme including a training in 'nonviolent communication', simulations and role plays with various scenarios of bullying, had a positive effect on interpersonal relationships and turnover intention. Nosek et al. (2014) tested a 'nonviolent communication training' on its ability to improve empathy in baccalaureate nursing students and found a statistically significant increase in empathy (Davis, 1983) post training.

We hypothesised that a training based on nonviolent communication would be a promising educational intervention to strengthen nursing students' communication skills for preventing and managing conflict situations, and for improving interpersonal relationships with patients, patients' relatives, co-students, clinical supervisors, and nursing and faculty staff. 'Nonviolent or empathic communication', described as 'connecting communication', was developed by Rosenberg (1998, 2003) to build personal

and professional relationships grounded in mutual respect, compassion, and emotional safety through empathic listening, using a conversation technique in a four-step process: observation–feeling–need–request. These four steps enable users to: 1) make objective observations of situations while avoiding judgement; 2) describe the emotional response (i.e. feeling) to the situation without blaming one another; 3) investigate what needs may or may not have been met; and 4) formulate a non-demanding request. Connecting communication contributes to an important aspect of nursing work called 'emotional labour' (Theodosius, 2008), which means managing the emotional demands of relating with patients, family, and colleagues. It supports important aspects of emotion regulation, such as i) conscious processing and being aware of emotions, ii) identifying and labelling emotions, and iii) accepting and tolerating emotions (Berking et al., 2008; Torre et al., 2018). To build trustful relationships with patients and patients' relatives in difficult situations, nursing students must learn to regulate their own emotions, understand others' emotions, and not taking patients' and patients' relatives emotional expressions personally (Delgado et al., 2017).

No previous studies have been conducted on the feasibility of a training programme on connecting communication within nursing education. Hence, this study aims to evaluate to what extent: (1) a training programme on connecting communication is suitable, satisfying, attractive and educational for nursing students (acceptability and demand); (2) the training can be successfully delivered to students and integrated within a nursing curriculum (implementation and integration); (3) students acquire the knowledge, skills and attitudes, necessary to prevent and manage conflict (limited efficacy).

Methods

Design

A mixed-method feasibility study was conducted, focusing on five feasibility aspects as described by Bowen et al. (2009): acceptability, demand, implementation, integration, and limited-efficacy testing, combined with the four levels of Kirkpatrick's evaluation model of learning events (Table 1). These four levels concern: 1) Reaction: the degree to which participants find the training favourable, engaging and relevant to their jobs; 2) Learning: the degree to which participants acquire the perceived knowledge, skills and attitude based on their participation in the training; 3) Behaviour: the degree to which participants apply in practice what they learned during training; and 4) Results: the degree to which targeted outcomes occur as a result of the training (Kirkpatrick et al., 1996, 2006).

Table 1. Evaluation model based on Bowen et al. (2009) and Kirkpatrick et al. (1996, 2006).

Area of focus	Research questions	Outcomes of interest	Research instruments	Research population	Four levels of Kirkpatrick's model
Acceptability	To what extent is the training judged as suitable, satisfying, or attractive to students?	Satisfaction Perceived appropriateness	Post-training survey; semi-structured paired interviews	Students and trainers	Level 1: Reaction
Demand	To what extent is training likely to be used or applied by students?	Actual use Intention to continue use	Post-training survey; reflection reports	Students	Level 3: Behaviour
Implementation	To what extent can the training be successfully delivered to intended participants in some defined, but not fully controlled, context?	Degree of execution Success or failure of execution	Post-training survey; attendance lists; semi-structured paired interviews	Students and trainers	Level 1: Reaction
Integration	To what extent can the training be integrated within the curriculum?	Perceived fit with infrastructure Perceived sustainability	Post-training survey	Students	Level 1: Reaction
Limited-efficacy testing on learning outcomes	To what degree students acquire the intended knowledge, skills and attitudes based on their participation in the training?	Perceived and demonstrated knowledge Perceived and demonstrated skills Perceived and demonstrated attitudes	Reflection reports; post-training survey	Students	Level 2: Learning
Limited-efficacy testing on targeted outcomes	To what degree targeted outcomes occur as a result of the training?	Effects of the training on empathy, self-compassion, exposure to violence	Pretest-posttest survey measuring: empathy (Brief Interpersonal Reactivity Index [IRI]) (De Corte, 2007); self-compassion (SCS-short) (Neff and Vonk, 2009); exposure to violence (Pejtersen et al., 2010)	Students	Level 4: Results

Participants and setting

The training was offered to third-year students during the first semester of their Bachelor of Nursing degree programme at the Rotterdam University of Applied Sciences. During this 20-week semester, students combine three days of clinical placement with two days of academical training per week. The planning service centre team randomly assigned two of the 18 classes of third-year nursing students (N=35) to the training. The students of the other 16 classes received the regular programme; professional communication lessons in misunderstood behaviour, which were available for the two intervention classes at a later date. Criteria for inclusion in the study were: (i) conducting the clinical placement in the Netherlands, (ii) attendance at least one of the five training sessions, and (iii) participation in both baseline and follow-up measurements.

Description of the training

The overall aim of the training was to enable nursing students to use the principles of connecting communication at the university and at clinical placement, with knowledge, skills, and attitudes as learning outcomes (Table 2).

Table 2. Intended learning outcomes of knowledge, skills, and attitudes.

	Learning objectives
Knowledge	The students can explain: (i) the elements and aspects of the process of connecting communication; (ii) the concepts of sympathy, empathy and self-compassion and supporting others (e.g., supporting self-management and self-direction (Duprez et al., 2018), 'the presence approach' (Baart, 2002), listening empathically in relation to connecting communication and building interpersonal and trust-based relationships.
Skills	The students can: (iii) define their own objectives in applying connecting communication in their professional communication; (iv) apply connecting communication to their own case histories (regarding clinical placements and at the faculty) and reflect on this; (v) recognise what triggers their emotions and reactions and find connection-focused alternatives to use; (vi) identify (potential) conflict situations, use connecting communication to prevent and deal with conflict and build interpersonal and trust-based relationships.
Attitude	The students can recognise: (vii) the main principle of connecting communication, that all people in the world have the same needs, regardless of gender, age, religion, culture, or race; (iix) can recognise that dialogue is a communication form in which differences can exist.

This training programme was developed, piloted, and offered by a faculty member with a Ph.D. in health sciences who is a candidate for International Nonviolent Communication (NVC) Certification, and a senior NVC-certified trainer with a background in education. Experiential learning theory (Brunero et al., 2010) and reflective practice (e.g., Schön, 1983; Rolfe 2002, 2014) were used for designing the learning activities.

The training contained five 100-minute sessions; Table 3 presents a full description. Students used a smartphone-sized booklet with the connecting communication core principles, elements, and examples to practise with during and after the training (Supplementary files 1 and 2). Besides, students were asked to bring examples of conflict situations experienced during clinical placements, at the university, or in their private lives. Students finished the training with an assignment. This was a reflection report in which students evaluated their personal learning objectives regarding professional communication, and analysed a conflict situation using processes and elements of connecting communication.

Table 3. Training components, guided and unguided study time, and intended learning activities.

Week	Training components	Guided	Unguided	Intended learning activities
		Study time (hours)		
1/2	Interactive lecture	**1**	**0.5**	(1) Understanding the concept of mental, physical, and moral resilience in relation to the SPRiNG (Studying Professional Resilience in Nursing students and Graduates) study (Bakker et al., 2018); (2) Discussing the relevance of the feasibility study for the nursing curriculum and nursing competency framework; (3) Recognising the relevance of the training for developing resilience for nursing students; (4) Describing how to participate in the SPRiNG study.
3	**Training session 1** The process and elements	**2**	**2**	Preparation and self-study: read literature, prepare assignment, bring assignment to class. Group meeting: (1) introduction to the process of connecting communication through teaching cases and students' own examples; (2) learning to translate judgements into feelings and needs, e.g. become aware what is going on in yourself and to clearly express yourself using the elements of connecting communication (learning self-compassion).
4	**Training session 2** Listen empathically	**2**	**2**	Preparation and self-study: read literature, make processing assignment 1, bring assignment to class. Group meeting: discussing empathic listening, the pitfalls and practice it.
5	**Training session 3** Four ways to listen to messages	**2**	**2**	Preparation and self-study: read literature, make processing assignment 2, take elaboration to class. Group meeting: discussing and practising four different ways of listening to messages using statements and case histories.
6	**Training session 4** Dealing with anger and 'No'	**2**	**2**	Preparation and self-study: read literature, make processing assignment 3, bring assignment to class. Group meeting: practising with triggers from yourself and others. Dealing with anger and receiving or saying: "No".
7	**Training session 5** Integration; the dialogue	**2**	**2**	Preparation and self-study: read literature, make processing assignment 4, bring assignment to class. Group meeting: practicing the dialogue in which the processes of self-compassion, clear expressing feelings and requests, and empathic listening alternate.
9/10	Assignment		**4**	Write a reflection report in which you: (1) evaluate your personal learning objectives in the field of professional communication, resilience and dealing with conflict situations; (2) analyse and rewrite a case history from nursing education applying processes and elements of connecting communication.
		11	**15**	
	Total hours (hrs)	**26 hrs + 2 hrs for contributing to research = 28 hrs = 1 European Credit (EC)**		

Data collection

The inclusion and the data collection started in November 2019, and follow-up was concluded in March 2020. Data was collected from participating students using: (i) a digital post-training survey, containing self-formulated closed and open-ended questions on feasibility aspects (Table 5), (ii) a digital pretest-posttest survey containing validated questionnaires on targeted outcomes, and (iii) reflection reports. Besides that, we held semi-structured interviews in two paired interview sessions with the two trainers, using a topic list addressing two feasibility aspects (acceptability and implementation; supplementary file 3). The two interview sessions lasted 60 and 73 minutes, respectively, and took place after the training. In addition, data on the students' participation and reasons for non-participation were collected using an attendance list, which had been completed by the trainers.

The post-training survey was developed guided by the feasibility aspects, and tested for face validity by the research team and trainers. In the pretest-posttest survey, the following background characteristics were measured before the training: age, gender, migration background, Dutch as the native language, prior education, study route, clinical placement setting, housing situation, professional support regarding mental health problems (from a general practitioner, psychologist, university counsellor or study career coach) and previous training in connecting communication.

In addition, three outcomes were measured: empathy, self-compassion, and exposure to violence. To measure empathy, we used the Dutch translation of the 16-item Brief Interpersonal Reactivity Index (Davis, 1983; De Corte, 2007; Ingoglia, 2016), with a 5-point Likert scale from 0 ('never') to 4 ('always'). The internal consistency of the scale is good with Cronbach's alpha ranging from 0.88 (baseline) to 0.91 (follow-up). Self-compassion was measured with the Dutch translation of the 12-item Self-compassion Scale short version (Neff, 2003; Neff and Vonk, 2009), using a 7-point Likert scale from 1 ('not applicable at all') to 7 ('very applicable'). The Cronbach's alpha (0.75) showed good internal consistency of the scale at baseline and follow-up. To measure exposure to aggression, we used an item of the Copenhagen Psychosocial Questionnaire II (Pejtersen et al., 2010) [Have you been exposed to threats of or physical violence at your clinical placement the last two weeks?], with answers scored on a 5-point scale ranging from 'no' to 'yes, daily'.

Data analysis

Quantitative survey data were analysed using SPSS version 26 (SPSS, Inc., Chicago, IL, USA) for Windows. Descriptive statistics were used to analyse the data from the post-training and pretest-posttest survey. For empathy, a total score and scores for each of the subscales were calculated. To calculate the total empathy score, scores on the Personal Distress subscale were reversed (Duarte et al., 2016). For self-compassion, scores for each of the positive scales (self-kindness, mindfulness, and common humanity) and for each of the negative scales (over-identification, isolation, self-judgement) were calculated. To calculate the total self-compassion score, scores on the negative subscales had to be reversed (Neff et al., 2018). For reasons of statistical power, the five answer categories for violence were merged into three categories: (1) 'never', (2) 'occasionally', and (3) 'frequently'.

Outcomes from the pretest-posttest survey were checked for normal distribution. The pretest-posttest survey data were compared to detect any statistically significant changes, using paired t-test for the empathy and self-compassion scales, and Fisher's exact test for exposure to violence. The statistical significance was set at $p < 0.05$.

The recorded and verbatim transcribed interviews, the reflection reports and the answers to the open survey questions were analysed using qualitative content analysis with a deductive approach (Elo and Kyngäs, 2008), applying codes related to the feasibility aspects (Table 1).

Ethical considerations

This study was conducted in accordance with the Dutch Medical Research Involving Human Subjects Act. The Medical Ethical Review Committee of Erasmus Medical Center Rotterdam approved the study (Ref. MEC-2019-0638). The study complies with the Dutch Code of Conduct for Scientific Practice

drawn up by the Association of Universities in the Netherlands (VSNU). All participants were informed about the study orally and in writing, before being approached for participation, and gave written informed consent.

Results

Characteristics of the study population

From all 35 enrolled students, 28 participated in the training and 24 completed the pretest-posttest survey (Figure 1). From the latter group, 23 students responded to the post-training survey and 20 completed the training with a reflection report.

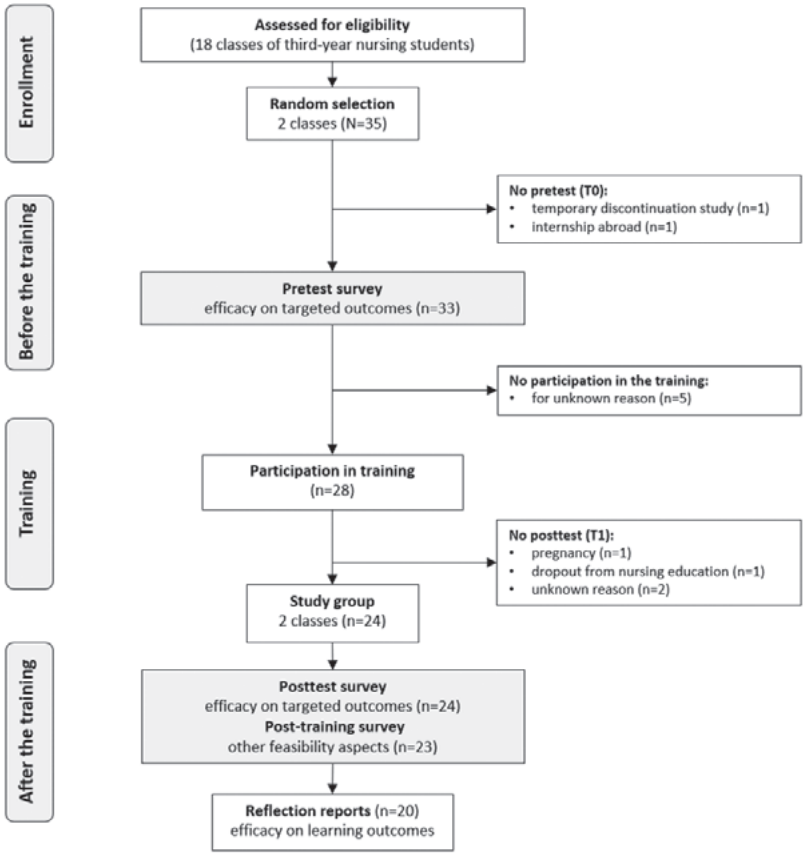

Figure 1. Flow chart of participants.

On average, the participant students were 22 years old, mostly Dutch females living with their parents, studying fulltime and did their clinical placement in a hospital setting (Table 4).

Table 4. Background characteristics of the study group (n=24).

	Study group (n=24)
Background characteristics	**Median (Mean ± SD) min-max**
Age	21.0 (21.9 ± 4.2) 19-39
	% (n)
Gender (% female)	95.8 (23)
Dutch or migration background	
% Dutch, no migration background	75.0 (18)
% Western migration background	4.2 (1)
% Non-Western migration background	20.8 (5)
Dutch as native language (% yes)	91.7 (22)
Housing situation	
% Living with parents	70.8 (17)
% Living with roommates, partner (with or without children), or alone	29.2 (7)
Prior education	
% higher general secondary education	62.5 (15)
% secondary vocational nursing training	25.0 (6)
% pre-university education, higher vocational education, university education or other	12.5 (3)
Educational route	
% full-time	79.2 (19)
% study-work trajectory	20.8 (5)
Type of clinical placement	
% general hospital	50 (12)
% academic hospital	16.7 (4)
% nursing home	4.2 (1)
% community-based home care setting	16.7 (4)
% mental health facility	12.5 (3)
Mental support in past year (yes-no) % yes	37.5 (9)
Followed a training based on connecting communication before (% yes)	8.3 (2)

Acceptability

Satisfaction

The post-training survey (Table 5) showed that most students were satisfied with the training. It contributed to preparing for difficult situations, clarity about what was important to themselves, and improvement of interpersonal relationships with patients, patients' relatives, clinical supervisors, nursing staff and co-students at their clinical placements, and with faculty staff of the university. The training itself was rated with an average score of 6.0 (SD ± 1.7) on a scale from 0 to 10.

The interviews with the trainers revealed that students were somewhat reluctant to participate in this feasibility study; they preferred to continue professional communication lessons with their regular teacher with whom they had built up rapport. It was insufficiently clear to them that they could follow the regular programme later.

Perceived appropriateness

Most students considered the processes and elements of connecting communication appropriate to apply in their clinical placements, and educational programme. All students confirmed that the training provided basic communication skills for nurses, and almost all that the training must be offered to all nursing students. Suggestions for improvement of the training included: i) the timing of the training, indicating to provide it in year 1 or 2 of the curriculum, ii) more emphasis on application of connecting communication in real-life nursing practice (illustrated by video material or own cases), iii) adding patient simulation sessions, iv) more concrete instead of vague language, v) a more flexible programme focussing on the needs of students, vi) clearer communication about the feasibility study, and vii) less assignments.

> "In year 1, I think it would be better to use this as a basis, rather than in year 3 wherein the professional communication lessons are very instructive." (female student, age 20, clinical placement in homecare)

> "In the second year. This way you are prepared for conflict situations at your clinical placements." (female student, age 22, clinical placement in academic hospital)

Table 5. Evaluation of the feasibility aspects measured with the post-training survey (n=23).

Feasibility Aspects	
ACCEPTABILITY	
Satisfaction	**Median (Mean ± SD) min-max**
I rate this training with the mark (0-10):	6.0 (6.0 ± 1.7) 3-8
The training based on connecting communication…..:	**% agree (n)**
has useful, educational and activating methods.	78.3 (18)
I experience…:	
• the approach of the teacher / trainer as inspiring and motivating	69.6 (16)
• the trainer as an expert	91.3 (21)
• the trainer's approach as supporting in learning CC processes and elements	65.2 (15)
• the atmosphere during the training as safe.	91.3 (21)
The training 'Conflict or Connection' contributes to:	
• preparing for difficult situations	78.3 (17)
• clarity about what is important to me	87.0 (20)
• improvement of relationships with my patients and their relatives	87.0 (20)
• improvement of relationships with clinical supervisors	78.3 (18)
• improvement of relationships with nursing staff and co-students at clinical placements	78.3 (18)
• improvement of relationships with nurse faculty members of the university	69.6 (16)
Open question	
1. What is the most important improvement you would like to suggest for the training?	
Perceived appropriateness	
The processes and elements of the training 'Conflict or Connection' based on connecting communication:	**% agree (n)**
• are applicable to my clinical placement	91.3 (21)
• are applicable within nursing education	91.3 (21)
The connecting communication training must be offered to all nursing students	95.7 (22)
Connecting communication is a basic communication skill for nurses	100 (23)
DEMAND	
Intent to continue use	
The training 'Conflict or Connection' based on connecting communication:	**% agree (n)**
• encourages me to continue to apply what I have learned	65.2 (15)
INTEGRATION	
Perceived fit with infrastructure	
The training 'Conflict or Connection' fits within professional communication lessons	69.6 (16)
The fundaments of connecting communication must be provided in year 1 and 2.	95.7 (22)
The training 'Conflict or Connection' must be offered as an elective in year 3	82.6 (19)
To be able to apply connecting communication:	
• faculty staff from the Bachelor of Nursing degree programme should be trained as well;	100 (23)
• mentors in clinical practice should be trained as well;	95.7 (22)
• clinical supervisors should be trained as well;	82.6 (19)
• faculty members that guide students at their clinical placement should be trained as well.	91.3 (19)

Feasibility Aspects	
Open question	
2. What place should communication trainings based on connecting communication have in the curriculum?	
IMPLEMENTATION	
Degree of execution (*n* = 24)	**Median (Mean ± SD) min-max**
Average amount of sessions followed) (1-5)	4.0 (3.7 ± 1.2) 1-5
Number of training sessions attended by participants	**% and number (n) of participants**
• 1 training session	4.2 (1)
• 2 training sessions	12.5 (3)
• 3 training sessions	25.0 (6)
• 4 training sessions	25.0 (6)
• 5 training sessions	33.3 (8)
Number of students that completed the training with a reflection report	83.3 (20)
LIMITED-EFFICACY TESTING ON LEARNING OUTCOMES	
Perceived and demonstrated knowledge and skills	**Median (Mean ±SD) min-max**
Grade point assignment (reflection reports; *n* = 20) (0-10)	7.5 (7.2 ± 0.9) 4.7-8.5
Open questions	
3. What did the training 'Conflict or Connection' contribute to your communication skills?	
4. What is the most important thing you learned in the training 'Conflict or Connection'?	

With regard to Kirkpatrick's Level 1 ('Reaction'), most of the students judged the training as suitable, satisfying, attractive, favourable, engaging, and relevant to apply during nursing education.

Demand

Actual use

Most students (n=18) stated the training improved their communication skills.

> "I have learned an additional conversation technique that I can put into practice. By really listening to others." (female student, age 19, clinical placement in homecare)

> "I now know better how to express my feelings and wishes in unpleasant situations." (female student, age 23, clinical placement in general hospital)

According to the reflection reports students applied connecting communication with nursing staff, clinical supervisors, patients and patients' relatives during clinical placements. They used it to understand angry, irritated, sad or anxious patients and to reflect in case of unpleasant or unfair statements of nursing staff or co-students. Taking into account the underlying feelings and needs of a person's behaviour also helped them to find connection and deal with their own feelings of anger, insecurity or disappointment.

Intent to continue use

In the post-training survey, most of the students reported that the training encouraged them to continue to apply what they learned about connecting communication.

In all reflection reports students stated the intention to continue using connecting communication. Students formulated new learning objectives regarding (i) identifying feelings and needs to understand themselves and others and (ii) listen empathically to improve relationships, collaboration, patient care, and (iii) prevent escalation and conflicts in future clinical placements. Some stated to first practice this in a safe environment such as their private lives.

With regard to Kirkpatrick's learning level 3 ('Behaviour'), the results show that most students used the learned communication methods and techniques during clinical placements, and sometimes at the university. The majority reported the intention to continue using connecting communication in future clinical placements.

Implementation

Degree of execution

In both classes all five planned training sessions were delivered.

Success or failure of execution

The average number of sessions attended was 3.7 sessions per student (SD ± 1.2). Half of the students attended 3 or 4 sessions and the majority completed the training with a final assignment. In the open-ended questions students explained they did not attend all classes or prepare assignments due to high study load. The trainers confirmed this; since the training was not mandatory, some students gave priority to other assignments or duties.

With regard to Kirkpatrick's Level 1 ('Reaction'), the participation of students in the training showed suboptimal implementation, as a minority of the students (n=8; 33.3%) attended all five training sessions and students did not always prepare for lessons.

Integration

Perceived fit with nursing curriculum

Most students stated that the training fitted well in the curriculum about professional communication. However, nearly all expressed that the training should be offered as an elective in year 3. The main principles of connecting communication could best be taught in year 1 and 2, as confirmed in the answers to the open question's:

> "You learn to better observe and listen to other people. This is especially important for the nursing profession, so in my opinion you can teach this course as early as possible in the study. This also pays off for your first clinical placement in year 2." (male student, age 20, clinical placement in general hospital)

"As [third-year, [EB]] students we have already built up our own coping mechanism, so to speak, so this training has been a bit redundant for us in my opinion." (female student, age 19, clinical placement in general hospital)

Perceived sustainability

In the post-training survey, most students confirmed that for them to use connecting communication, also faculty staff, nurses with a mentor role in clinical practice, and clinical supervisors should be trained. The trainers confirmed the need to educate faculty staff and clinical supervisors in connecting communication to enable them to be role models and to practice what they teach.

With regard to Kirkpatrick's Level 1 ('Reaction'), most participants were positive about integrating the training in the educational programme, preferably in the first or second year of the programme, at least before their first 20-week clinical placement.

Limited-efficacy testing on learning outcomes

The mean mark for the assignment - the written reflection reports - was 7.2 (SD ± 0.9; min-max 4.7 to 8.5) on a scale from 0 to 10 (poor-excellent). One student, who had attended 2 training sessions, received an insufficient mark (4.7). These marks reflect that the training was effective on learning outcomes regarding the knowledge and skills of connecting communication (Table 2). Since attitude was not tested in the reflection reports, it remains unclear to what extent these are achieved.

Most students confirmed that the training had improved their communication skills. They also expressed the most important things they learned. Some responded in general terms, such as becoming more aware of the importance of communication. Others mentioned they had more knowledge about connecting communication and that they learned to understand their own emotions and needs in conflict situations. Some expressed they learned empathic listening without judgement of other persons. In addition, some had become aware of their interpersonal relationships in nursing practice, education and their private lives.

"I am better able to empathise with people and I don't judge them quickly, I first try to ask myself why they react the way they do." (female student, age 22, clinical placement in mental health care)

"Talking, communicating with a colleague if you notice certain irritations that make you feel uncomfortable." (female student, age 20, clinical placement in general hospital)

"Looking at your own emotions and those of another person and how these can be evoked." (female student, age 21, clinical placement in general hospital)

Three of the participant students stated that the training contributed very little to their communication skills.

> "Nothing new. However, repetition…This may be useful in the 2nd semester of year 1 and in year 2." (female student, age 23, clinical placement in academic hospital)

However, in the reflection reports, two of the three underlined the value of connecting communication:

> "As a nurse, it is important to provide a listening ear to patients. Patients are very vulnerable and can show many emotions. Patience, LSA [listening - summarising – asking further questions, [EB]], and reflecting feelings are important aspects that a nurse must use, but we must not forget about ourselves and that is why the four aspects of connecting communication are important." (female student, age 23, clinical placement in academic hospital)

With regard to Kirkpatrick's Level 2 ('Learning'), students' grades and views showed that the training was effective in learning the knowledge and skills of connecting communication. Regarding attitude, this remains unclear.

Limited-efficacy testing on targeted outcomes

There were no statistically significant differences in empathy and exposure to violence between T0 and T1 (Table 6). However, the total score of self-compassion increased significantly (3.77 vs. 4.10; p=0.03). Self-judgement, one of the self-compassion scales, decreased significantly (4.21 vs. 3.50; p=0.03).

Table 6. Differences between means regarding empathy, self-compassion, and exposure to violence before and after the training (n=24).

	Pretest (T0)		Posttest (T1)				
EFFICACY	***Mean***	***SD****	***Mean***	***SD***	***MD****	***SD***	***p-value****
Empathy[1] total (0-4; low-high)	2.21	0.44	2.22	0.45	0.01	0.25	0.92[4]
Perspective taking	2.31	0.67	2.14	0.81	-0.18	0.56	0.13[4]
Fantasy	1.90	1.16	2.01	1.16	0.11	0.61	0.37[4]
Empathic concern	2.47	0.67	2.49	0.61	0.02	0.49	0.83[4]
Personal distress	1.83	0.97	1.77	1.01	-0.06	0.74	0.68[4]
Self-compassion[2] total (1-7; low-high)	**3.77**	**0.97**	**4.10**	**0.95**	**0.33**	**0.71**	**0.03[4]**
Positive scales							
Self-kindness	3.96	1.21	4.20	1.21	0.24	1.11	0.37[4]
Mindfulness	4.13	1.22	4.31	1.22	0.19	1.01	0.38[4]
Common humanity	3.88	1.10	4.29	1.10	0.42	1.09	0.07[4]
Negative scales							
Self-judgement	**4.21**	**1.59**	**3.50**	**1.59**	**-0.69**	**1.50**	**0.03[4]**
Over-identification	4.69	1.52	4.48	1.52	-0.21	1.27	0.43[4]
Isolation	4.46	1.66	4.19	1.65	-0.27	0.90	0.15[4]

	Pretest (T0)		Posttest (T1)				
EFFICACY	***Mean***	***SD****	***Mean***	***SD***	***MD****	***SD***	***p-value****
Exposure to violence[3] in past two weeks	% (n)		% (n)				
None	79.2 (19)		62.5 (15)				0.473[5]
Occasionally	12.5 (3)		33.3 (8)				
Frequently	8.3 (2)		4.2 (1)				

* SD = standard deviation; ** MD = difference between means; *** *p*-value < 0.05 indicates a statistically significant difference
[1]Brief Interpersonal Reactivity Index (IRI); [2]Self-compassion Scale Short Form (SCS-SF); [3]Copenhagen Psychosocial Questionnaire (COPSOQ).
[4] Paired t-test; [5] Fisher's Exact Test.

With regard to Kirkpatrick's Level 4 ('Results'), the pretest-posttest survey results showed significantly improved self-compassion and decreased self-judgement scores, possibly occurring as a result of the training. No significant changes were found in the empathy and exposure to violence scores.

Discussion

This study shows that students regarded the training on connecting communication to prevent and manage conflict situations in clinical placements and at the university, acceptable, applicable, and feasible to implement and integrate in the nursing curriculum, preferably for the start of clinical placements. Concerning learning outcomes, the training was positively evaluated on knowledge and skills. In addition, the reflection reports showed that students used the knowledge and skills in their clinical placements, and to a lesser extent in the academic setting. Finally, the training significantly improved self-compassion, decreased self-judgement, but did not influence empathy and exposure to violence. This represents a positive outcome on Kirkpatrick's levels 1 (Reaction), 2 (Learning) and 3 (Behaviour), and a mixed outcome on level 4 (Results).

Notable is the relatively low mean rating of the training; 6.0 on a scale from 0 to 10 (poor-excellent). This was not in line with the results from the post-training survey and the reflection reports in which most students stated the training contributed to their communication skills. This incongruence might be explained by the timing of the training, experienced as too late in the curriculum, the miscommunication at the start of the training, the lack of simulation training, insufficient opportunities for case-based learning (see e.g., Thistlethwaite et al., 2012), as well as the timing of the follow-up survey (coinciding with the students' clinical placement assessments).

Previous research is partly in line with our results, but supports the possibility of offering this training early in the educational programme. Nosek et al. (2014) investigated a connecting communication training with two 105-minute sessions – which is a less intensive course – among mainly first-year baccalaureate nursing students (N=55). The qualitative results demonstrated a positive impact in empathising with self (self-compassion) and others. The quantitative results showed, unlike our study, a significant increase on empathy. An explanation for this difference in effect might be the extensive role playing in the Nosek study. Another explanation for not finding an effect on empathy in our study was the lack of simulations during training. In the systematic review of Levett-Jones et al. (2019),

immersive and experiential simulations were found to be effective in improving empathy in nursing students. Another explanation is the relatively low training participation.

Our study showed that the self-compassion total score significantly improved, and the self-judgement subscale significantly declined between T0 and T1. The application of connecting communication possibly enabled students to analyse conflict situations without taking the blame. This might also contribute to self-compassion and an improvement in mental health, since in previous studies among medical students self-compassion was negatively associated with burnout (Godthelp et al., 2020; Alkema et al., 2008; Dev et al., 2020). However, our study did not show significant differences in exposure to violence before and after the training. This can be explained by the small number of students in the study, resulting in even smaller numbers actually exposed to violence. Besides, this outcome measure is questioned in other studies (e.g., Heckeman et al., 2015), since an increase of incidents can also be the result of lower barriers in reporting and more consciousness about violent events. Lastly, to diminish exposure to violence in nursing students, an organisational multi-component approach, rather than a single intervention (i.e., a training) is recommended by Heckeman et al., (2015). The Cochrane review of Spelten et al. (2020), however, did not produce clear evidence for this.

Strengths and limitations

A strength of this study is that we used two evaluation models on feasibility and behavioural change. These models were useful for studying different feasibility aspects of the training and the extent to which behavioural change has been achieved. Another strength of this study is the use of quantitative and qualitative methods and data. The qualitative data contributed to the interpretation and understanding of the outcomes measured in the survey.

A limitation of this study is that learning on Kirkpatrick's Level 3 and 4 (behaviour and results) was measured on self-reported and not observed behaviour. Furthermore, a limitation is that our study did not involve a control group, which hampers firm conclusions about limited efficacy. Another limitation concerns the small sample of 24 students participating in the study. Finally, the feasibility was mainly studied from the perspective of students. The perspective from clinical supervisors and faculty members other than the trainers remains underexposed.

Implications

To offer the training in the first educational years, as preferred by the students to be better prepared for clinical placements, the training needs further development. It can be improved by adding sessions with a simulated patient, in order to train the skills in situations close to real-life. To enhance case-based learning, conflict scenarios can be developed based on situations as described in students' reflection reports and in other assignments such as reflective case studies. To improve implementation and integration, it might be useful, as confirmed in the post-training survey, to provide training in connecting communication also to faculty staff and clinical supervisors. However, before integrating the training in the regular educational programme and in clinical placement settings, we recommend to further study the applicability, feasibility, and efficacy of this training in a larger and more diverse group of students, i.e. with more male nursing students and students of older age, and from the perspective of clinical supervisors and faculty staff.

Because our study was characterised by a pretest-posttest design it is not clear whether the improved self-compassion and declined self-judgement levels are the result of the training, although qualitative data point in that direction. Therefore, it is recommended to conduct a future study with a control group. It might also be relevant to investigate the effects of the training on other forms of offensive behaviour besides verbal and physical violence, such as conflicts and quarrels, sexual harassment, and bullying (Pejtersen et al., 2010). Furthermore, the effect of the training can be evaluated by measuring the effect on interpersonal relationships, as studied by Kang et al. (2017). The feasibility including limited-efficacy testing of the training should be further explored through fine-tuning the contents, including more case-based learning, and through integration in the curriculum, training of the faculty staff, and setting up an implementation study with a stepped-wedge design early in the curriculum, preferably before the first internship.

Conclusions

A 10-week communication training based on connecting communication is suitable, satisfying, attractive and likely to be applied by nursing students. It can be successfully delivered to students and integrated within the curriculum, preferably before their clinical placements. Nursing students acquired the intended knowledge and skills. A significant improvement of self-compassion and decline of self-judgement was established post-training, but no influence on empathy and exposure to violence was observed. Due to the research design, however, it remains uncertain whether these changes occurred as a result of the training. Therefore, a controlled study is recommended.

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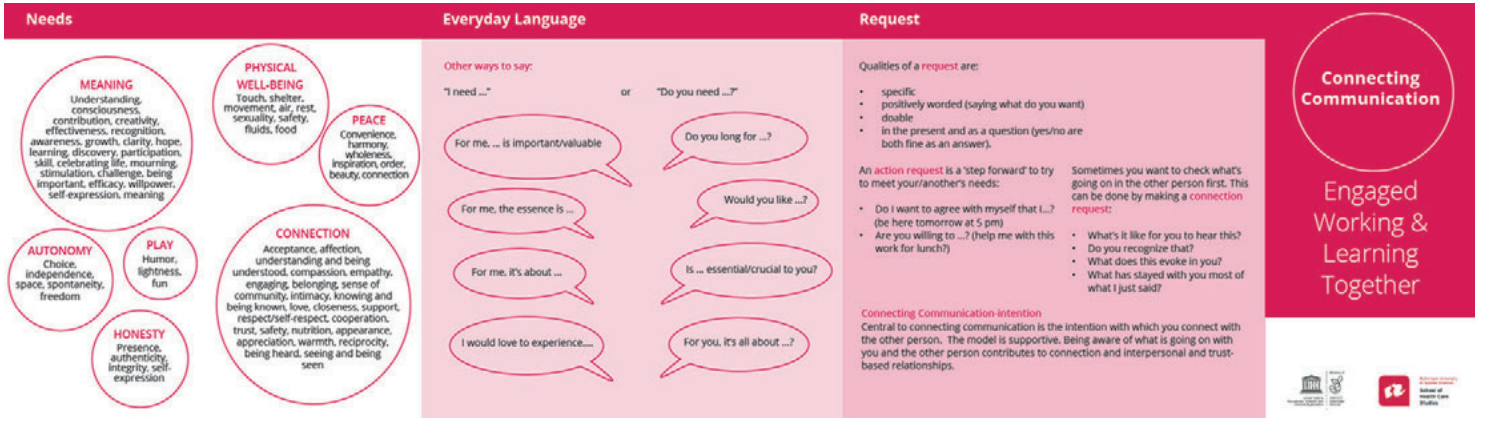
Supplementary information

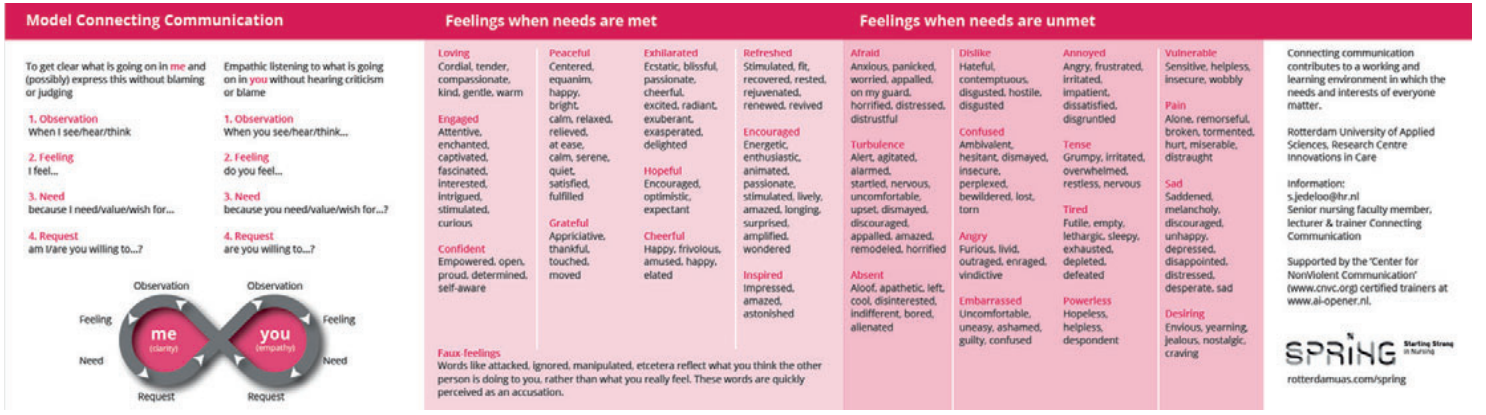
Supplementary file 1. Smartphone-sized booklet with the connecting communication core principles and elements.

Supplementary file 2. Example of the application of connecting communication in a nursing student-patient interaction.

Supplementary file 3. Topic lists of the paired interviews

Supplementary file 1. Smartphone-sized booklet with the connecting communication core principles and elements.





Supplementary file 2. Example of the application of connecting communication in a nursing student-patient interaction.

Situation: Mrs. Rose looked at me and said: "Hell no, I really don't want to be helped by an intern"			
Thoughts, judgements	"Mrs. Rose is playing difficult!"; "What? I am experienced enough to do this!"; "Am, I…..?"		
To get clear what is going on in ME (A)[1] and (possibly) express this (B)[1] without blaming or judging		Empathically listening to what is going on in YOU (C)[1] without hearing criticism or blame	
A.	When I hear Mrs. Rose say she doesn't want to be helped by an intern (o)[2] I feel angry and irritated (f)[2] because appreciation and understanding are important to me (n)[2]. Am I willing to connect with Mrs. Rose, now that I am aware of what is going on in me (r)[2]?	**C.**	When you say you don't want to be helped by an intern (o) do you feel anxious and insecure (f) because you need to trust that you are safe (n) in my hands? Would you like me to tell you something more about myself (r)?
B.	When I hear you say that you don't want to be helped by an intern (o) I feel insecure (f) about how to go about this. In order for me to understand (n) are you willing to explain this to me (r)?		

[1] Three possibilities of connection: clarity in yourself (A), express this (B) and, empathic listening to the other (C).
[2] Four elements of connecting communication: observation (o), feelings (f), needs (n), request (r).

Supplementary file 3. Topic lists of the paired interviews

Semi-structured interview 1

Topic: Acceptability

How was the training 'Conflict or Connection' received by the third-year students?

Subtopics:

- Satisfaction
- Perceived appropriateness for third-year nursing students

Semi-structured interview 2

Topic: Implementation

To what extent was the training 'Conflict or Connection' successfully delivered to the third-year students in the nursing degree programme?

Subtopics:

- Degree of execution of the training
- Success or failure of execution of the training (hindering and promoting factors).

CHAPTER 7

Summary and General Discussion

The overall aim of this thesis is threefold. Firstly, to give insight into nursing students' experiences and reasons that contribute to late dropout from nursing education. Secondly, to give insight into the associations between modifiable psychosocial work characteristics and mental health and late dropout from nursing education. Thirdly, to give insight in available interventions to improve the mental health of student or novice nurses to prevent dropout. In this final chapter, the main findings are summarised and reflected upon. Furthermore, a number of methodological issues are discussed and the implications for nursing education, nursing practice, policy and future research are described.

SUMMARY OF THE MAIN FINDINGS OF THE THESIS

In this summary, the answers to the following main research questions will be addressed:

1. What are the reasons for nursing students to dropout late from nursing education?
2. What psychosocial work characteristics are associated with mental health and late dropout from nursing education?
3. Which preventive interventions aimed at improving mental health of student or novice nurses to prevent dropout are available and what is their effectiveness on dropout-related outcomes?
4. How feasible is a training based on connecting communication for implementation within the curriculum of the Bachelor of Nursing degree programme from the perspective of nursing students?

Part I Exploring nursing students' mental health and dropout

1. What are the reasons for nursing students to dropout late from nursing education? (Chapter 2)

To get insight into nursing students' experiences and reasons that contribute to withdrawing in a late stage of the nursing degree programme, a qualitative study using semi-structured interviews was conducted. The sample consisted of eleven dropped out nursing students from the Bachelor of Nursing degree programme in two universities of applied sciences in the Netherlands. Two core themes were identified: 'ending up in a downward spiral of physical, psychological and social problems' and 'experiencing an increasing mismatch between expectations and reality'. Reasons for late dropout from nursing education turned out to be diverse and interrelated. Former students 'ending up in a downward spiral' had stopped because of physical health and psychological and/or social problems. They had come to the conclusion: "I can't keep this up". Former students experiencing 'an increasing mismatch between expectations and reality' concluded: "This isn't what I want". In contrast with studies on early dropout, academic ability, in an intellectual sense, did not play a major role in late dropout. Negative experiences during clinical placements, though, led to dropout in both groups. The group of students who had ended up in a downward spiral, lacked a safe learning and work environment at clinical placement, study coaching, and psychological support. The other group, who increasingly experienced a mismatch between expectations and reality, lacked adequate information provision about both nursing education and work at the start of the nursing programme. They also lacked information and discussion about the broad range of career opportunities in nursing later in the programme. Neither physical health or psychological problems, nor social problems did play a role in this group.

2. **What psychosocial work characteristics are associated with mental health and late dropout from nursing education? (Chapter 3, 4)**

To gain insight into the psychosocial work characteristics that are associated with impaired mental health and late dropout from nursing education, a prospective cohort study was conducted. This cohort study was part of the SPRiNG research project. In the SPRiNG study **(Chapter 3)**, three year cohorts of third-year nursing students from the Bachelor of Nursing degree programme of Rotterdam University of Applied Sciences in the Netherlands, were invited for three years (i.e., 2016 to 2018) consecutively in May and were followed for 2.5 years. We used subsets from the SPRiNG study data (baseline and one-year follow-up measurements) for the prospective investigation of associations between psychosocial work characteristics of clinical placements on the one hand and mental health and late dropout from nursing education on the other **(Chapter 4)**. Mental health was operationalised as psychological distress. As late dropout in the initial study population (N = 711) was low (3.4%), we were unable to investigate associations between psychosocial work characteristics and actual late dropout. Instead, intention to leave nursing education was investigated. Psychological demands (meaning working fast and hard, experiencing excessive work, not enough time, and conflicting demands) and frequent exposure to verbal and/or physical violence were found to be risk factors for distress. Furthermore, co-worker support (meaning co-workers are competent, friendly and helpful, and have interest in me) reduced the risk for the intention to leave nursing education in the last stage of the programme. Hence, it was concluded that improving the psychosocial working environment of nursing students' clinical placements may enhance their mental health, and reduce the intention to leave late in nursing education, and, possibly, actual late dropout.

Part II Interventions for improving mental health to prevent dropout

3. **Which preventive interventions aimed at improving mental health of student or novice nurses to prevent dropout are available and what is their effectiveness on dropout-related outcomes? (Chapter 5)**

A systematic literature review was conducted to give insight into interventions aimed at improving the mental health of student or novice nurses and into their effectiveness on dropout-related outcomes. The interventions described in the 21 identified studies focussed on three areas: (i) managing stress or stressors (*N* = 4); (ii) facilitating the transition to nursing practice (*N* = 14); and (iii) a combined approach (*N* = 3). Most of the studies targeting student nurses described interventions aimed at managing stress, including cognitive-behavioural therapy, relaxation, and self-care/coping skills training. Five studies showed a statistically significant effect; some indications were found for the effectiveness of a stress management intervention with a relaxation component in reducing sickness absence in first-year nursing students. In addition, indications were found for effects of another stress management intervention, including cognitive-behavioural therapy, relaxation, and self-care/coping skills training, in preventing dropout of nursing students. Furthermore, some indications were found for the effectiveness of interventions to facilitate the transition from nursing education to nursing practice, in improving retention or intention to stay. Most of the studies, however, showed no, unclear or adverse effects. In conclusion, a wide range of interventions are available, but the evidence for their effectiveness is limited. There is a need for high-quality studies in this field.

4. **How feasible is a training based on connecting communication for implementation within a curriculum of a Bachelor of Nursing degree programme from the perspective of nursing students? (Chapter 6)**

High prevalence of offensive behaviour at the workplace against nurses and nursing students is associated with impaired mental health and well-being, intention to leave and actual dropout, as well as with a decline in quality of care and patient safety. During clinical placements, nursing students are a potentially vulnerable group for offensive behaviour and communication problems by patients, patients' relatives, as well as co-workers. Their limited experience, high client contact time, frequent ward changes, challenge to build up relationships in a new environment with high work pressure and strong hierarchical relationships, contributes to this. We hypothesised that a training based on nonviolent communication (described as connecting communication), experiential learning theory and reflective practice would be a promising educational intervention to strengthen nursing students' communication skills to prevent and manage conflict situations and improve interpersonal relationships with patients, co-workers and faculty staff. Therefore, a training based on the principles of connecting communication was developed, offered, and evaluated in two classes of third-year nursing students (n = 24) within a Bachelor of Nursing degree programme at Rotterdam University of Applied Sciences. The mixed-method evaluation concerned five feasibility aspects: i.e., acceptability, demand, implementation, integration, and, limited-efficacy testing.

This study shows that students regarded the training on connecting communication to prevent and manage conflict situations acceptable, applicable, and feasible to implement and integrate in the nursing curriculum, preferable before clinical placements. In addition, the reflection reports showed that students used the knowledge and skills in their clinical placements, and to a lesser extent in the academic setting. According to the trainers, miscommunication, students' lack of preparation for lessons, and the timing of the training prohibited full participation in the training. According to the students' reflection reports and grades, students perceived the training to be effective to increase their knowledge and skills regarding connecting communication. The pretest-posttest survey results show statistically significant improved self-compassion (3.77 vs. 4.10; p=0.03), which can be mainly contributed to a decrease of self-judgement (4.21 vs. 3.50; p=0.03), one of the subscales of self-compassion. The application of connecting communication possibly enabled students to analyse conflict situations without taking the blame. This might also contribute to self-compassion and an improvement in mental health, since in previous studies among medical students self-compassion was negatively associated with burnout (Godthelp et al., 2020; Alkema et al., 2008; Dev et al., 2020). No significant changes were found in the empathy and exposure to violence scores.

From the perspective of nursing students, the 10-week communication training based on connecting communication seemed feasible to implement in the Bachelor of Nursing degree programme, preferably before the clinical placements. Due to the research design, however, it remains uncertain whether the measured changes in self-compassion and self-judgement occurred as a result of the training. Therefore, future research with a control group is recommended.

Reflections on the main findings

Psychosocially healthy and safe work and learning environments in relation to mental health and dropout: determinants

This thesis shows that a psychosocially healthy and safe learning and work environment is important for the mental health of nursing students and for the prevention of late dropout from education **(Chapter 2, 4)**. We found, in line with previous research (e.g., Eick et al., 2012, Ten Hoeve et al., 2017; Rojo et al., 2020), that unpleasant experiences, and lack of acceptance, support, and time for patients at clinical placement contribute to late dropout.

A closer look at the psychosocial work environment **(Chapter 4)** showed that third-year students were sometimes exposed to offensive behaviour: violence, gossip and slander and bullying from patients, patients' relatives, co-workers, managers, and/or physicians. Discrimination based on, for example, skin colour, religious belief, sexual orientation, and/or age also occurred. Some of the psychosocial work characteristics at clinical placement were found to be associated with distress and with the intention to leave nursing education a year after **(Chapter 4)**. Psychosocially safe learning and work environments are important, since nursing students spend 50% or more of their educational hours in clinical placements (Eick et al., 2012; Saukkoriipi et al., 2020). Such environments are especially important in the later years, when the complexity of the patient cases, as well as the students' responsibilities (e.g., Lambregts et al., 2016), and mental health problems (Deary et al., 2003) increase.

This thesis also describes the relatively high prevalences of mental health problems in a sample of 711 third-year nursing students **(Chapter 4)**. Almost half of them scored positively on distress (46.5%) and almost three quarter (70.6%) scored positively on high need for recovery (Bakker et al., 2019). As previous research showed that burnout of nursing students during their training is a risk factor for intention to leave the profession early (Rudman et al., 2012), it is especially important to provide psychosocially healthy and safe learning and work environments.

Looking at the near future, psychosocially healthy and safe learning and work environments will become even more important for several reasons. Firstly, the ongoing workforce shortages demand an increased enrolment of nursing students; an international, national and local trend (WHO, 2020; CBS Statline, 2021; Association of Universities of Applied Sciences, 2021). Since the Dutch action plan 'Working in Healthcare' took off in 2018 (Ministry of Health, Welfare and Sport, 2018), universities of applied sciences offering the Bachelor of Nursing degree programme have lifted the number control and admitted 1,500 more nursing students; an increase of 24% in three years (Association of Universities of Applied Sciences, 2021). The increased student numbers require more training capacity, while there was and still is a shortage of supervisory capacity in clinical placements, as shown in a report from the largest labour union in the Netherlands (FNV and Totta, 2020). This union opened a hotline for nursing students experiencing clinical placement abuse in November 2019 and received 2,045 reports in two months. Reports were for example about: being used as an employee (80%), insufficient supervisor time and guidance (64%), and (being forced to) unqualifiedly performing procedures (59%). More than half of the reporting students intended to quit nursing education; 15% of them already had. Comparable problems were described in a systematic review by Graj et al. (2019). The review synthesised studies on clinical placement related risks for students in healthcare, e.g.,

psychological risks, risk of abuse, physical risks, or insufficient supervision. The review also described barriers to report negative events, such as: i) students' lack of knowledge of reporting processes, ii) students' perception that no action would be taken in response to the report, iii) concerns about the potential ramifications of reporting, i.e., students fearing placement failure, and iv) staff hostility or retaliation. These reporting barriers might negatively impact competency development and eventually even lead to adverse health events in patients (Graj et al., 2019). In addition, several studies reported experiencing and contributing to adverse health events is a risk factor for clinical placement related stress (Pulido-Martos et al., 2012; Eick, 2012; Graj et al., 2019). These studies also pointed to the complexity and interconnectedness of factors associated with nursing students' mental health and late dropout from nursing education.

Secondly, psychosocially healthy and safe work environments are increasingly important because mental health problems in students seem to increase. This is illustrated by the statistically significantly positive trend in mental health problems for the three consecutive cohorts of third-year nursing students in our study (Figure 1). Both distress and need for recovery were significantly higher in third-year students of the 2017-2018 cohort than in those of the previous two cohorts; an increase of more than 10% (Bakker et al., 2019).

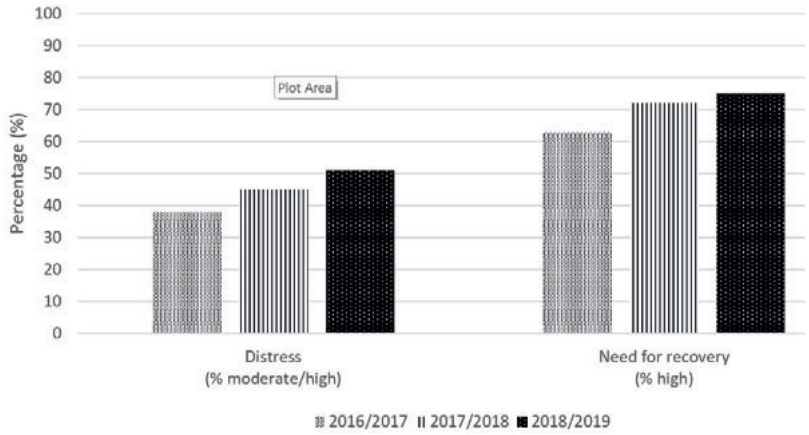


Figure 1. Prevalences of two indicators of mental health measured after 8 months of clinical placement exposure in three cohorts of third-year students (cohort 2015-2016, N=225; cohort 2016-2017, N=181; cohort 2017-2018, N=305).

Whereas our data show a positive trend, national reference data on the mental health of young adults in the general population show a more stable pattern (Van der Velden et al., 2019; Schoemaker et al., 2019). Moreover, the prevalence of mental health problems in our nursing student population was already relatively high in 2016 and seems to further increase.

Thirdly, psychosocially healthy and safe learning and work environments are important more than ever, in the light of the COVID-19 pandemic. The pandemic poses a serious threat to an already overloaded healthcare system. There are indications that the pandemic has already resulted in increased work pressure, sickness absence and/or decreased support in clinical placements (CBS, 2021; Reverté-Villarroya et al., 2021; Ulenaers et al., 2021; van Giessen et al., 2020). Elimination of the waiting

lists for postponed healthcare, the threat of flare-ups of COVID-19 infections and of new variants, and the recurrent need for switching between classroom and online education, currently influence the learning environment of nursing students negatively and may continue to do so in the future. Therefore, psychosocially healthy and safe work environments for nursing students and practicing nurses are needed more than ever to promote their mental health and prevent dropout.

Psychosocially healthy and safe work and learning environments in relation to mental health and dropout: interventions

In two sub studies **(Chapter 2, 4)**, we found several clues that can contribute to a healthy and safe learning and work environment in clinical placements and at universities and that need to be addressed at organisational level. These were: i) sufficient supervisor, co-worker and faculty staff support, ii) a safe learning environment in which nursing students feel supported and free to talk about their experiences; iii) sufficient time for patient care and for learning during clinical placements; and iv) information and discussion with faculty staff about the broad range of career opportunities and specialties within the nursing profession, the occupational challenges of nursing, and the felt hierarchy in healthcare including the subordination of nursing. Besides that, we found some clues that need to be addressed at individual level. These were related to improving nursing students' knowledge, skills and understanding of: i) self-care, ii) healthy and effective ways of coping with stress, stressors and study demands; ii) ways of dealing with insecurity, perfectionism, and fear, and iii) how to self-regulate and manage their learning process and mental health. This implies that interventions to improve mental health and to reduce the risk of quitting nursing education in a late stage of the programme should be offered at both organisational and individual level.

Individual and organisational level interventions

In the systematic review (**Chapter 5**), we found both individual and organisational level interventions. For novice and student nurses some indications were found for the effectiveness of interventions offered at individual level. A 10-minute preceptorship intervention with professional support (Hu et al., 2015) decreased novice nurses' work stress and the intention to leave. Stress management interventions for nursing students following the Bachelor of Nursing degree programme decreased sickness absence or attrition (Bailey, 1984; Wernick, 1984). One organisational level intervention concerned a nursing curriculum redesign, from traditional to problem-based, with more individual mental support. Although the intervention showed a positive effect on student well-being and coping, it had adverse effects on sickness absence (Jones & Johnson, 2006). The latter, however, could also be interpreted as a positive effect, since students may have learned to stay home when ill, instead of ignoring their health problems. Some evidence for the effectiveness on the intention to stay and the retention of novice nurses was found for a combination of interventions offered at individual and organisational level. These so-called Transition-to-Practice Programmes with stress management, clinical education, and professional and peer support, are aimed at facilitating the transition from nursing education to nursing practice **(Chapter 5).** Our systematic review, however, showed that very few interventions have been evaluated in high-quality studies, leaving the effectiveness of most other interventions largely unclear.

Our findings are in line with previous relevant systematic reviews of work stress interventions. Significant effects on stress-related outcomes were found in individual level interventions, particularly cognitive behavioural interventions. Organisational level interventions showed no significant effects (van der Klink et al., 2001; Richardson et al., 2008). The systematic review of Lamontagne et al. (2007) showed that combined interventions, targeting both the individual and organisational level, were effective in addressing the individual and organisational consequences of work stress. Reviews on stress management in student nurses conclude that most interventions are offered at the student's individual level and that only few interventions are offered at individual-organisational interface and organisational level (Jones and Johnston, 2000; Galbraith and Brown, 2011). Some statistically significant effects of interventions offered at individual level (improving students' coping skills) and organisational level (reducing stressors through curriculum development) were found in the systematic review from Turner and McCarthy (2017). Although there is some evidence for the effectiveness of a combined approach in reducing work stress, combined interventions are still scarce.

To improve the psychosocial learning and work environments, we developed an intervention for nursing students that can be offered at individual and organisational level (combined approach). This intervention addresses an important stressor for nursing students, i.e., conflict situations with patients, patients' relatives, supervisors, or co-workers at the clinical placement, and conflict situations in their private lives (**Chapter 6**). The training supports skills development in professional communication and reflective practice. In the study presented in **Chapter 6,** the communication training was offered at individual level only; we first wanted to know whether the training was perceived as feasible from the perspective of nursing students themselves. To make it sustainably effective, it would be helpful to expand the intervention at organisational level, through training of nursing faculty members, clinical supervisors, and nursing managers as well. We expect this intervention to be insufficient for nursing students who already suffer from mental health problems. To those students, individually tailored psycho-therapeutic interventions might best be offered (Li et al., 2018). In this thesis, however, the focus is rather on preventive interventions that can be implemented in the nursing educational programme.

Population-based and high-risk group-based approach

In addition to deciding upon prioritising interventions at individual and/or organisational level, we considered the population-based and high-risk group-based approaches. We found a high prevalence of mental health impairment in third-year nursing students **(Chapter 4),** and an increase of mental health problems in consecutive cohorts (Bakker et al., 2019). Since impaired mental health (e.g., burnout) during nursing education is a risk factor for an intention to leave early in the nursing career (Rudman et al., 2012), mental health improvement or prevention of deterioration during nursing training is important and interventions are necessary. This raises the question of whether a population-based or high-risk group-based approach is the best option to improve or protect nursing students' mental health. In other words: should we teach all nursing students about occupational mental health risks, stress management and other evidence-based interventions to protect their mental health? Or should we target our approach at a high-risk group in particular, with regular screening of mental health, tailored feedback, and targeted interventions to protect their mental health?

Our research presented in **Chapters 2 and 4** revealed that nursing students dealing with high psychological demands and frequent exposure to violence during clinical placements were more at

risk for mental health problems, and that students experiencing low co-worker support were more at risk for an intention to leave, compared to those with more beneficial scores on these psychosocial work characteristics. Since nursing students move through clinical placements, they can be exposed to psychosocially unsafe work environments and a greater risk of mental health problems at several moments during nursing training (Eick et al., 2012; Graj et al., 2019). Moreover, they must be able to deal with major live events (e.g., relationship breakdowns, divorce of parents, illness and death of relatives, becoming a mother or father) and with various academic and clinical stressors (e.g., academic workload, problems associated with studying, fear of unknown situations, mistakes with patients or handling of new technical equipment) at any moment during their studies (Kukkonen et al., 2016; Porru et al., 2021; Pulido-Martos et al., 2012). This implies that all nursing students can be exposed to stressors and thereby an increased risk of mental health problems and late dropout at any moment during their training. Given the high likelihood of exposure to stressors and high incidence of psychological distress, a population-based approach in mental health protection would suit this situation. Potential interventions involve the creation of psychologically healthy and safe work environments for al nursing students, and teaching them about occupational mental health risks and protection, stress management and other evidence-based mental health interventions.

A high-risk group-based approach may be of added value to students having mental health problems. After screening for, for example, high distress scores, a high need for recovery, or the presence of an intention to leave nursing education, tailored feedback and targeted interventions for this specific group only should be offered.

Hence, as there is a need to both protect and improve mental health, combining a population-based approach with a high-risk group-based approach is recommended to prevent late dropout in nursing students.

Methodological considerations

My various (nursing) roles in relation to some methodological aspects

Being a former nursing student myself, a former bed-side nurse, a faculty member and a PhD candidate, had advantages as well as disadvantages for this research project. My position as a faculty member in the Bachelor of Nursing degree programme at the University of Applied Sciences in Rotterdam, enabled me to navigate relatively easily through the research setting (i.e., nursing education). This was crucial in the preparation of the studies presented in **Chapters 2, 3, 4 and 6**. For instance, in the qualitative interview study **(Chapter 2)** it was an advantage that I knew the students' language, based on my own experience as a nursing student, faculty member and study coach. It helped to develop the topic list, to get good rapport with former nursing students and, as a consequence, to obtain in-depth information.

Being a faculty member on the one hand also enabled recruitment of participants for the interview study: owing to the relationships and mutual trust with current nursing students, they were willing to introduce me to former co-students to be interviewed **(Chapter 2)**. They were the so-called key persons, who served as mediators of a hard-to-reach group. The fact that recruitment in other nursing faculties was less successful or not successful at all, indicates that trust-based relationships with students of the own faculty helped to recruit former nursing students for the interview study. This

enabled us to include a more heterogeneous group of participants leading to rich data compared to other similar qualitative studies (e.g., Last and Fulbrook, 2003; Glossop 2002; Ten Hoeve et al., 2017). On the other hand, the interviewees **(Chapter 2)** associated me with faculty staff from Rotterdam University of Applied Science. In the interviews, they did criticise the support given by faculty staff of the nursing degree programme, but they may have been more reluctant to fully criticise it. For the cohort study, being a former nursing student, nurse, and faculty member was an advantage; it gave me context information and, through several small student research assignments, possibilities to fine-tune, optimise and evaluate our approach in the recruitment of participants for the cohort study.

Administering the SPRiNG questionnaire as part of the curriculum during lessons that address students' professional development and research skills gave a better response than would probably have been obtained if the questionnaire had been sent independently of the educational programme **(Chapter 3, 4)**. Being a former nursing student, former bed-side nurse, and currently a faculty member, however, may have been a disadvantage to the recruitment of students, since I was somewhat afraid to "bother" students who were already overloaded. We encouraged colleagues from the nursing education programme to put more effort in actively recruiting students who did not follow classes due to personal or health problems, or temporarily had interrupted the programme. However, my colleagues also expressed hesitation to place more burden on already overloaded students and I, in turn, was afraid to be too pushy in this and withheld myself from actively trying to contact nursing students who had taken a temporary break from nursing education. This can be associated to the phenomenon of 'gatekeeping', defined as 'the process whereby actors prevent access to eligible patients for research recruitment' (Kars et al., 2016). Finally, I believe that my background has had advantages to the translation of research results into practice. My contextual knowledge of the profession and the training is of importance and could not have been introduced into the study by newly graduated health scientists. In conclusion: the practical, contextual and methodological advantages of being a former student, former bed-side nurse and currently a faculty member outweighed the aforementioned disadvantages.

The healthy student effect

In the study presented in **Chapter 4**, the completion of the survey from the SPRiNG cohort study was integrated in the educational curriculum. We, therefore, obtained a high response rate at baseline and started with a large study group. However, we may have suffered from a well-known phenomenon in occupational health research, the so-called 'healthy worker effect' (Last, 2001). In the context of our study this can be named 'the healthy student effect'. Nonresponse analyses revealed that both having an intention to leave, and the actual dropout rate of nursing students were significantly lower in our study group than in students without data at one-year follow-up (**Chapter 4**). Sick-listed, demotivated, or delayed students might have been less willing to fully participate in the SPRiNG study or simply had already dropped out in the first two years of their studies. In other words, we might have missed some students who were less engaged to the programme, who were possibly less healthy and had more risk of dropping out of nursing education. This may have led to an underestimation of the effects of psychosocial work characteristics, since the study group will have involved relatively many well-functioning students compared to the nonresponse group.

Causal pathways between mental health, intention to leave and dropout

Due to the low occurrence of dropout from education in our study population (3.4%), we were unable to investigate how mental health and dropout in the last years of the education programme are related and whether there is a causal pathway **(Chapter 4)**. For this reason, we used mental health as an outcome, in addition to dropout. This enabled us to build two models for investigating associations of determinants with mental health, and with the intention to leave nursing education. Although it is reasonable to assume that there is a causal pathway between mental health and dropout of nursing students, there is limited evidence for this. In a previous longitudinal study in the UK (Deary et al., 2003), no direct relation was found between impaired mental health and actual dropout of nursing education. Likewise, Dopmeijer et al. (2021) did not find associations between mental health (i.e., symptoms of anxiety and depression, anxiety sensitivity, and hopelessness) and dropout among about 1,500 Higher Education students in the Netherlands, including nursing students. However, as mentioned before, Rudman et al. (2012) did find an association; impaired mental health (i.e., burnout) during nursing education was associated with intention to leave the nursing profession in an early stage. Intention to leave is also not the same as actual dropout, which will be discussed below. In conclusion, the causal pathway between mental health and dropout remains unclear.

The same applies to a possible causal pathway between intention to leave, another outcome we chose as a proxy of dropout, and dropout **(Chapter 3, 4)**. To what extent does an intention to leave nursing education predict actual dropout? In several behavioural explanatory models, such as Theory of Planned Behaviour (Azjen, 2011), intention is related to actual behaviour, but it explains only a small portion of the actual behaviour. Perceived behavioural control, risk perception, and other determinants contribute as well. In conclusion, although intention to leave is conceptually closer to actual dropout than mental health, any causality between intention to leave and dropout also remains unclear. It is therefore yet unsure whether improving the psychosocial work and learning environment by influencing psychosocial work characteristics (psychological demands, exposure to violence, co-worker support) will contribute to a decrease of late dropout of nursing students through an improved mental health and a reduced intention to leave. Studying a causal pathway between mental health and late dropout might be possible in the future, when more cohorts will have been included, which enables analyses of dropout as an outcome instead of its proxy 'intention to leave'.

Implications for practice, education and policy

Invest in psychosocially healthy and safe learning and work environments for nursing students

The findings of this thesis (particularly in **Chapter 2, 3**) highlight the need for clear internship agreements in which nursing students' supernumerary status is guaranteed. These agreements should be evaluated and enforced between nursing faculty staff and healthcare organisations staff. Besides that, since healthcare organisations are under pressure because of the shortage of nurses, new approaches for clinical placement learning are needed. Our studies showed that, in line with other studies (e.g., Cooper et al. 2015; Saukkoriipi et al., 2020), nursing students need a learning and work climate in which they: i) have a named clinical supervisor, ii) feel welcome, iii) can discuss learning goals with clinical supervisor and co-workers, iv) feel supported in learning by the clinical supervisor's and co-workers' guidance skills, and v) experience an open culture for discussing vulnerabilities.

Nursing students who experienced a mismatch between reality and expectations **(Chapter 2)** lacked in their third-year information and discussion with faculty staff about: i) the broad range of career opportunities and specialties within the nursing profession, ii) the occupational challenges of nursing, i.e., irregular shifts, and iii) the perceived hierarchy in healthcare and nurses' subordinate position. This implicates that nursing students need more knowledge, support and coaching to help them stay motivated, engaged, healthy and well-functioning in their study and future work. They need, especially at the start of and during their clinical placements, teaching, support and coaching in the broad range of career perspectives; a positive team atmosphere in preventing work stress and protection of patient safety; and tailored psychosocial support in preventing post-traumatic stress, distress and eventually burnout. Meeting these needs is a joint responsibility of nurse educators and staff at clinical placement sites in collaboration with the occupational health services of healthcare organisations.

To guarantee psychosocial healthy and safe work environments for nursing students, it is important that employers pay attention to the prevention of mental health problems, sickness absence and dropout of the healthcare team at the clinical placement site. In their role of co-worker and supervisor, registered nurses guide nursing students within their clinical placement, function as role models and contribute to a positive or negative image of healthcare in general, and of nursing in particular (Scammell et al., 2020). The communication training 'Conflict or Connection' **(Chapter 6)** might be a promising intervention for nurses to work on a healthy psychosocial organisational climate in which: (i) leadership characteristics (i.e., relationship-oriented leadership style), (ii) group relations and group behaviour (i.e., a supportive atmosphere among co-workers), and (iii) communication and participation contribute to the protection of healthcare workers' mental health (see also Bronkhorst et al., 2015, 2018).

Protect and improve mental health and engagement of nursing students during training

At nursing student level

To prevent dropout at the beginning of the nursing career, it would be helpful to timely identify a deterioration of mental health (e.g., increased distress and recovery needs), lower levels of study and work engagement, or increasing intention to leave scores. To support students to take the lead in improving their mental health and well-being, and to support discussions in the classroom, a smart health surveillance system with feedback and tailored support, might be a promising intervention to develop for nursing education programmes. Besides that, such a system might help to identify high-risk groups. In the Netherlands, health surveillance systems are already developed and implemented among university students (i.e., de studentengezondheidstest [the student health check] from the University of Amsterdam; Van der Heijde et al., 2015), and among arts students (i.e., Student Life monitor from the Performing Arts Health and Medicine research group; Karreman et al., 2019). Regular monitoring of the nursing student's mental health, study and clinical placement engagement, and intention to leave, by using a quick digital scan or dashboard with direct feedback and support options, will enable students and teachers to timely intervene. This requires clear cut-off points for mental health, engagement and intention to leave, as well as sufficient support options at school and at the clinical placement site. Options for referring students include evidence-based self-help programmes

(e.g. 'Snel beter in je vel' [Feel better quickly], Lokman et al., 2017), mindfulness interventions (Chen et al., 2021), and consulting their study career coach or general practitioner for further referral to a mental health nurse practitioner, psychologist or psychotherapist.

At organisational level

Anonymised data from a health surveillance system might also be useful for nursing education programmes to evaluate interventions and improve the educational programme. Perhaps the health surveillance system could also include instruments to measure the quality of clinical placements, such as the Clinical Learning Environment, Supervision and Nurse Teacher (CLES + T) scale. This is a self-reported scale for measuring student nurses' perceptions of: i) supervisory relationship, ii) pedagogical atmosphere on the ward, and iii) role of the nurse teacher (Gustafsson et al., 2015). In this way, nursing schools and healthcare organisations can use the results of the scale to improve the quality of their clinical placements in a targeted way.

Update the Dutch nursing curriculum with occupational health themes

The finding that managing stress and stressors might contribute to preventing late dropout **(Chapter 2, 4, 5)**, indicates that nursing students should learn about occupational health, including work stress models and work stress interventions during training. Despite the recent update of the Bachelor of Nursing degree programme in the Netherlands (Lambregts et al., 2015), only CanMEDS role 6, 'The Organiser' (see Supplementary file 1), pays attention to: "contributing continuously and methodically to promoting and ensuring the safety of users and staff". Safety of patients and co-workers matters, but a body of knowledge and skills for learning to ensure nursing students' own safety, i.e., their mental health during daily work, is lacking in the curriculum. It seems important, even more since the COVID-pandemic, to teach student nurses the knowledge and skills to protect and improve their own mental health, in the literature sometimes referred to as 'self-care' or 'self-care behaviours' (Brouwer et al., 2021; Casey et al., 2021). Since COVID-19, self-care in nursing is no longer only associated with patients' self-care as in Orem's Self-Care Deficit Theory (Orem et al., 2011), a well-known nursing theory, but also with nurses and nursing students' own self-care. Numerous scientific articles and editorials on self-care of students and nurses have been published ever since (e.g., Brouwer et al., 2021; Hossain et al., 2021; Mills et al., 2020; Taylor et al. 2020). To anticipate on new COVID-19 waves, the nursing curriculum needs a change at national level (see Chan et al., 2019).

To teach nursing students about the determinants of burnout and work stress models, and to give them insight in the role of personal, organisational, and societal factors, it is recommended to add occupational health themes, including self-care, to the Dutch Bachelor of Nursing curriculum. As part of this improvement, learning connecting communication as a basic skill **(Chapter 6)** might support nursing students in preventing of, dealing with, and reflecting on conflicts as well as other offensive behaviours. To improve interpersonal relationships between nursing students and co-students, nursing faculty staff, clinical supervisors, and co-workers, it might help to teach connecting communication from the first year on. Furthermore, it is recommended to add a chapter about mental and physical health risk protection of nursing students to the Dutch national occupational health and safety plans for healthcare institutions.

At last, in the near future more nursing students will have to be trained in clinical placements within healthcare organisations that are already under pressure. Stimulating a supportive working atmosphere and developing relationship-oriented leadership styles seem to be increasingly important. It is necessary for nursing schools and healthcare organisations who offer clinical placements to understand, recognise and act upon determinants of mental health and the role of mental health in (the intention to) late dropout. Retention of nurses should start during education. Therefore, investing in nursing students should be a joint task of nursing schools and healthcare organisations.

To effectively improve mental health of nursing students and prevent late dropout, both population and high-risk group-based approaches are necessary in combination with interventions offered at individual and organisational level in clinical placements and at the university. A health surveillance system with tailored support, implemented in the nursing education programme might be a promising intervention.

Implications for future research

In the cohort study **(Chapter 4)**, we likely have suffered from selection bias and may have missed part of the group who were less engaged to the programme and probably less healthy. To reduce the problem of 'the healthy student effect' in cohort studies among nursing students, a cohort study can best be started earlier, preferably before the first clinical placement.

In this thesis, we have not investigated the causal pathways between mental health and intention to leave on the one hand and actual dropout on the other **(Chapter 4)**; for this, follow-up research is required. To (further) increase response rates, the cohort study might best be integrated in the aforementioned health surveillance system including feedback and support for nursing students, faculty staff and clinical supervisors. Implementation research is needed to study the feasibility of such a system, as well as experimental studies to investigate whether it actually contributes to mental health and less dropout of both student and novice nurses. Cohort data might also be useful to evaluate the effectiveness of interventions implemented in the nursing educational programme. Lastly, we recommend the communication training in connecting communication to be offered early in the nursing education programme **(Chapter 6)**. To further study the effectiveness of the communication training in the educational context, an experimental study with a control condition will be of added value, preferably before the first internship. A stepped-wedge cluster randomised, cross-over or waiting list control design over a randomised controlled trial is preferred, because in this way the communication training will eventually be delivered to all nursing students.

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Supplementary file 1. Description of CanMEDS role 6, 'The Organiser'

CanMEDS role 6, 'The Organiser' - The nurse takes responsibility for the safety of care recipients and staff within the organisation.

Core concept: promoting safety

Contributing continuously and methodically to promoting and ensuring the safety of users and staff.

Knowledge

- Knows safety policy (nationally and in the own organisation) and laws and regulations concerning the safety of employees and care recipients.
- Knows the (somatic, psychological, social and contextual) factors that influence the safety of care recipients and staff.
- Knows and oversees the consequences of one's own actions in relation to the occurrence of unsafe situations.

Skills

- Relevant screening methods can be used to identify risk factors.
- Works in accordance with safety policy standards in daily practice.
- Can deal with the emotions of care recipients and respond in a de-escalating manner.
- Can recognize (near) incidents and react adequately to limit damage to the client, provides openness and prevents repetition.
- Can work according to the guidelines of safety policy and infection prevention, privacy, ergonomics, economy and ecology.

Attitude

- Shows initiative and responsibility in solving problems in the working and therapeutic environment that lead to unsafety.
- Is aware of being a role model regarding the use of safety standards.

7

APPENDIX

SAMENVATTING

Om aan de toekomstige vraag naar gezondheidszorg te kunnen voldoen zullen meer verpleegkundigen moeten worden opgeleid en behouden voor de zorg. Uitval uit de verpleegkundeopleiding heeft met veel factoren te maken, maar er is weinig bekend over uitval in een laat stadium van de opleiding (late uitval). Mentale gezondheid is een belangrijke factor die samenhangt met uitval van verpleegkundigen. Het is onduidelijk of dit ook geldt voor verpleegkundestudenten. Er is daarom aanvullend inzicht nodig in de factoren die bijdragen aan late uitval van studenten verpleegkunde, en de rol die mentale gezondheid daarin speelt. Daarnaast is meer kennis nodig over haalbare interventies die toegepast kunnen worden in verpleegkunde curricula. Het algemene doel van dit proefschrift is daarom drieledig. Ten eerste inzicht geven in de ervaringen en redenen van verpleegkundestudenten die bijdragen aan late uitval uit de opleiding. Ten tweede inzicht geven in de verbanden tussen psychosociale werkkenmerken en mentale gezondheid en late uitval uit de opleiding verpleegkunde. Ten derde inzicht geven in beschikbare interventies om de mentale gezondheid van studenten of beginnende verpleegkundigen te verbeteren om uitval te voorkomen. Deze samenvatting geeft een overzicht van de belangrijkste resultaten.

DEEL I Verkenning van de mentale gezondheid en uitval van verpleegkunde-studenten

1. Wat zijn redenen voor verpleegkundestudenten om te stoppen met de opleiding in een laat stadium? (**Hoofdstuk 2**)

Om inzicht te krijgen in de ervaringen van verpleegkundestudenten en de redenen om te stoppen in een laat stadium van de opleiding, is een kwalitatieve studie uitgevoerd met semigestructureerde interviews. De onderzoeksgroep bestond uit elf voormalige verpleegkundestudenten van twee Nederlandse hogescholen. Twee kernthema's kwamen uit de analyses van de interviews naar voren: 'Terechtkomen in een neerwaartse spiraal van fysieke en mentale gezondheids- en sociale problemen' en 'In toenemende mate een mismatch ervaren tussen verwachtingen en realiteit van de opleiding'. De redenen voor late uitval uit de opleiding verpleegkunde bleken divers en met elkaar samenhangend te zijn. De voormalige studenten die 'in een neerwaartse spiraal belandden' waren gestopt vanwege gezondheids- en/of sociale problemen. Zij waren tot de conclusie gekomen: "dit houd ik niet vol". De voormalige studenten die steeds meer een mismatch tussen verwachtingen en realiteit ervoeren, concludeerden: "dit is niet wat ik wil". In tegenstelling tot onderzoeken naar uitval in een vroeg stadium van de opleiding (vroege uitval) speelden gebrek aan academische, intellectuele vaardigheden, bij deze groep geen grote rol.

Negatieve ervaringen tijdens praktijkstages leidden in beide groepen tot uitval. De groep studenten die in een neerwaartse spiraal terecht was gekomen, miste een veilige leer- en werkomgeving tijdens de stage, studieloopbaanbegeleiding, en psychologische ondersteuning. De andere groep, die in toenemende mate een mismatch ervoer tussen verwachtingen en realiteit, had adequate informatie bij de start van de opleiding gemist, zowel over de opleiding tot verpleegkundige als over het werk als verpleegkundige na de opleiding. Ook hadden ze later in de opleiding informatie over het brede scala aan loopbaanmogelijkheden in de verpleging gemist. Noch lichamelijke gezondheidsproblemen, noch mentale gezondheidsproblemen, noch sociale problemen speelden bij deze groep een rol.

2. Welke psychosociale werkkenmerken hangen samen met mentale gezondheid en late uitval uit de verpleegkunde opleiding? (**Hoofdstuk 3, 4**)

Om inzicht te krijgen in de psychosociale werkkenmerken die samenhangen met een verminderde mentale gezondheid en late uitval uit de verpleegkunde opleiding, is een prospectieve cohortstudie uitgevoerd. Deze cohortstudie was onderdeel van het zogenoemde SPRiNG onderzoeksproject. In de SPRiNG studie (**Hoofdstuk 3**), werden drie jaargroepen (cohorten) van derdejaars verpleegkundestudenten van de bacheloropleiding verpleegkunde van Hogeschool Rotterdam gevolgd. De drie groepen werden achtereenvolgens in mei 2016, 2017 en 2018 uitgenodigd om mee te doen aan de studie en werden gedurende 2,5 jaar gevolgd. Om de verbanden tussen enerzijds psychosociale werkkenmerken van stages en anderzijds mentale gezondheid en late uitval uit de verpleegkundeopleiding te onderzoeken, gebruikten we sets van gegevens (een begin- en vervolgmeting een jaar later) uit de SPRiNG-studie (**Hoofdstuk 4**). Mentale gezondheid werd in dit hoofdstuk geoperationaliseerd als 'psychische stress' (in het Engels psychological distress). Aangezien late uitval in de oorspronkelijke onderzoeksgroep laag was (3.4%), waren we niet in staat om verbanden tussen psychosociale werkkenmerken en daadwerkelijke late uitval uit de opleiding te onderzoeken. In plaats daarvan werd de 'intentie om de bacheloropleiding verpleegkunde te verlaten' onderzocht. Snel en hard werken, te veel werk, te weinig tijd en tegenstrijdige eisen en frequente blootstelling aan verbale en/of fysieke agressie bleken risicofactoren te zijn voor psychische stress. Daarnaast bleek steun van collega's (geoperationaliseerd als: collega's zijn competent, vriendelijk en behulpzaam, en hebben belangstelling voor mij) een beschermende factor te zijn; het deed de intentie om de opleiding te verlaten afnemen. Een conclusie van deze studie was dat het verbeteren van de psychosociale werkomgeving van stages de mentale gezondheid van verpleegkundestudenten kan verbeteren en de intentie om de verpleegkundeopleiding te verlaten kan verminderen. Daardoor kan mogelijk ook de daadwerkelijke late uitval uit de opleiding worden voorkomen.

DEEL II Interventies ter verbetering van de mentale gezondheid om uitval te voorkomen

3. Welke bestaande preventieve interventies zijn er voor het verbeteren van de mentale gezondheid van studenten of beginnende verpleegkundigen om uitval te voorkomen? (**Hoofdstuk 5**)

Een systematisch literatuuronderzoek gaf inzicht in de beschikbaarheid van interventies gericht op het verbeteren van de mentale gezondheid van studenten of beginnende verpleegkundigen en in hun effectiviteit op onder meer uitval, behoud of intentie om te blijven dan wel te stoppen met de opleiding of het beroep. De in totaal 21 studies die zijn opgenomen in het literatuuronderzoek beschreven interventies op drie gebieden: (i) omgaan met stress of factoren die stress veroorzaken (N = 4 studies); (ii) faciliteren van de overgang van opleiding naar de verpleegkundige praktijk (N = 14 studies); en (iii) een gecombineerde aanpak (N = 3 studies). De meeste studies gericht op verpleegkundestudenten beschreven interventies voor het omgaan met stress, waaronder cognitieve gedragstherapie, ontspanning, en vaardigheidstraining in zelfzorg en coping. Vijf studies toonden een statistisch significant effect en leverden aanwijzingen voor de effectiviteit van een stressmanagement interventie met een ontspanningscomponent om ziekteverzuim bij eerstejaars verpleegkundestudenten te verminderen. Daarnaast kwamen er uit het systematisch literatuuronderzoek aanwijzingen voor effecten van een andere stressmanagement interventie met cognitieve gedragstherapie, ontspanning, en vaardigheidstraining in zelfzorg en coping, op het voorkomen van uitval van verpleegkundestudenten.

Verder waren er aanwijzingen voor de effectiviteit van interventies om de overgang van de opleiding naar de verpleegkundige praktijk te vergemakkelijken op de intentie om in de verpleging te blijven werken en op het daadwerkelijke behoud van beginnende verpleegkundigen voor het verpleegkundig beroep. De meeste studies lieten echter geen, onduidelijke of negatieve effecten zien. De conclusie was dat er een breed scala aan interventies beschikbaar is, dat er aanwijzingen zijn dat die interventies belangrijk zijn om te voorkomen dat studenten of beginnende verpleegkundigen uitvallen, maar dat het bewijs voor de effectiviteit ervan nog beperkt is. Er is behoefte aan studies van hoge kwaliteit op dit onderwerp.

4. Hoe haalbaar is een training gebaseerd op verbindend communiceren voor implementatie in een curriculum van een bacheloropleiding verpleegkunde vanuit het perspectief van verpleegkundestudenten? (**Hoofdstuk 6**)

Veel ongewenst gedrag op de werkplek tegen verpleegkundigen en studenten verpleegkunde kan leiden tot verminderde mentale gezondheid en welbevinden, de intentie om te vertrekken en daadwerkelijke uitval, evenals tot een afname van de kwaliteit van zorg en van de patiëntveiligheid. Tijdens praktijkstages zijn studenten verpleegkunde een potentieel kwetsbare groep voor ongewenst gedrag van en communicatieproblemen met (naasten van) patiënten en collega's. Hun beperkte werkervaring, frequente contacten met patiënten en wisselingen van stageplek, en het steeds moeten opbouwen van nieuwe werkrelaties in nieuwe werkomgevingen met hoge werkdruk en sterke hiërarchische verhoudingen dragen hiertoe bij.

De verwachting was dat een training in geweldloze communicatie oftewel 'verbindend communiceren', ervaringsleren en reflectieve vaardigheden de communicatievaardigheden van verpleegkunde-studenten zou versterken, conflictsituaties zou verminderen en relaties met patiënten, collega's en docenten zou verbeteren. De training werd aangeboden aan en geëvalueerd in twee klassen van derdejaars verpleegkundestudenten binnen de bacheloropleiding verpleegkunde van Hogeschool Rotterdam. De mixed-method evaluatie betrof vijf haalbaarheidsaspecten, te weten: bruikbaarheid van de training, behoeften van studenten, implementatie, integratie in het curriculum, en een beperkte toetsing van de effectiviteit van de training.

Uit dit evaluatieonderzoek bleek dat studenten de training verbindend communiceren ter voorkoming en hantering van conflictsituaties haalbaar vonden om te implementeren en te integreren in het curriculum van de opleiding verpleegkunde, bij voorkeur voorafgaand aan de praktijkstages. Bovendien bleek uit de reflectieverslagen dat studenten de opgedane kennis en vaardigheden gebruikten in hun praktijkstages en, in mindere mate, in de onderwijssetting. Volgens de opleiders stonden miscommunicatie, gebrek aan lesvoorbereiding van de studenten en de timing van de training een volledige deelname aan de training soms in de weg. Uit de reflectieverslagen en de behaalde cijfers bleek de training effectief in het vergroten van kennis en vaardigheden met betrekking tot verbindend communiceren. De resultaten van de voor- en nameting lieten een statistisch significante verbetering van zelfcompassie zien, die samenhing met een afname van zelfkritiek, een van de subschalen in de zelfcompassievragenlijst. Door de training in verbindend communiceren zijn studenten mogelijk beter in staat conflictsituaties te begrijpen, zonder de schuld op zich te nemen. Dit zou ook kunnen bijdragen aan zelfcompassie en een verbetering van de mentale gezondheid. Er waren na de training geen significante veranderingen in de scores voor empathie en blootstelling aan agressie.

Vanuit het perspectief van verpleegkundestudenten leek de 10-weekse communicatietraining in verbindend communiceren haalbaar om te implementeren in de bacheloropleiding verpleegkunde, bij voorkeur voorafgaand aan de praktijkstages. Door de onderzoeksopzet blijft het echter onzeker of de gemeten veranderingen in zelfcompassie en zelfkritiek allemaal toe te schrijven zijn aan de training. Daarom wordt toekomstig onderzoek met een controlegroep aanbevolen.

In **hoofdstuk 7** worden de resultaten van dit proefschrift samengevat en wordt gereflecteerd op de bevindingen en methoden.

Een belangrijke conclusie van dit proefschrift is dat mentale gezondheidsklachten veel voorkomen bij verpleegkundestudenten. Late uitval kan verband houden met negatieve ervaringen tijdens praktijkstages: het ontbreken van een veilige leer- en werkomgeving, gebrek aan studiecoaching en psychologische ondersteuning, een weinig positief beeld krijgen van het werken als verpleegkundige en een gebrek aan zicht op loopbaanmogelijkheden. Hoge taakeisen tijdens praktijkstages en frequente blootstelling aan agressie zijn risicofactoren voor psychische stress. Steun van collega's op stage vermindert de kans dat studenten de intentie hebben om te stoppen in de laatste fase van hun verpleegkundeopleiding. Een goede psychosociale leer- en werkomgeving binnen praktijkstages draagt bij aan de mentale gezondheid van verpleegkundestudenten, en verlaagt de kans dat studenten willen stoppen met de verpleegkundeopleiding en mogelijk ook aan daadwerkelijke uitval. Er is een breed scala aan interventies beschikbaar om de mentale gezondheid te bevorderen en uitval te voorkomen, maar het bewijs voor de effectiviteit ervan is beperkt. Er is behoefte aan studies van hoge kwaliteit om duidelijke conclusies over dit onderwerp te kunnen trekken. Vanuit het perspectief van verpleegkundestudenten lijkt een communicatietraining in verbindend communiceren haalbaar om te implementeren in de bacheloropleiding verpleegkunde, bij voorkeur voorafgaand aan de praktijkstages. Vervolgonderzoek met een controlegroep wordt aanbevolen om meer inzicht te krijgen in de effectiviteit van die training.

In de nabije toekomst zullen meer studenten verpleegkunde moeten worden opgeleid binnen zorgorganisaties die nu al onder druk staan. Het stimuleren van een ondersteunende werksfeer en het ontwikkelen van relatiegerichte leiderschapsstijlen lijken steeds belangrijker te worden. Het is noodzakelijk dat verpleegkundeopleidingen en zorgorganisaties die praktijkstages aanbieden de factoren die een rol spelen bij de mentale gezondheid van verpleegkundestudenten en late uitval begrijpen, erkennen en er actie op ondernemen. Werken aan behoud van verpleegkundigen moet beginnen tijdens de opleiding. Investeren in verpleegkundestudenten moet daarom een gezamenlijke taak zijn van verpleegkundeopleidingen en zorgorganisaties. Drie belangrijke aanbevelingen daarbij zijn: i) investeer in een psychosociaal gezond en veilig leer- en werkklimaat voor verpleegkundestudenten, ii) bescherm en verbeter de mentale gezondheid en studie-/werkbevlogenheid van verpleegkundestudenten tijdens de opleiding en iii) actualiseer het huidige curriculum van de bacheloropleiding verpleegkunde in Nederland met thema's over gezondheid op het werk.

Om de mentale gezondheid van verpleegkundestudenten effectief te verbeteren en late uitval te voorkomen, is een breed scala aan interventies nodig; van brede preventieve interventies tot specifieke interventies voor risicogroepen aangeboden op individueel en/of organisatieniveau tijdens praktijkstages en op de hogeschool. Een gezondheidssurveillancesysteem met feedback

en ondersteuning op maat, geïmplementeerd in het verpleegkundeonderwijs bij voorkeur voor de start van de eerste praktijkstage, zou een veelbelovende interventie kunnen zijn. Data uit dit gezondheidssurveillancesysteem kan worden gebruikt voor toekomstig onderzoek naar de relatie tussen de mentale gezondheid van verpleegkundestudenten en uitval.

ABOUT THE AUTHOR

Ellen Bakker (1968) completed her secondary education at St. Michaels College, Zaandam in 1985. In 1990 she obtained her Bachelor degree in Nursing at the University of Applied Sciences in Alkmaar. After graduation Ellen worked in various health care settings, such as academic hospitals, mental health care, and home and disability care facilities. Eventually Ellen chose to work as a home health registered nurse (RN) in a deprived neighbourhood in Amsterdam, where she worked closely with two general practitioners. In 2004, she obtained a masters' degree in Cultural Anthropology/Non-Western Sociology, with a specialty in Medical Anthropology at the University of Amsterdam. Ellen performed her 6-month fieldwork, an ethnographic study on disclosure and non-disclosure within a rural home-based care AIDS-project, in Malawi.

Between 2000 and 2009 Ellen worked in several projects to improve healthcare for vulnerable groups, such as adolescents, adults and elderly with impairments or chronic conditions and their informal caregivers. First, as an innovation worker at National Support Centre Specialised Care, next as project leader at Markant, Amsterdam Centre of Support and Expertise in Informal care, and last as a junior researcher at Vilans, National Centre of Expertise for long term care. In 2009, Ellen started working in nursing education as a faculty member at the Master Advanced Nursing Practice (ANP) programme at Rotterdam University of Applied Sciences. She combined this with working at the Innovations in Care research centre of Rotterdam University of Applied Sciences. As such, she contributed to the evaluation of the use of SeCZ TaLK, a board game to facilitate health workers, teachers and young people with a chronic condition or disability to communicate about sexuality, intimacy and relationships. In addition, she has contributed to two scientifical studies as part of the NURSE-CC (NUrsing Research into Self-management and Empowerment in Chronic Care) research group. In 2016, alongside her teaching work, Ellen started her PhD-trajectory at Research Centre Innovations in Care and the Department of Public and Occupational Health of Amsterdam UMC. This PhD-trajectory was part of the SPRiNG (Studying Professional Resilience in Nursing students and Graduates) research project. This enabled her to expand her qualitative research skills to more quantitative ones. During her PhD-trajectory Ellen followed several courses at the Netherlands Institute for Health Sciences (NIHES) at Erasmus MC and at the Postgraduate Epidemiology Programme at EpidM, VU University Amsterdam.

Since January 2022, Ellen combines teaching at the bachelor of nursing degree programme with the implementation of the results of her studies. As a member of SPRiNG Living Lab, her work includes a pilot of a Student Life Monitor in which nursing students can monitor their mental and physical health and receive tailored feedback and support. Together with Leiden University of Applied Sciences she participates in a realist review of interventions to support the transition from nursing education to practice.

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Psychosociaal veilig werkklimaat HR en Amsterdam UMC

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There is a global shortage of nurses due to the increasing demand for healthcare with an ageing population, while the labour force is demographically declining. Therefore, it is important to educate and retain more nurses for the healthcare sector. More nursing students will have to be trained within healthcare organisations that are already under pressure. Retention of nurses should, therefore, already start within education. However, little is known about the determinants and reasons for dropping out of nursing students in a late stage of the degree programme (late dropout) and the role of mental health in this. This thesis provides insight into i) nursing students' experiences and reasons that contribute to late dropout from nursing education, ii) the associations between modifiable psychosocial work characteristics and mental health and late dropout of nursing students, and iii) available interventions for improving the mental health of student and novice nurses to prevent dropout.

The results show that mental health complaints are common among nursing students. Late dropout can be related to negative experiences during clinical placements, such as lacking a safe learning and working environment and missing perspectives for future career opportunities. Psychological demands, such as experiencing excessive work, and frequent exposure to aggression were found to be risk factors for distress. Co-worker support reduced the risk of intending to leave nursing education in a late stage of the programme. A wide range of interventions for improving mental health to prevent dropout exist, but evidence of their effectiveness is limited. Following these findings, a training based on connecting communication to improve interpersonal trust-based relationships, was tested for feasibility in two classes of nursing students. Students were positive regarding the feasibility of the training, preferably to start before the first clinical placement.

This dissertation contributes to the understanding of the multifactorial phenomenon of nursing students' dropout and the role of mental health. It provides evidence supporting the recommendations on how to improve the mental health and retention of nursing students; a joint task of nursing degree programmes and healthcare organisations. Thereby, it might contribute to a future-proof, healthy and resilient nursing workforce.