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Titolo della tesi

Associated and predictive factors of the progression pathway of undergraduate nursing students: A systematic review with meta-analysis and an international longitudinal study

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Abstract

Background

Nursing students' academic pathway is both historical and still of current interest in the international literature. Such interest is likely due to the global nursing shortage and to the interest of High Education Institutions (HEIs) to identify the best strategies to maximize nursing students' academic success, considering the social and economic implications of this issue. However, the possible progressions of the educational pathway of academic nursing students are manifold and no consensus exists about outcome definitions. Moreover, the possible evolution of nursing students' academic progression pathway depends on several factors, whose role is partially still unclear, despite the possible determinants of academic outcomes are high investigated in the literature.

Systematic review and meta-analysis

Aim

The aim of this extensive systematic review and meta-analysis was to provide an overview of the effects of micro-, meso-, and macro-level variables on the academic outcomes of nursing students.

Search methods

A systematic research was performed on PubMed, Scopus, Education Resources Information Center (ERIC), and Open Grey using the keywords 'students, nursing', 'achievement', 'academic success', 'retention', 'attrition', 'wastage', 'academic failure', 'student dropouts', and 'withdrawal'. Moreover, the reference lists of the included studies and references that had cited the included studies were retrieved through Scopus and assessed for eligibility.

Selection criteria

To be included in the review, studies had to be observational in nature; undergraduate nursing students attending an academic program lasting at least three years were the considered population; all the measures of academic success and lack of success measured at least at the end of the legal duration of the nursing program were considered as outcomes.

Data collection and analysis

Studies were screened for eligibility and inclusion analyzing title/abstract and full-texts, respectively. The assessment of risk of bias was performed through the 'Downs and Black

instrument' after having modified it as needed. The following data were extracted: general information, study characteristics, and data related to the research question of the review. All the above-mentioned processes were performed by two raters independently. Descriptive data reported in the studies have been synthetized to provide an overview of the included studies and samples. Moreover, in order to detect the possible effect of micro-, meso-, and macro-level variables on the academic outcomes, data about each possible influencing variable were synthetized by pooling studies reporting the same definition of the outcome. When more than two studies reporting the same definition of the outcome and influencing variable were retrieved, meta-analyses were performed utilizing the odds ratio (OR) or Cohen's d as effect sizes for categorical and continuous variables, respectively. The Cochran's Q (χ^2) and I^2 were calculated for each meta-analysis for the assessment of heterogeneity. A subgroup analysis was conducted for the meta-analyses in which a 'substantial' or 'considerable' (i.e. $I^2 \geq 50\%$) heterogeneity was detected; a sensitivity analysis was performed for each meta-analysis that included three or more studies. For the meta-analyses that included three or more studies, the publication bias was assessed through funnel plots, test for the asymmetry of the funnel plots (Begg and Mazumdar's rank correlation and Egger's linear regression method), and the computation of the failsafe number when needed.

Results

Eighteen studies out of the 9,210 retrieved references were included in the systematic review, nine of which were included in the meta-analyses. Studies were published from 1979 to 2018 and conducted in Australia (27.8%), United Kingdom (27.8%), Italy (22.2%), United States (16.7%), and State of Israel (5.6%). Most of the studies revealed to be retrospective cohort (55.6%), followed by prospective cohort (38.9%), and case-control (5.6%). Overall, 10,024 undergraduate nursing students were involved, with study samples ranging from 101 to 2,278. Data regarding gender was available for 8,780 students with 75.4% females; mean age was reported for 5,413 students with a range of 21.3 to 27.0 years of mean age. In the included studies, seven different definitions of the academic outcome were provided. Meta-analyses about the role of female gender, having attended a Classical, Scientific or Academic high school, and having reported higher final grades at the high school revealed a strong association of such variables with the academic success defined as graduation within the legal duration of the program, as opposed to the other factors described. No publication bias was detected, and the sensitivity analyses confirmed the meta-analytic results, despite some studies reported weaknesses regarding the external validity. Moreover, the detected heterogeneity in the meta-analyses about students' gender and secondary school grades

seemed to be due to the study design, since the significant positive association of both female gender and higher grades with the outcome was confirmed in the prospective cohort studies group without heterogeneity among the pooled data. Contrasting and limited evidence were found for the other factors assessed in the literature, as well as for the other outcome definitions.

Discussions and Conclusions

Nursing students' academic pathway progression was confirmed as both historical and still of current interest topic in the international literature. However, a large heterogeneity in the investigation of the phenomenon in the literature was detected, as well as a little detailed description of the setting where the studies were conducted. This pointed out the different methods of measures adopted in the involved HEIs and Countries to evaluate students' pathway and did not allow a complete summary of the literature, highlighting the need to adopt a shared definition of the outcome for future research. Meta-analytic results contributed to outline the profile of the 'successful nursing student'. However, their main limitation is due to the nature of some of the involved variables, which, if used as selection criteria for nursing students, a part for the secondary school grades, would often be unethical and discriminatory. It is strongly recommended to consider the secondary school grade as selection criterion for nursing students and to further investigate the role of modifiable student variables which HEIs and national policies are able to influence. The study design seems to have influenced the results; thus, prospective observational studies are recommended for future research. Therefore, a radical change in the orientation of the future research on this topic is recommended to discover the influence of modifiable factors on students' success which have been underestimated thus far.

Keywords

Undergraduate academic nursing students – Academic outcomes – Associated factors – Systematic review – Meta-analysis

International longitudinal study

Rationale and aim

Several efforts have been made in the 'European space' since 1999 with the Bologna Declaration to standardize nursing education and improve students' mobility. Among the Countries that adhered to the Bologna Declaration in 2003, there is Albania, a Country with a different socio-economic and cultural background compared to the Countries belonging to the European Union (EU).

The aim of this study was to investigate associated and predictive factors of nursing students' academic success in the Albanian context after the adoption of the Bologna Declaration.

Study design and setting

An international longitudinal study was conducted in the Nursing Bachelor Program (NBP) of the University of Elbasan, which is the second largest university in Albania. In Albania, the NBP lasts three years and nurses have been educated only in Bachelor Programs since 2009, despite the first academic program for nurses has been held in 1994.

Participants

In October 2017 and 2018, all students at the end of the first year of the NBP were invited to participate in the study, involving two cohorts of students.

Variables, data collection and analysis

At the end of each academic year, both micro- and meso-level independent variables of the students were collected. A discussion among three researchers and the Albanian Head of Nursing Department was performed, also considering the literature, to identify the variables to assess. The outcome considered was the academic success of the students defined as graduation within the legal duration of the program. In October 2017 and 2018, students at the end of their first year were asked to participate in the study signing and informed consent and filling a questionnaire. Students were followed-up re-administering the questionnaire at the end of each academic year. In September 2020, the cohort of students matriculated in 2017-2018 will undergo to the last administration of the questionnaire; therefore, this cohort was not included in the analyses. The outcome was obtained through the administrative list of graduates in the sessions of July and September 2019. Descriptive and inferential statistics were performed at all the time points to identify any associations with the academic success. Variables associated with the outcome in the bivariate analyses ($p \leq 0.05$) were included in multivariate logistic regression models to predict students' academic success when feasible.

Results

Among students who matriculated in 2016-2017, n = 165 students were enrolled in the study. Among these, n = 124 students participated at the end of their second year, while n = 75 students participated at the end of their third year. Students were very young, mainly female, belonged to low-medium social classes, and mainly had attended high secondary school; few of them have had previous working or other academic experiences and their modifiable factors mostly remained stable during the pathway. As relevant data, most of the students

did not work or volunteer and declared to have had financial difficulties while attending the NBP, as well as learning difficulties due to high study load. Concerns about their academic results was the main reason indicated from students who considered to leave the program. Most of the students declared to study individually and regularly, and a negative difference between students' level of satisfaction and perceived level of importance was revealed for the investigated organizational factors of the university. Students' levels of empathy raised during the pathway and they reported a good perception of the clinical learning environment attended during the clinical placements, despite they were poorly aware of the occurrence of organizational changings in the attended floors. Almost all the students met the reference guide during the academic years and reported a good motivation to perform the clinical placement.

For students assessed at the end of their first year, the detected frequency of academic success was 65.5% and the outcome revealed to be associated with having never worked before enrolling in the NBP and 'individual' as study method during the first year (p = 0.049). These factors revealed also to be significant predictors of the outcome.

For students assessed at the end of their second year, the detected frequency of students' academic success was 86.3%. When compared to 'not success', 'success' students were younger, reported higher secondary school grades, had not faced personal health issues that did not allow to undertake one or more exams during the second year, reported lower level of satisfaction about clinical placement, and reported negative differences between level of satisfaction and perceived level of importance about relationship with persons in the university, teaching, clinical placement, and other organizational factors. Finally, 'not success' students better perceived the supervisory relationship in the clinical learning environment during the second-year clinical placement. In the regression logistic model, students who reported a higher secondary school grade, lower level of satisfaction about the clinical placement, as well as students who did not face personal health issues that did not allow to undertake one or more exams during the second year showed a higher probability of academic success.

For students assessed at the end of their third year, the detected frequency of students' academic success was 92.0%. However, the percentage of 'not success' students was significantly higher among drop out students compared to students who participated at the end of their third year. 'Success' students reported higher level of cognitive empathy compared to 'not success' students, as well as higher level of perceived importance towards their education about teaching, and others organizational features of the university.

Considering the small number of students in the 'not success' group, predictive analyses were not performed regarding data collected at the end of the third year.

Discussions and Conclusions

In Albania, the historical predominance of the female gender among nursing students was confirmed, while the young age, working and secondary school background of admitted students highlight the different selection method compared to other European Countries. Considering that nursing has been acknowledged as a scientific discipline quite recently in Albania, a change in the social origins of nursing students is expected in the following years. However, students' empathy levels suggest that the choice to be a nurse could be mainly related to individual attitude rather than the perceived image of the profession. During the pathway, most of the students perceived a high study load and a strong 'presence' of the institution. Such model may have contributed to motivate students, or sometimes to increase their burden. Despite the reported good perception of the clinical environments attended, it seems that students did not have the possibility to be deeply involved in the floors' environment, considering that they were poorly aware of the organizational changings occurred.

Even considering the quite high frequency of nursing students' academic success in Albania, its occurrence could be further improved. Different associated/predictive factors were identified in the time points of data collection, highlighting both the dynamic and complex nature of the phenomenon and the need of assessing students' status at several time points, despite the second year of the educational pathway seems to be the most crucial. The importance of the secondary school grade as selection criterion was further confirmed and younger students who did not have previous working experiences reported higher frequency of success. Overall, it seems that 'success' students were intrinsically more motivated than 'not success' since they were more oriented to choose the nursing career and were individually focused to reach their learning objectives. Further research is needed to assess the role (and possible training strategies) of students' non-intellective constructs (e.g. personality traits, motivational factors, self-regulatory learning strategies, and psychosocial contextual influences) since they may influence student' success.

Keywords

Undergraduate academic nursing students – Albania – Academic success – Associated factors – Predictive analysis – Longitudinal study

Chapter 1. Overview and literature background

1.1 Introduction

The topic of the educational outcomes of academic students is dated to several decades ago (1). The heuristic and theoretical model developed by Tinto in 1975 to understand students' behavior (2) has been one of the most acknowledged in the literature (3). Tinto speculated that the interactions between students and academic institutions may explain the academic pathway of students. In particular, the interaction among the background characteristics of students and their level of academic, environmental and social integration in an institution would be able to influence students' decision to 'drop out' from an educational pathway (2). It is widely acknowledged that the purpose of the education of healthcare workers is to ensure adequate care and health advances worldwide, responding to the needs of the population (4), in the light of equity and sustainability of healthcare, as recently highlighted by the World Health Organization (WHO) through the identification of the Sustainable Development Goals (SDGs) to be reached until 2030 (5). In particular, nursing education should prepare nurses to meet the healthcare needs of the population, even considering the requests and preferences of the patients (6). Therefore, the outcomes of the educational pathway of nursing students is particularly relevant for Higher Education Institutions (HEIs), because they are able to influence the evaluation of performance, efficiency and economical sustainability of HEIs (7, 8). Moreover, the global nursing shortage (9, 10) negatively impacts on the health conditions of the general population worldwide (4). For these reasons, the topic of academic outcomes of nursing students is still widely investigated in the literature (11-22) and there are multiple educational pathways for nursing student's academic progression (23) and factors that influence its evolution (11, 14, 19, 21, 24, 25). However, the literature about these topics is controversial because several definitions of the academic outcomes have been considered and their associated/predictive factors are not yet widely explored and ascertained (14, 17, 18, 21, 23, 24, 26).

1.2 Possible progressions of the educational pathway of academic nursing students

The possible progressions of the educational pathway of academic nursing students are classifiable into two outcome categories, i.e. 'retention' ('academic success') and 'attrition' ('academic lack of success') (23). The retention refers to the achievement of the Nursing Degree either through the 'ideal' pathway, i.e. within the legal duration of the program, or more slowly. In this latter case, the delay to graduation can occur either subsequently to the

interruption of studies for a period of time ('stopout') or due to failure of exams or other activities, despite the consistent commitment of the student in the program (i.e. 'interim program retention' pathway). Some authors identified retention as the academic success of nursing students, considering the achievement of the Nursing Degree as success, regardless of the time spent to graduate (23, 27-29); other authors defined academic success only as the graduation within the legal duration of the program (13, 15, 17, 18, 30, 31). Moreover, other authors extended the definition of academic success to include also the achievement of learning objectives and skills, or some constructs related to students' perception (e.g. satisfaction), or the post-graduation progression (e.g. career success) (32). Therefore, no wide consensus is available in the literature regarding the definition of academic success and the phenomenon is often investigated from different viewpoints.

Attrition is generally identified with the 'academic failure' which, according to the definition of success adopted, can include only 'out of class' students, i.e. those persisting in the program over the scheduled time and not achieving the Degree, or 'out of class' students along with those who graduated spending more time than the legal duration of the program. However, the academic failure and attrition always include students who dropped out from the program, even though such phenomenon can have several features depending on time and modality of dropping out: official or unofficial; voluntary or involuntary; early or late in the program (14, 23, 26).

Hence, the estimation of the phenomenon is quite difficult since it depends on the assumed definition of the outcome.

1.3 Possible factors associated/predictive of academic outcomes

The possible evolution of nursing students' academic progression pathway depends on several factors, whose role is partially still unclear, despite the possible determinants of academic outcomes are high investigated in the literature (11, 14, 21, 23, 25, 33). Such outcomes are generated by complex interactions between multiple factors (2, 21) that are classifiable in three levels: micro (individual factors of the student, e.g. age, gender, etc.), meso (institutional and organizational factors related to the features of the educational programs), and macro (political and professional factors) (14, 21). However, most of the literature related to the academic outcomes of nursing students is focused on the role of individual factors (14), although many of them are unchangeable or impossible to use as selection criteria for nursing students for ethical and legislative reasons (e.g. gender or secondary school attended), while little has been investigated on organizational and political

professional factors that also seem to play a key role in determining student outcomes (2, 21). Furthermore, several conceptual models have been developed in the literature outlining the possible interactions between the variables that influence the academic outcomes of the nursing students (2, 33), though regarding some factors (e.g. personality traits, life and work conditions while attending the program, other activities and difficulties experienced while attending the program, clinical placement experiences, etc.) the evidence is still lacking (21).

Therefore, considering: 1) the complexity of the phenomenon, 2) the heterogeneity of the methods and criteria used in the available literature reviews, and 3) the need to understand the actual relationship between individual, institutional, and political-professional variables with the academic outcome, it is necessary the awareness of the literature gaps in reference to the associated/predictive factors of nursing students' academic outcomes. Such knowledge would allow to perform further research about little-explored factors and finally to develop conceptual reference models to translate evidence into support interventions, with the ultimate goal of early intercepting students at risk of lack of success and maximizing academic outcomes of nursing students.

Chapter 2. Systematic review and meta-analysis

2.1 Aim

The aim of this extensive systematic review and meta-analysis was to provide an overview of the effects of micro-, meso-, and macro-level variables on the academic outcome of nursing students.

2.2 Methods

An extensive systematic review of the literature and meta-analysis were conducted in accordance with relevant criteria described in the 'Cochrane Handbook for Systematic Reviews of Interventions', Version 5.1.0 (34) and their reporting was checked against relevant items of the 'Preferred Reporting Items for Systematic Reviews and Meta-Analyses' (PRISMA) checklist (35).

2.2.1 Criteria for considering studies for this review

2.2.1.1 Types of studies

To be included in the review, studies had to be observational in nature. The actual correspondence between the study design described by the authors and the study characteristics was assessed thorough the 'List of study design features' checklist described in the 'Cochrane Handbook for Systematic Reviews of Interventions', Version 5.1.0. However, during the development of this list there was lack of total consensus regarding labels, and therefore, the value and interpretation of some items on the list was discussed to classify primary studies (34). Lastly, to be considered, the studies had to be published in Italian or English.

2.2.1.2 Types of participants

Undergraduate nursing students attending an academic program lasting at least three years were the considered population with no exclusion criteria. In studies conducted on mixed samples, i.e. that had included other educational programs' students, only data regarding nursing students were considered, if separately available. Authors were contacted to obtain data separately for nursing students, if not deductible by the full-text.

2.2.1.3 Types of outcome measures

Since the focus of the study regarded all the possible progressive pathways of undergraduate nursing students, all the measures of academic success and lack of success measured at least at the end of the legal duration of the nursing program were considered as outcomes. In

particular, considering the great variability of the definition of academic outcomes in the literature, the outcome 'academic success' referred to students who graduated, while 'academic lack of success' regarded students who did not graduate. Both the outcomes were stratified according to the possible progressive pathways of students described in the included studies. This allowed to ensure a wide search strategy and an extensive view of the phenomenon.

2.2.2 Search methods for identification of studies

2.2.2.1 Electronic searches

In order to identify suitable keywords for the search strategy, a pilot search was performed in Scopus using the following search strings: a) nursing students and attrition; b) nursing students and retention; c) nursing students and dropout, along with the filter 'Review'. Therefore, considering the keywords used in the retrieved reviews (11, 12, 14, 19-21, 24) and the aims of the present study, the following keywords were utilized in the search strategy: 'students, nursing', 'achievement', 'academic success', 'retention', 'attrition', 'wastage', 'academic failure', 'student dropouts', and 'withdrawal'. The consulted electronic databases were PubMed, Scopus, Education Resources Information Center (ERIC), and Open Grey. The identified keywords were combined both for the research about academic success and failure. In regard to academic success, the following combinations were used: a) students, nursing and achievement; b) students, nursing and academic success; c) students, nursing and retention. Instead, for the research about academic lack of success, the following strings were used: a) students, nursing and attrition; b) students, nursing and wastage; c) students, nursing and academic failure; d) students, nursing and student dropouts; e) students, nursing and withdrawal. The research was performed on January 21st, 2019 and limited to December 31st, 2018; no further limits or filters were utilized in order to ensure a high sensitivity of the search strategy and adopt a 'broad approach' (34). The full search strings are reported in Table 1 (in Appendix). All the retrieved references were collected and managed with EndNote X7 for Windows (Thomson Reuters, New York).

2.2.2.2 Searching other resources

In order to maximize the finding of potentially relevant manuscripts, the reference lists of the included studies (i.e. 'references scanning' process), as well as the references that had cited the included studies (i.e. 'citations scanning' process) were assessed for eligibility. Both processes were performed through Scopus.

2.2.3 Data collection and analysis

2.2.3.1 Selection of studies

Studies were screened for eligibility and inclusion analyzing title/abstract and full-texts, respectively. Two raters (VC, AD) independently screened titles and abstracts of the retrieved references (eligibility phase). In order to avoid the exclusion of potentially relevant articles, in this phase, titles and abstracts had to fulfil the following broad criteria: a) include any kind of nursing students or medical Faculties; b) describe the assessment of academic outcomes, even though generically defined as 'achievement'. Full-texts were analyzed by two raters (VC, AD) for their inclusion in the review considering the following as inclusion criteria: a) the full-text was available through the library resources of the University of L'Aquila; b) the full-text was published in Italian or English; c) the full-text described quantitative non-randomized studies, i.e., the study design, assessed through the 'List of study design' (34), revealed to be prospective or retrospective cohort or case-control; d) the sample of the study included academic nursing students that attended a program that lasted at least three years; e) the authors had considered one of the definitions described in the literature regarding academic success or lack of success as outcomes and was measured in at least at the end of the legal duration of the program; f) the authors described the assessment of predictive or associated factors with the outcome. In this phase the following exclusion criteria were considered: mixed samples (e.g. nursing and midwifery students) and no separate data available or not separate data obtained after contacting the authors. Finally, whether the same data were duplicated in different journals or included in larger and mixed samples, the paper presenting the highest methodological quality and most of data regarding nursing students was included. Studies that reported data on the same sample but about different variables regarding the academic outcome were included and treated as a unique study for descriptive statistics of the students and their characteristics, while they were considered as separate studies when assessing the results on associated or predictive factors. The whole selection and computing processes for the PRISMA flow-chart were performed using SPSS version 25.0 (IBM Corp., Armonk, NY, USA). Both in the eligibility and inclusion stage, the agreement among the judgements of the raters (inter-rater reliability) was estimated with the Krippendorff's alpha coefficient (α) ranging from 0 (totally disagree) to 1 (totally agree) (36). Any disagreement between the raters was resolved by discussion with a third author (LL) until consensus was reached.

2.2.3.2 Assessment of risk of bias in included studies

The assessment of risk of bias in systematic reviews refers to the detection of possible source of systematic errors (bias) in the conduction of the included studies. In particular, such evaluation allows to evaluate the believability of the results of the studies and it should be performed as objective as possible. Therefore, the instrument utilized for the evaluation of risk of bias in the included studies should lead the reviewers to systematically and objectively evaluate the papers (34). In this regard, given the great variability of research designs, several tools have been developed to evaluate risk of bias in non-randomized studies, although in 2003 Deeks and colleagues (37) identified the 'Downs and Black instrument' (38) and the 'Newcastle-Ottawa Scale' (39) as the most useful tools. Also Hootman and colleagues in 2011 identified these instruments as those with more pros when compared with another tool ('Scottish Intercollegiate Guidelines Network'), although the evaluation of risk of bias is acknowledged as a critical phase of a systematic review that can lead to not plausible deductions; therefore, it should be performed independently by two raters (40). However, both the 'Downs and Black instrument' and the 'Newcastle-Ottawa Scale' need to be customized according to the research design of the included studies, as suggested in the 'Cochrane Handbook for Systematic Reviews of Interventions', Version 5.1.0 (34) and already performed in the literature (41). Considering these issues and the high number of features that the 'Downs and Black instrument' allows to evaluate, this tool was used in this systematic review, after having modified it as needed. The original checklist is composed of 27 items organized in the following five sub-scales:

a) Reporting (10 items). The aim of this sub-scale is to assess whether the paper provided sufficient information to allow the reader to perform an unbiased assessment of the findings.

b) External validity (3 items). The aim of this sub-scale is to assess the extent of the generalization of the study findings to the population to which belong the sample.

c) Internal validity – bias (7 items). The aim of this sub-scale is to detect biases in the measurement of the intervention and outcome.

d) Internal validity – confounding (selection bias) (6 items). The aim of this sub-scale is to detect biases during the selection of the sample.

e) Power (1 item). The aim of this sub-scale is to assess whether the negative findings of a study could be due to chance.

All the items can be scored 0 or 1, except for one item in the 'Reporting' subscale, which can be scored from 0 to 2, and the last item regarding power, which can be scored from 0 to 5. Therefore, the total maximum achievable score of the original checklist was 32.

The excluded items for each sub-scale in this review were the following:

a) Reporting: items number 4 and 8 (i.e. *'Are the interventions of interest clearly described?'*, *'Have all important adverse events that may be a consequence of the intervention been reported?'*). Moreover, the item number 9 (i.e. *'Have the characteristics of patients lost to follow-up been described?'*) was considered only for longitudinal studies; therefore, the score reached in this sub-scale was standardized and expressed through percentages.

b) External validity: item number 13 (i.e. *'Were the staff, places, and facilities where the patients were treated, representative of the treatment the majority of patients receive?'*). The maximum achievable score for this sub-scale was two for all the study design; however, the score was expressed also through percentages.

c) Internal validity – bias: items number 14, 15, 16, 17, and 19 (i.e. *'Was an attempt made to blind study subjects to the intervention they have received?'*, *'Was an attempt made to blind those measuring the main outcomes of the intervention?'*, *'If any of the results of the study were based on 'data dredging', was this made clear?'*, *'In trials and cohort studies, do the analyses adjust for different lengths of follow-up of patients, or in case-control studies, is the time period between the intervention and outcome the same for cases and controls?'*, and *'Was compliance with the intervention/s reliable?'*). The maximum achievable score for this sub-scale was two for all the study design; however, the score was expressed also through percentages.

d) Internal validity – confounding (selection bias): items number 23, 24, and 25 (i.e. *'Were study subjects randomized to intervention groups?'*, *'Was the randomized intervention assignment concealed from both patients and health care staff until recruitment was complete and irrevocable?'*, and *'Was there adequate adjustment for confounding in the analyses from which the main findings were drawn?'*). Moreover, item number 26 (i.e. *'Were losses of patients to follow-up taken into account?'*) was considered only for longitudinal studies; therefore, the score reached in this sub-scale was standardized and expressed through percentages.

e) Power: this subscale, including only one item (i.e. *'Did the study have sufficient power to detect a clinically important effect where the probability value for a difference being due to chance is less than 5%?'*), was not considered to assess quality given the observational design of the included studies.

Moreover, a total standardized score was computed for each study considering all the items of the checklist. Risk of bias evaluation was performed independently by two raters (VC, AD) and the agreement among the judgements of the authors (inter-rater reliability) was estimated with the Krippendorff's alpha coefficient (α). Any disagreement between the raters was resolved by discussion with a third author (LL) until consensus was reached.

2.2.3.3 Data extraction and management

Data extraction was performed through a previously tested (14) electronic spreadsheet of Microsoft Excel for Windows. Two researchers independently extracted data (VC, AD) and a Professor (LL) supervised the process and intervened to solve any disagreement.

The following data were extracted:

a) General information: First author, publication year, and journal with current impact factor (IF);

b) Study characteristics: Country, study design (assessed with the 'List of study design' checklist), whether the study was multicentric or monocentric, number of cohort of students involved, duration (years) and denomination of the program attended, sample (N), sociodemographic characteristics of the sample, and methods utilized for data collection;

c) Data related to the research question of the review: study aim, adopted definition of the outcome, independent variables assessed for the association with/prediction of the outcome, statistical analyses performed by the authors, and summary of results provided referred to all the outcome definitions adopted by the authors, if available.

Authors were contacted, if needed.

2.2.3.4 Data synthesis

Descriptive data reported in the studies have been synthetized to provide an overview of the included studies and samples. Moreover, in order to detect the possible influence of the effects of micro-, meso-, and macro-level variables on the academic outcomes, data about each possible influencing variable were synthetized-pooling studies reporting the same definition of the outcome. When studies reported definitions of academic success and lack of success, investigating the associated/predictive variables of both definitions, results were first summarized referring to academic success as the outcome. Afterwards, when the definition of academic lack of success provided in these studies was not complementary to the definition of success (i.e. they referred to one aspect of lack of success such as failure), results were also summarized referring to academic lack of success as the outcome.

Consequently, when more than two studies reporting the same definition of the outcome and influencing variable were retrieved, meta-analyses were performed utilizing the odds ratio (OR) or Cohen's *d* as effect sizes for categorical and continuous variables, respectively. The Random Effects Model (REM) was used to compute the meta-analyses through Prometa free software. Data that could not be included in the quantitative synthesis were narratively synthetized.

2.2.3.5 Assessment of heterogeneity

The Cochran's Q (χ^2) and I^2 were calculated for each meta-analysis for the assessment of heterogeneity. In this regard, a significant Q-test ($p \leq 0.05$) indicates the presence of heterogeneity, while the I^2 represents the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error. A rough guide provided in the 'Cochrane Handbook for Systematic Reviews of Interventions', Version 5.1.0 regarding the thresholds for the interpretation I^2 are as follows:

- 0% to 40%: might not be important;
- 30% to 60%: may represent moderate heterogeneity;
- 50% to 90%: may represent substantial heterogeneity;
- 75% to 100%: considerable heterogeneity.

The cuff-offs are superimposed since the importance of inconsistency depends on several factors (34) and may depend on the research topic and the characteristics of the included studies. Therefore, the cut-off for the assessment of heterogeneity was decided after discussion among the researchers and Professor.

2.2.3.6 Subgroup and sensitivity analyses

After discussion among the researchers and Professor (34), it was decided to perform a subgroup analysis for the meta-analyses in which a 'substantial' or 'considerable' (i.e. $I^2 \geq 50\%$) heterogeneity was detected. The subgroup analysis was performed computing separate ORs or Cohens'*d* based on the study design of the involved studies.

A sensitivity analysis was performed for each meta-analysis that included three or more studies by removing each study from the meta-analyses in order to detect whether one of the involved studies could have affected the results (34).

2.2.3.7 Assessment of reporting biases

For the meta-analyses that included three or more studies, the publication bias was assessed through funnel plots, test for the asymmetry of the funnel plots (Begg and Mazumdar's rank

correlation and Egger's linear regression method), and the computation of the failsafe number when needed. Moreover, if needed, an estimation of the effect size after the control of the eventual publication bias was computed in accordance with the trim and fill method (34).

2.3 Results

2.3.1 Search results

The electronic searches in the scientific databases identified 7,763 potentially relevant records, while the 'references scanning' and 'citations scanning' processes identified 774 and 673 potentially relevant references, respectively. Duplicates were then removed, and titles and abstracts of 4,727 references were assessed for eligibility. Available full-texts of 268 records were then analyzed and n = 18 studies were included in the systematic review, nine (k) of which were included in the quantitative synthesis (meta-analysis). In the PRISMA flow-chart, detailed information about the reason for exclusion of 250 full-texts are reported (Figure 1). In the eligibility and inclusion stage, the agreement among the judgements of the authors (Krippendorff's alpha coefficient, α) was 0.95 and 0.98, respectively.
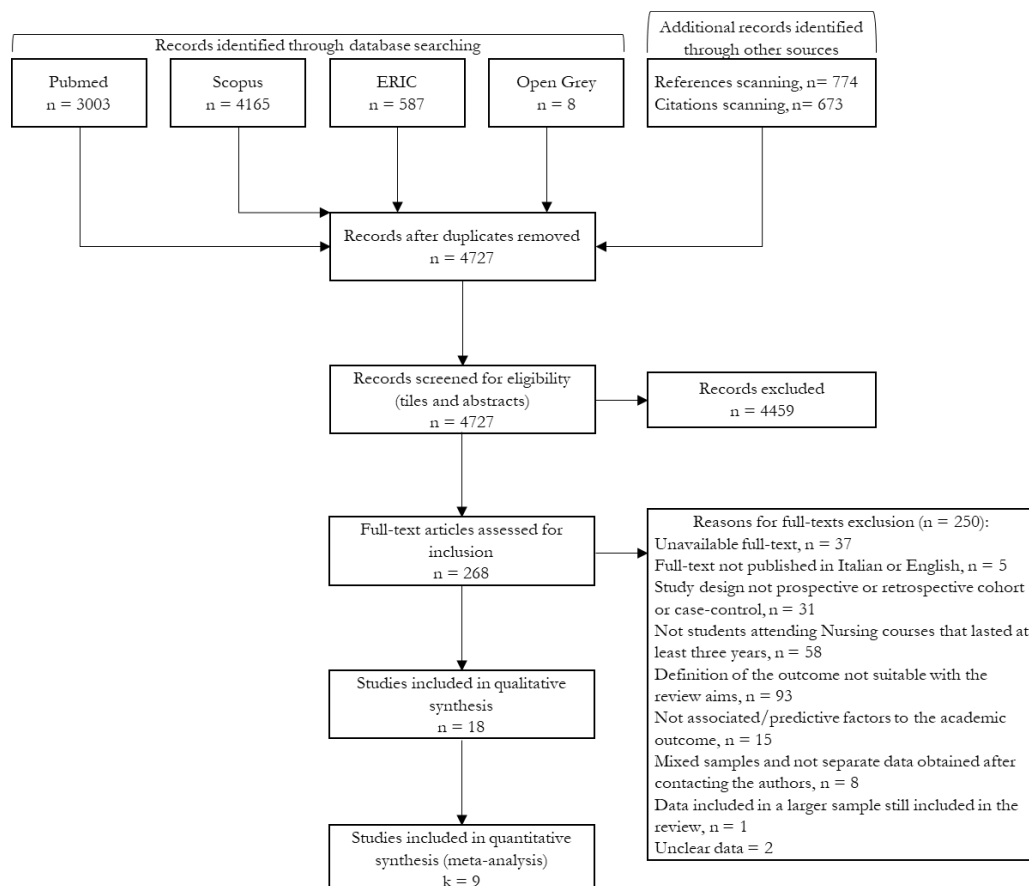
Figure 1. PRISMA flow-chart.

The included studies are listed in Table 2 (in Appendix).

2.3.2 Characteristics of the included studies

As shown in Table 3 (in Appendix), the 18 included studies were published from 1979 to 2018 and conducted in Australia (n = 5, 27.8%), United Kingdom (n = 5, 27.8%), Italy (n = 4, 22.2%), United States (n = 3, 16.7%), and State of Israel (n =1, 5.6%). In regard to the study design, according to the 'List of study design features', most of the studies revealed to be retrospective cohort (n = 10, 55.6%), followed by prospective cohort (n = 7, 38.9%), and case-control (n = 1, 5.6%). Only two studies were multi-center (11.1%) and half of the studies included more than one cohort of students (n =9, 50.0%). All the studies were conducted in academic educational programs and nearly all (n = 17, 94.4%) involved educational programs lasting three years, while one study was conducted in an educational program lasting four years. However, the programs denominations were quite variable among the studies. Two studies reported data on the same sample of other two studies, but about different variables regarding the academic outcome. Therefore, in regard to descriptive statistics of the students and their characteristics, these samples were considered only once. Overall, 10,024 undergraduate nursing students were involved, with study samples ranging from 101 to 2,278. Data regarding gender was available for 8,780 students with 75.4% (6624) females and 24.6% males (2,156). Mean age was reported for 5,413 students with a range of 21.3 to 27.0 years of age. In regard to data collection, many studies were performed by consulting administrative records (n = 8, 44.4%), often along with questionnaires (n = 7, 38.9%) or interviews (n = 1, 5.6%); only two studies reported collecting data from students through a questionnaire.

As shown in Table 4 (in Appendix), all the included studies aimed at investigating the association or predictive power of several micro- and meso-level variables in reference to the academic outcome of nursing students. In the included studies, seven different definitions of the academic outcome were provided, as follows:

1. Academic success: graduation within the legal duration of the program [ID 1, 3, 4, 5, 6, 10, 11, 12, 13, 14, 16, 18];
2. Academic success: graduation not considering the time spent [ID 2, 14, 15];
3. Academic lack of success: failure (due to not achieving the required standards) [ID 2, 4, 11];
4. Academic lack of success: voluntarily drop out/withdrawal [ID 1, 3, 4, 7, 8, 9, 11, 12, 13, 14, 16];
5. Academic lack of success: continuous enrolment in the program [3, 6, 12, 13, 14, 16];

6. Academic lack of success: not completing the program [ID 15];

7. Academic lack of success: drop out at seven years of follow-up [ID 17].

2.3.3 Risk of bias in included studies

Most of the included studies showed a low risk of bias. However, in some cases, the quality of reporting could be improved prior to publication. In fact, the characteristics of participants, the principal confounders as well as the actual probability values for the main outcomes were not always clearly described. In regard to external validity, the representativeness of samples was the main problem detected; while, statistical tests used to assess the main outcomes were not always appropriate, affecting the internal validity of the studies (Table 5, in Appendix). The agreement among the two raters was 0.93 (Krippendorff's alpha coefficient).

2.3.4 Synthesis of data: academic success defined as graduation within the legal duration of the program

Among the 6,650 students involved in the studies that considered 'graduation within the legal duration of the program' as the definition of academic success (n =11), 86.8% of them graduated on time, with great variability among the studies (range 30.1% - 84.0%) (Table 6).

Study ID	First author, year	Sample	Success students (N)	% of success students
1	Brimble, 2015	418	308	73.7%
3	Dante et al., 2011	117	81	69.2%
4	Dante et al., 2013	145	91	62.8%
5	Dante et al., 2015	120	84	70.0%
6	Deary et al., 2003	168	141	84.0%
10	Lancia et al., 2018	2,278	1,402	61.5%
11	Mulholland et al., 2008	1,808	1,431	79.1%
12°	Pitt et al., 2014	352	46	33.3%
13°	Pitt et al., 2015			
14	Pryjmachuk et al., 2008	1,173	727	62.0%
16	Salamonson et al., 2011	352	106	30.1%

18	Wilson et al., 2011	101	67	66.3%
	Total	**6,650**	**5,774**	**86.8%**

Table 6. Frequency of academic success defined as graduation within the legal duration of the program.
° Studies reporting data on the same sample, but different variables regarding the academic outcome.

2.3.4.1 Meta-analyses for the outcome academic success defined as graduation within the legal duration of the program

In regard to the variables potentially associated with the outcome, nine (k = 9) (13, 15, 17, 28, 30, 43, 44, 50, 51) studies were included in the meta-analyses. Meta-analytic results revealed that nursing students who were female or those, male or female, who had attended a Classical, Science, Academic, or Ordinary secondary school had a significant higher probability of academic success (Figures 4 and 5, respectively). Moreover, students who graduated in time reported significantly higher final grades at the secondary school than 'lack of success' students (Figure 6). However, the following student variables were not associated with the outcome 'graduation within the legal duration of the program': native speaker of the language of the Country where the study was conducted, age, work experience before attending the nursing program, work experience in the nursing field before attending the nursing program, time spent in minutes to reach the university, working while attending the nursing program, weekly hours of work while attending the nursing program, life events while attending the nursing program, economic hardship while attending the nursing program, and family commitments while attending the nursing program (Figures 2, 3, 7-14).
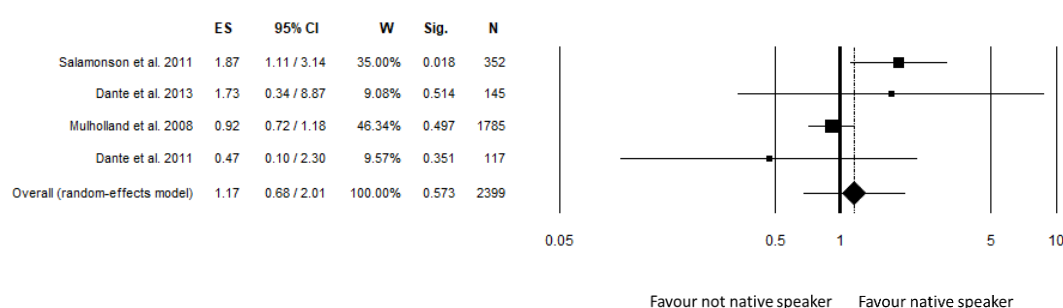
Figure 2. Meta-analysis comparing students who were native speakers of the language of the Country where the study was conducted and students who were not native speakers [outcome 'graduation within the legal duration of the program' (Odds ratio)].

ES = Effect size (Odds ratio), 95% CI = 95% Confidence Interval, W = Weight, Sig. = Statistical significance, N = Total sample.
Heterogeneity statistics: Q = 7.23, df = 3, p = 0.065, I^2 = 58.49.

	ES	95% CI	W	V	SE	Sig.	N	N1	N2
Dante et al. 2015	0.69	0.29 / 1.09	13.72%	0.04	0.20	0.001	120	84	36
Deary et al. 2003	0.28	-0.14 / 0.69	13.24%	0.04	0.21	0.190	168	141	27
Dante et al. 2011	0.25	-0.14 / 0.64	13.96%	0.04	0.20	0.213	117	81	36
Wilson et al. 2011	0.04	-0.37 / 0.45	13.25%	0.04	0.21	0.850	101	67	34
Lancia et al. 2018	0.02	-0.06 / 0.10	29.43%	0.00	0.04	0.639	2278	1402	876
Dante et al. 2013	0.02	-0.32 / 0.36	16.39%	0.03	0.17	0.914	145	91	54
Overall (random-effects model)	0.18	-0.02 / 0.38	100.00%	0.01	0.10	0.074	2929	1866	1063

Figure 3. Meta-analysis comparing standardized mean differences of students' age [outcome 'graduation within the legal duration of the program' (Cohen's *d*)].
ES = Effect size (Cohen's *d*), 95% CI = 95% Confidence Interval, W = Weight, V = Variance, SE = Standard error, Sig. = Statistical significance, N = Total sample, N1 = 'Success students', N2 = 'Lack of success students'.
Heterogeneity statistics: Q = 12.44, df = 5, p = 0.029, I^2 = 59.80.

	ES	95% CI	W	Sig.	N
Dante et al. 2015	3.53	1.52 / 8.20	6.61%	0.003	120
Dante et al. 2013	2.81	1.34 / 5.89	7.98%	0.006	145
Deary et al. 2003	2.41	0.93 / 6.20	5.54%	0.069	168
Lancia et al. 2018	1.94	1.63 / 2.31	22.60%	0.000	2278
Salamonson et al. 2011	1.56	0.80 / 3.03	9.17%	0.192	352
Dante et al. 2011	1.52	0.66 / 3.50	6.67%	0.331	117
Mulholland et al. 2008	1.25	0.95 / 1.64	19.54%	0.110	1808
Pryjmachuk et al. 2008	1.14	0.83 / 1.57	17.92%	0.425	1173
Wilson et al. 2011	0.98	0.31 / 3.14	3.97%	0.977	101
Overall (random-effects model)	1.65	1.28 / 2.12	100.00%	0.000	6262

Figure 4. Meta-analysis comparing males and females [outcome 'graduation within the legal duration of the program' (Odds ratio)].
ES = Effect size (OR), 95% CI = 95% Confidence Interval, W = Weight, Sig. = Statistical significance, N = Total sample.
Heterogeneity statistics: Q = 18.92, df = 8, p = 0.015, I^2 = 57.71.

	ES	95% CI	W	Sig.	N
Dante et al. 2011	2.04	0.87 / 4.75	1.96%	0.099	111
Lancia et al. 2018	1.40	1.18 / 1.65	48.31%	0.000	2250
Dante et al. 2015	1.39	0.62 / 3.12	2.17%	0.420	120
Mulholland et al. 2008	1.37	1.00 / 1.87	14.19%	0.051	1186
Pryjmachuk et al. 2008	1.14	0.92 / 1.42	30.30%	0.220	1094
Dante et al. 2013	0.87	0.44 / 1.71	3.07%	0.687	145
Overall (random-effects model)	1.30	1.16 / 1.46	100.00%	0.000	4906
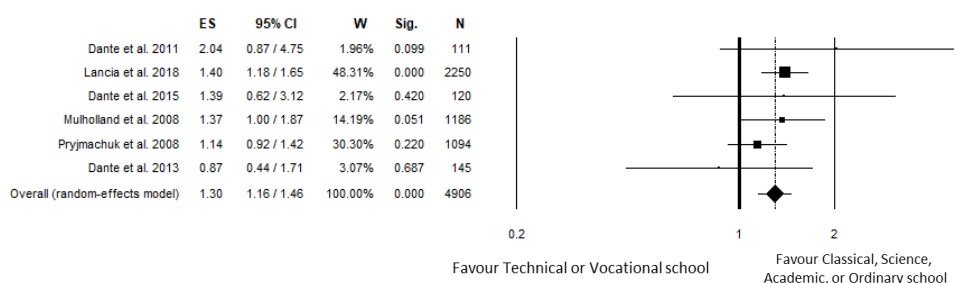
Figure 5. Meta-analysis comparing students who had attended Classical, Science, Academic, or Ordinary secondary schools and those who had attended Technical or Vocational secondary schools [outcome 'graduation within the legal duration of the program' (Odds ratio)].
ES = Effect size (OR), 95% CI = 95% Confidence Interval, W = Weight, Sig. = Statistical significance, N = Total sample.
Heterogeneity statistics: Q = 4.57, df = 5, p = 0.471, I^2 = 0.00.
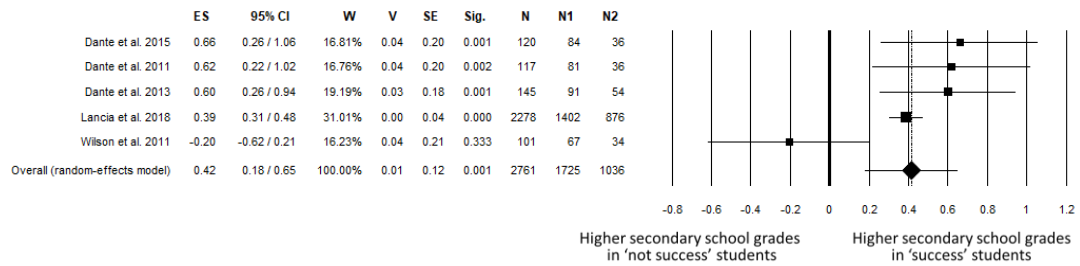
Figure 6. Meta-analysis comparing standardized mean differences of students' secondary school grades [outcome 'graduation within the legal duration of the program' (Cohen's *d*)].

ES = Effect size (Cohen's *d*), 95% CI = 95% Confidence Interval, W = Weight, V = Variance, SE = Standard error, Sig. = Statistical significance, N = Total sample, N1 = 'Success students', N2 = 'Lack of success students'.

Heterogeneity statistics: Q = 12.32, df = 4, p = 0.015, I^2 = 67.53.
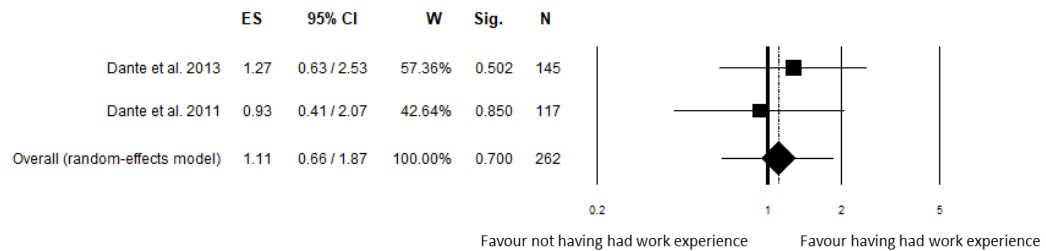
Figure 7. Meta-analysis comparing students who have had work experience before attending the nursing program and those who have not had work experience [outcome 'graduation within the legal duration of the program' (Odds ratio)].

ES = Effect size (Odds ratio), 95% CI = 95% Confidence Interval, W = Weight, Sig. = Statistical significance, N = Total sample.

Heterogeneity statistics: Q = 0.34, df = 1, p = 0.561, I^2 = 0.00.
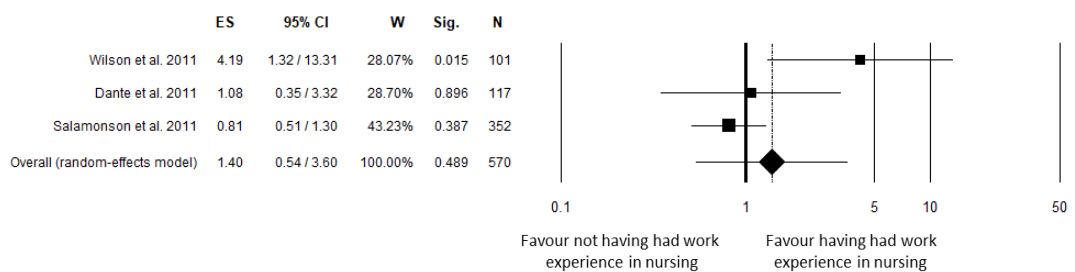
Figure 8. Meta-analysis comparing students who have had work experience in the nursing field before attending the nursing program and those who have not had work experience [outcome 'graduation within the legal duration of the program' (Odds ratio)].

ES = Effect size (Odds ratio), 95% CI = 95% Confidence Interval, W = Weight, Sig. = Statistical significance, N = Total sample.

Heterogeneity statistics: Q = 6.63, df = 2, p = 0.036, I^2 = 69.83.

31

	ES	95% CI	W	Sig.	N
Dante et al. 2013	1.99	0.99 / 3.97	38.58%	0.052	145
Dante et al. 2015	1.79	0.81 / 3.97	30.36%	0.152	120
Dante et al. 2011	0.92	0.42 / 2.01	31.05%	0.829	117
Overall (random-effects model)	1.51	0.95 / 2.42	100.00%	0.084	382

Favour > 30 minutes to university   Favour ≤ 30 minutes to university
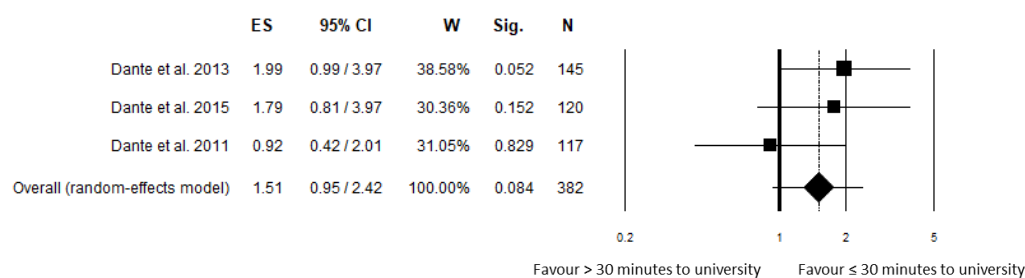
Figure 9. Meta-analysis comparing students who used to spend ≤ 30 minutes to reach the university with students who used to spend more time [outcome 'graduation within the legal duration of the program' (Odds ratio)].
ES = Effect size (Odds ratio), 95% CI = 95% Confidence Interval, W = Weight, Sig. = Statistical significance, N = Total sample.
Heterogeneity statistics: Q = 2.32, df = 2, p = 0.314, I^2 = 13.79.

	ES	95% CI	W	Sig.	N
Salamonson et al. 2011	1.26	0.78 / 2.02	53.88%	0.346	352
Dante et al. 2013	1.04	0.53 / 2.04	26.55%	0.911	145
Dante et al. 2011	0.87	0.40 / 1.92	19.57%	0.735	117
Overall (random-effects model)	1.11	0.79 / 1.57	100.00%	0.549	614

Favour students who did not use to work   Favour students who used to work
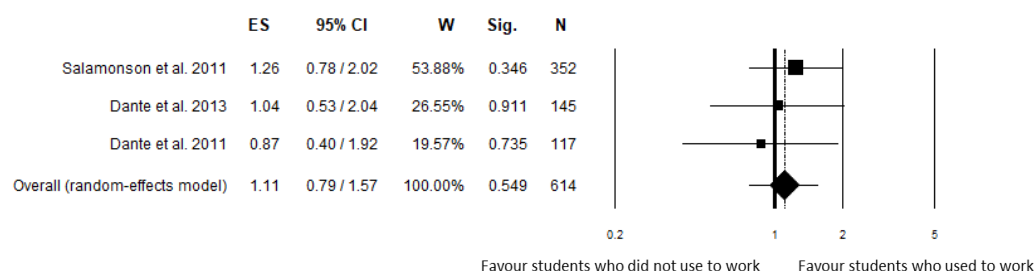
Figure 10. Meta-analysis comparing students who used to work while attending the nursing program with students who did not use to work [outcome 'graduation within the legal duration of the program' (Odds ratio)].
ES = Effect size (Odds ratio), 95% CI = 95% Confidence Interval, W = Weight, Sig. = Statistical significance, N = Total sample.
Heterogeneity statistics: Q = 0.66, df = 2, p = 0.720, I^2 = 0.00.

	ES	95% CI	W	V	SE	Sig.	N	N1	N2
Dante et al. 2013	0.73	0.23 / 1.24	50.33%	0.07	0.26	0.005	68	43	25
Dante et al. 2011	-0.82	-1.39 / -0.25	49.67%	0.08	0.29	0.005	59	40	19
Overall (random-effects model)	-0.04	-1.56 / 1.49	100.00%	0.60	0.78	0.962	127	83	44

Higher weekly work hours while attending program in 'not success' students   Higher weekly work hours while attending program in 'not success' students
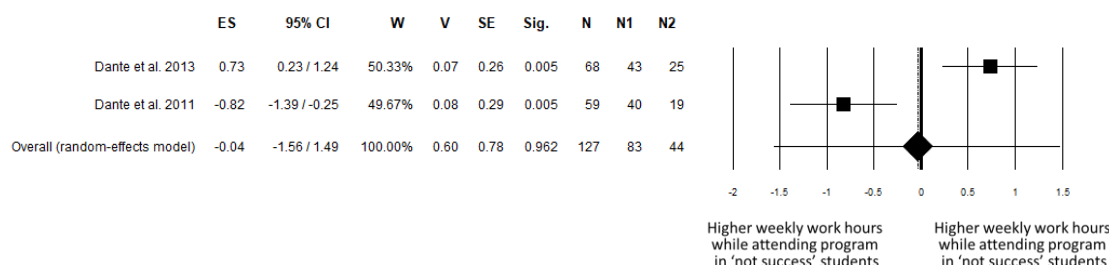
Figure 11. Meta-analysis comparing standardized mean differences of students' weekly hours of work while attending the nursing program [outcome 'graduation within the legal duration of the program' (Cohen's *d*)].
ES = Effect size (Cohen's *d*), 95% CI = 95% Confidence Interval, W = Weight, V = Variance, SE = Standard error, Sig. = Statistical significance, N = Total sample, N1 = 'Success students', N2 = 'Lack of success students'.
Heterogeneity statistics: Q = 16.05, df = 1, p ≤ 0.001, I^2 = 93.77.

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	ES	95% CI	W	Sig.	N
Dante et al. 2011	1.64	0.63 / 4.27	40.00%	0.309	117
Dante et al. 2013	1.56	0.71 / 3.40	60.00%	0.267	145
Overall (random-effects model)	1.59	0.87 / 2.91	100.00%	0.133	262

Favour who did not use to volunteer while studying — Favour who used to volunteer while studying
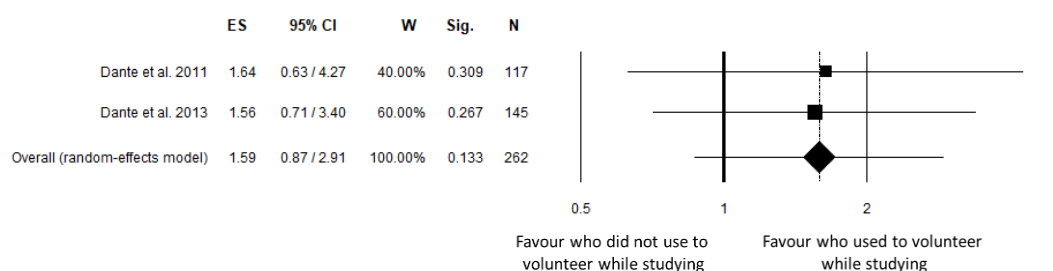
Figure 12. Meta-analysis comparing students who used to volunteer while attending the nursing program with students who did not use to volunteer [outcome 'graduation within the legal duration of the program' (Odds ratio)].
ES = Effect size (Odds ratio), 95% CI = 95% Confidence Interval, W = Weight, Sig. = Statistical significance, N = Total sample.
Heterogeneity statistics: Q = 0.01, df = 1, p = 0.931, I^2 = 0.00.

	ES	95% CI	W	Sig.	N
Dante et al. 2011	1.68	0.77 / 3.64	48.81%	0.190	89
Dante et al. 2013	0.52	0.26 / 1.03	51.19%	0.060	145
Overall (random-effects model)	0.92	0.29 / 2.91	100.00%	0.885	234

Favour students who had not experienced life events — Favour students who had experienced life events
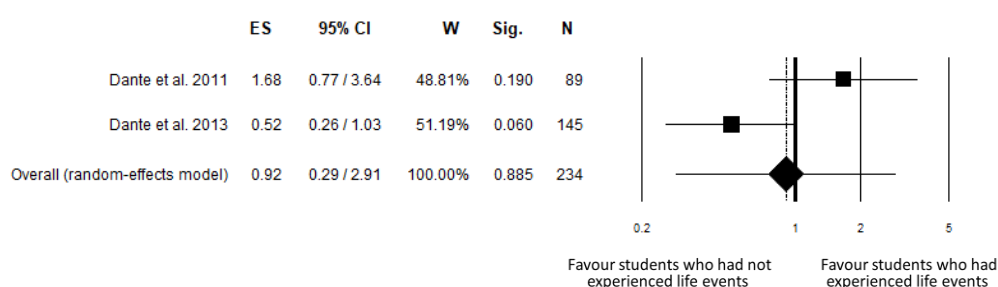
Figure 13. Meta-analysis comparing students who had experienced life events while attending the nursing program and students who had not experienced life events [outcome 'graduation within the legal duration of the program' (Odds ratio)].
ES = Effect size (Odds ratio), 95% CI = 95% Confidence Interval, W = Weight, Sig. = Statistical significance, N = Total sample.
Heterogeneity statistics: Q = 4.98, df = 1, p = 0.026, I^2 = 79.90.

	ES	95% CI	W	Sig.	N
Dante et al. 2011	1.04	0.54 / 2.03	50.55%	0.898	117
Dante et al. 2013	0.98	0.50 / 1.92	49.45%	0.949	145
Overall (random-effects model)	1.01	0.63 / 1.62	100.00%	0.963	262

Favour students who had not experienced economic hardship — Favour students who had experienced economic hardship
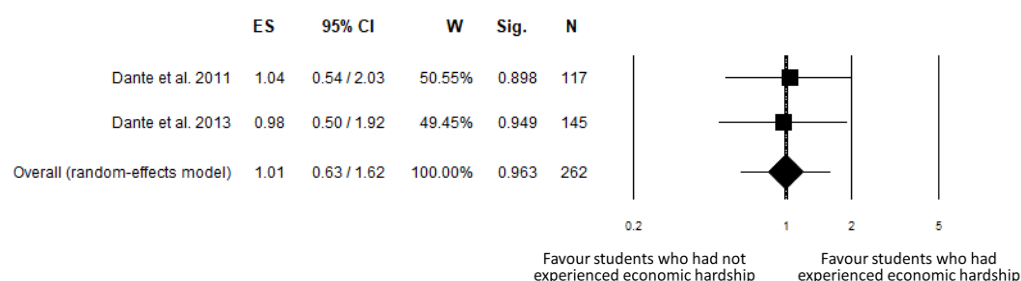
Figure 14. Meta-analysis comparing students who had experienced economic hardship while attending the nursing program and students who had not experienced economic hardship [outcome 'graduation within the legal duration of the program' (Odds ratio)].
ES = Effect size (Odds ratio), 95% CI = 95% Confidence Interval, W = Weight, Sig. = Statistical significance, N = Total sample.
Heterogeneity statistics: Q = 0.02, df = 1, p = 0.892, I^2 = 0.00.
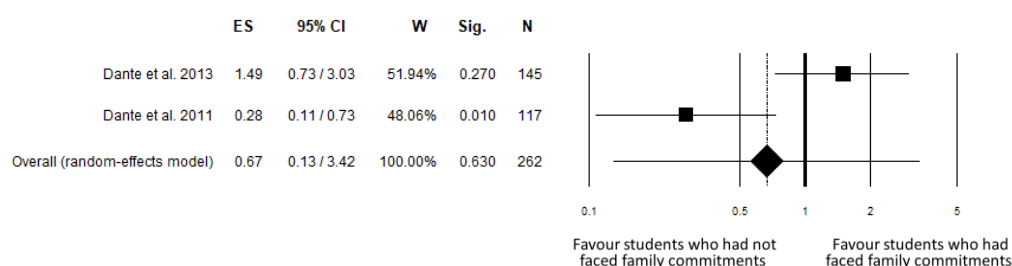
Figure 15. Meta-analysis comparing students who had faced family commitments while attending the nursing program and students who had not faced family commitments [outcome 'graduation within the legal duration of the program' (Odds ratio)].

ES = Effect size (Odds ratio), 95% CI = 95% Confidence Interval, W = Weight, Sig. = Statistical significance, N = Total sample.

Heterogeneity statistics: $Q = 7.50$, $df = 1$, $p = 0.006$, $I^2 = 86.66$.

2.3.4.1.1. Subgroup and sensitivity analyses

The investigation of substantial or moderate heterogeneity through the subgroup analysis based on the study design was feasible for the variables 'native speaker of the language of the Country where the study was conducted', 'age', 'gender', and 'secondary school grades'. In this regard, the study design explained the heterogeneity of meta-analytic results for the variables 'native speaker of the language of the Country where the study was conducted' and 'gender' ($Q = 6.55$, $df = 1$, $p = 0.010$ and $Q = 4.11$, $df = 1$, $p = 0.043$; respectively). However, being native speaker of the language of the Country where the study was conducted confirmed to be significantly associated with the outcome only in prospective cohort studies (Figure 16), as opposed to female gender, which remained significantly associated to the outcome in both groups of studies (prospective and retrospective, Figure 17).
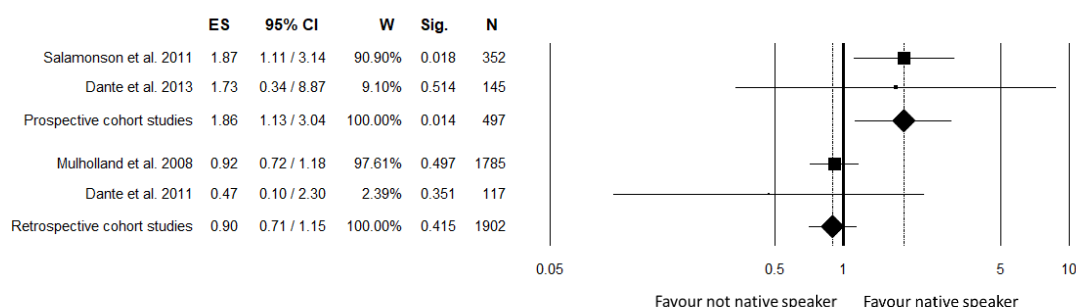
Figure 16. Subgroup analysis based on the study design for the meta-analysis comparing students who were native speakers of the language of the Country where the study was conducted and students who were not native speakers [outcome 'graduation within the legal duration of the program' (Odds ratio)].

ES = Effect size (Odds ratio), 95% CI = 95% Confidence Interval, W = Weight, Sig. = Statistical significance, N = Total sample.

Heterogeneity statistics for the subgroup 'Prospective cohort study': Q = 0.01, df = 1, p = 0.927, I² = 0.00.
Heterogeneity statistics for the subgroup 'Retrospective cohort study': Q = 0.66, df = 1, p = 0.415, I² = 0.00.
Test of differences (ANOVA Q-test Random-effects) between the subgroups: Q = 6.55, df = 1, p = 0.010.

	ES	95% CI	W	Sig.	N
Dante et al. 2013	2.81	1.34 / 5.89	27.70%	0.006	145
Dante et al. 2015	3.53	1.52 / 8.20	21.28%	0.003	120
Deary et al. 2003	2.41	0.93 / 6.20	16.87%	0.069	168
Salamonson et al. 2011	1.56	0.80 / 3.03	34.16%	0.192	352
Prospective cohort studies	2.35	1.59 / 3.47	100.00%	0.000	785
Dante et al. 2011	1.52	0.66 / 3.50	9.47%	0.331	117
Lancia et al. 2018	1.94	1.63 / 2.31	31.92%	0.000	2278
Mulholland et al. 2008	1.25	0.95 / 1.64	27.62%	0.110	1808
Pryjmachuk et al. 2008	1.14	0.83 / 1.57	25.35%	0.425	1173
Wilson et al. 2011	0.98	0.31 / 3.14	5.64%	0.977	101
Retrospective cohort studies	1.41	1.05 / 1.91	100.00%	0.025	5477

Favour males   Favour females

Figure 17. Subgroup analysis based on the study design for the meta-analysis comparing males and females [outcome 'graduation within the legal duration of the program' (Odds ratio)].
ES = Effect size (OR), 95% CI = 95% Confidence Interval, W = Weight, Sig. = Statistical significance, N = Total sample.
Heterogeneity statistics for the subgroup 'Prospective cohort study': Q = 2.58, df = 3, p = 0.461, I² = 0.00.
Heterogeneity statistics for the subgroup 'Retrospective cohort study': Q = 12.78, df = 4, p = 0.012, I² = 68.70.
Test of differences (ANOVA Q-test Random-effects) between the subgroups: Q = 4.11, df = 1, p = 0.043.

Instead, for age and secondary school grades, the study design did not explain the heterogeneity of meta-analytic results (Q = 1.96, df = 1, p = 0.161 and Q = 2.14, df = 1, p = 0.143; respectively). Nevertheless, higher grades remained significantly associated with the outcome in prospective cohort studies (Figure 19), as opposed to age, which confirmed to be not significantly associated to the outcome in both groups of studies (prospective and retrospective, Figure 18).

	ES	95% CI	V	SE	Sig.	N	N1	N2
Dante et al. 2013	0.02	-0.32 / 0.36	0.03	0.17	0.914	145	91	54
Dante et al. 2015	0.69	0.29 / 1.09	0.04	0.20	0.001	120	84	36
Deary et al. 2003	0.28	-0.14 / 0.69	0.04	0.21	0.190	168	141	27
Prospective cohort studies	0.32	-0.08 / 0.71	0.04	0.20	0.113	433	316	117
Dante et al. 2011	0.25	-0.14 / 0.64	0.04	0.20	0.213	117	81	36
Lancia et al. 2018	0.02	-0.06 / 0.10	0.00	0.04	0.639	2278	1402	876
Wilson et al. 2011	0.04	-0.37 / 0.45	0.04	0.21	0.850	101	67	34
Retrospective cohort studies	0.03	-0.05 / 0.11	0.00	0.04	0.457	2496	1550	946

Higher age in 'not success' students   Higher age in 'success' students

Figure 18. Subgroup analysis based on the study design for the meta-analysis comparing standardized mean differences of students' age [outcome 'graduation within the legal duration of the program' (Cohen's *d*)].
ES = Effect size (Cohen's *d*), 95% CI = 95% Confidence Interval, W = Weight, V = Variance, SE = Standard error, Sig. = Statistical significance, N = Total sample, N1 = 'Success students', N2 = 'Lack of success students'.
Heterogeneity statistics for the subgroup 'Prospective cohort study': Q = 6.37, df = 2, p = 0.041, I^2 = 68.61.
Heterogeneity statistics for the subgroup 'Retrospective cohort study': Q = 1.26, df = 2, p = 0.533, I^2 = 0.00.
Test of differences (ANOVA Q-test Random-effects) between the subgroups: Q = 1.96, df = 1, p = 0.161.

	ES	95% CI	W	V	SE	Sig.	N	N1	N2
Dante et al. 2013	0.60	0.26 / 0.94	57.44%	0.03	0.18	0.001	145	91	54
Dante et al. 2015	0.66	0.26 / 1.06	42.56%	0.04	0.20	0.001	120	84	36
Prospective cohort studies	0.63	0.37 / 0.89	100.00%	0.02	0.13	0.000	265	175	90
Dante et al. 2011	0.62	0.22 / 1.02	28.92%	0.04	0.20	0.002	117	81	36
Lancia et al. 2018	0.39	0.31 / 0.48	42.80%	0.00	0.04	0.000	2278	1402	876
Wilson et al. 2011	-0.20	-0.62 / 0.21	28.28%	0.04	0.21	0.333	101	67	34
Retrospective cohort studies	0.29	-0.08 / 0.66	100.00%	0.04	0.19	0.126	2496	1550	946

Higher secondary school grades in 'not success' students   Higher secondary school grades in 'success' students

Figure 19. Subgroup analysis based on the study design for the meta-analysis comparing standardized mean differences of students' secondary school grades [outcome 'graduation within the legal duration of the program' (Cohen's *d*)].
ES = Effect size (Cohen's *d*), 95% CI = 95% Confidence Interval, W = Weight, Sig. = Statistical significance, N = Total sample, N1 = 'Success students', N2 = 'Lack of success students'.
Heterogeneity statistics for the subgroup 'Prospective cohort study': Q = 0.05, df = 1, p = 0.827, I^2 = 0.00.
Heterogeneity statistics for the subgroup 'Retrospective cohort study': Q = 9.08, df = 2, p = 0.011, I^2 = 77.98.
Test of differences (ANOVA Q-test Random-effects) between the subgroups: Q = 2.14, df = 1, p = 0.143.

The sensitivity analysis was feasible for the variables 'native speaker of the language of the Country where the study was conducted', 'age', 'gender', 'secondary school attended', 'secondary school grades', 'having had work experience in the nursing field before attending the nursing program', 'time spent to reach the university', and 'working while attending the nursing program' (Figure 20 to 27). Meta-analytic results resulted to be not significantly influenced by one of the studies included, except for the meta-analysis regarding students'

age that demonstrated to be associated with academic success when data from Lancia et al., 2018 (17) were removed. In this case, successful students were significantly older than their colleagues (Figure 21). An overview of the assessment of heterogeneity and sensitivity analyses is provided in Table 7.
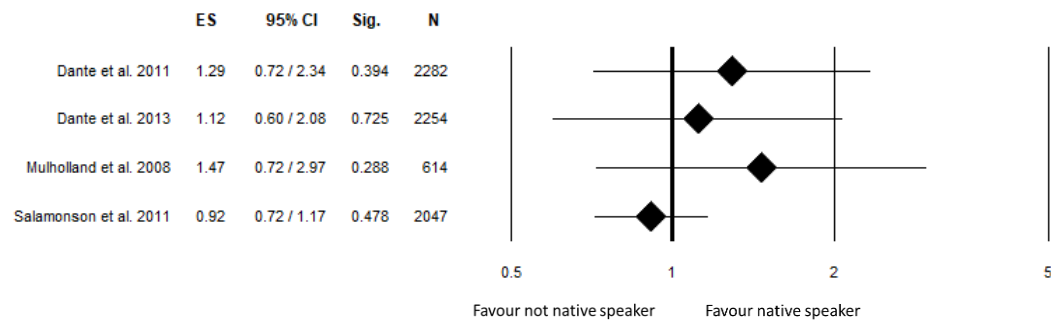
Figure 20. Sensitivity analysis for the meta-analysis comparing students who were native speakers of the language of the Country where the study was conducted and students who were not native speakers [outcome 'graduation within the legal duration of the program' (Odds ratio)].
ES = Effect size (Odds ratio), 95% CI = 95% Confidence Interval, Sig. = Statistical significance, N = Total sample.
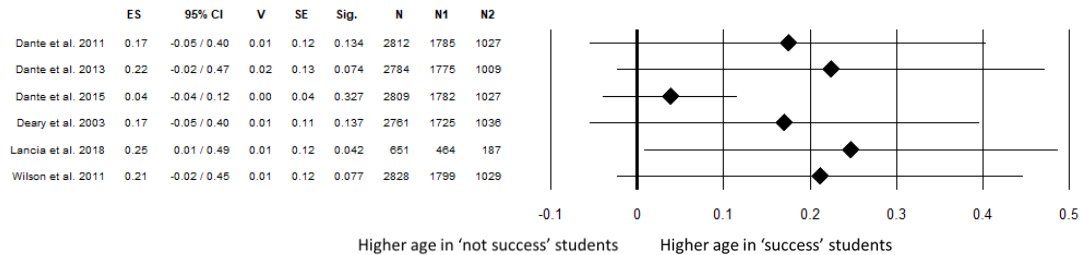
Figure 21. Sensitivity analysis for the meta-analysis comparing standardized mean differences of students' age [outcome 'graduation within the legal duration of the program' (Cohen's *d*)].
ES = Effect size (Cohen's *d*), 95% CI = 95% Confidence Interval, V = Variance, SE = Standard error, Sig. = Statistical significance, N = Total sample, N1 = 'Success students', N2 = 'Lack of success students'.

	ES	95% CI	Sig.	N
Dante et al. 2011	1.66	1.27 / 2.18	0.000	6145
Dante et al. 2013	1.57	1.21 / 2.04	0.001	6117
Dante et al. 2015	1.56	1.22 / 1.99	0.000	6142
Deary et al. 2003	1.61	1.24 / 2.10	0.000	6094
Lancia et al. 2018	1.56	1.18 / 2.06	0.002	3984
Mulholland et al. 2008	1.76	1.33 / 2.33	0.000	4454
Pryjmachuk et al. 2008	1.77	1.37 / 2.29	0.000	5089
Salamonson et al. 2011	1.67	1.26 / 2.20	0.000	5910
Wilson et al. 2011	1.69	1.30 / 2.19	0.000	6161

Favour males   Favour females
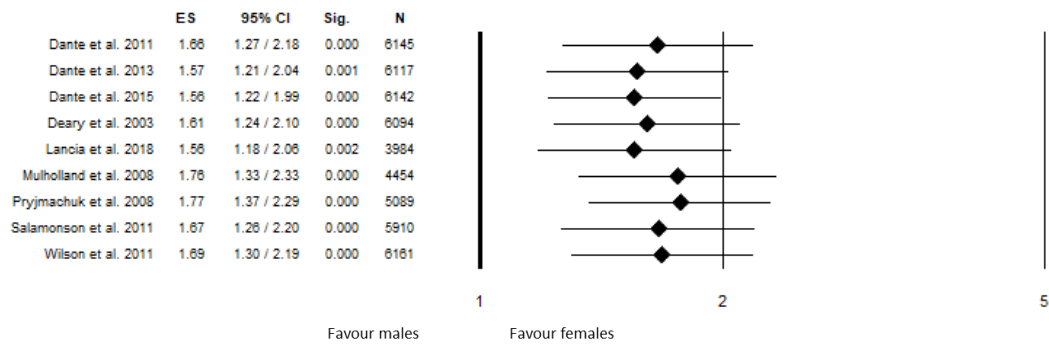
Figure 22. Sensitivity analysis for the meta-analysis comparing males and females [outcome 'graduation within the legal duration of the program' (Odds ratio)].
ES = Effect size (OR), 95% CI = 95% Confidence Interval, Sig. = Statistical significance, N = Total sample.

	ES	95% CI	Sig.	N
Dante et al. 2011	1.29	1.14 / 1.45	0.000	4795
Dante et al. 2013	1.32	1.17 / 1.49	0.000	4761
Dante et al. 2015	1.29	1.13 / 1.48	0.000	4786
Lancia et al. 2018	1.22	1.03 / 1.44	0.019	2656
Mulholland et al. 2008	1.28	1.11 / 1.49	0.001	3720
Pryjmachuk et al. 2008	1.38	1.19 / 1.59	0.000	3812

Favour Technical or Vocational school   Favour Classical, Science, Academic, or Ordinary school
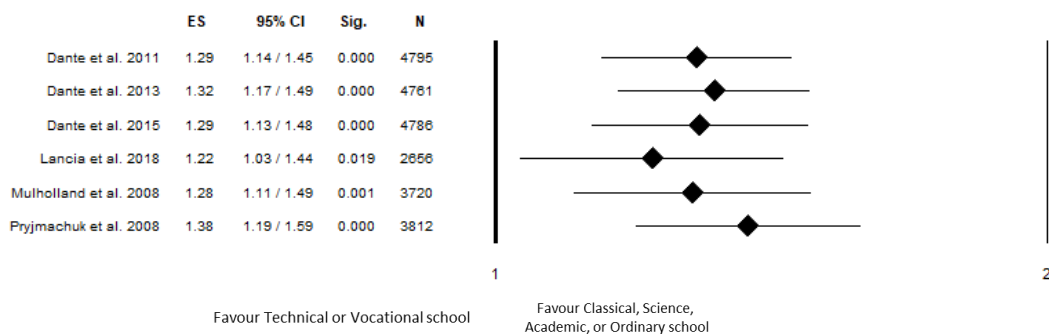
Figure 23. Sensitivity analysis for the meta-analysis comparing students who had attended Classical, Science, Academic, or Ordinary secondary schools and those who had attended Technical or Vocational secondary schools [outcome 'graduation within the legal duration of the program' (Odds ratio)].
ES = Effect size (OR), 95% CI = 95% Confidence Interval, Sig. = Statistical significance, N = Total sample.

	ES	95% CI	V	SE	Sig.	N	N1	N2
Dante et al. 2011	0.38	0.10 / 0.66	0.02	0.14	0.009	2644	1644	1000
Dante et al. 2013	0.37	0.08 / 0.67	0.02	0.15	0.012	2616	1634	982
Dante et al. 2015	0.37	0.09 / 0.64	0.02	0.14	0.009	2641	1641	1000
Lancia et al. 2018	0.42	0.04 / 0.81	0.04	0.20	0.033	483	323	160
Wilson et al. 2011	0.47	0.33 / 0.61	0.00	0.07	0.000	2660	1658	1002

Higher secondary school grades in 'not success' students   Higher secondary school grades in 'success' students
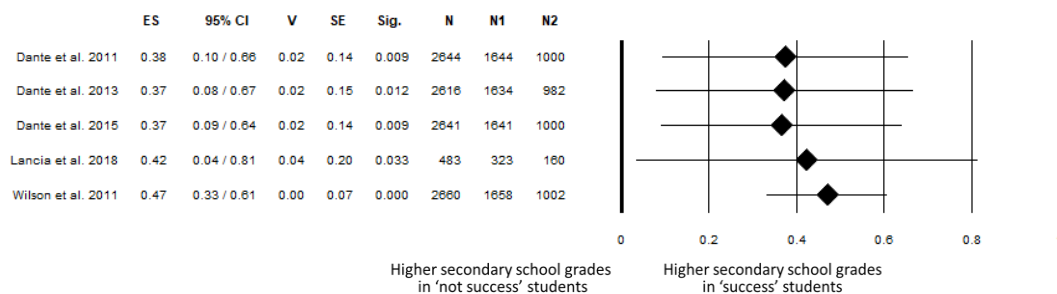
Figure 24. Sensitivity analysis for the meta-analysis comparing standardized mean differences of students' secondary school grades [outcome 'graduation within the legal duration of the program' (Cohen's *d*)].
ES = Effect size (Cohen's *d*), 95% CI = 95% Confidence Interval, W = Weight, V = Variance, SE = Standard error, Sig. = Statistical significance, N = Total sample, N1 = 'Success students', N2 = 'Lack of success students'.

	ES	95% CI	Sig.	N
Dante et al. 2011	1.69	0.34 / 8.33	0.520	453
Salamonson et al. 2011	2.11	0.56 / 7.97	0.271	218
Wilson et al. 2011	0.85	0.55 / 1.31	0.454	469

Favour not having had work experience in nursing — Favour having had work experience in nursing
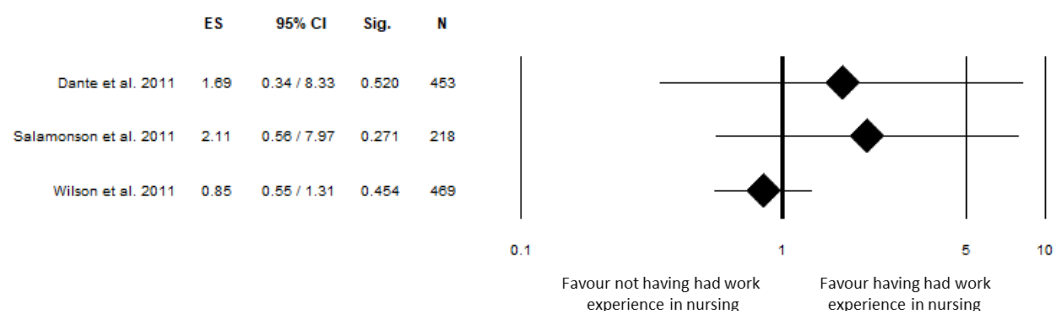
Figure 25. Sensitivity analysis for the meta-analysis comparing students who have had working experience in the nursing field before attending the nursing program and those who have not had working experience [outcome 'graduation within the legal duration of the program' (Odds ratio)].
ES = Effect size (Odds ratio), 95% CI = 95% Confidence Interval, Sig. = Statistical significance, N = Total sample.

	ES	95% CI	Sig.	N
Dante et al. 2011	1.90	1.13 / 3.20	0.016	265
Dante et al. 2013	1.28	0.66 / 2.46	0.464	237
Dante et al. 2015	1.38	0.65 / 2.94	0.402	262

Favour > 30 minutes to university — Favour ≤ 30 minutes to university
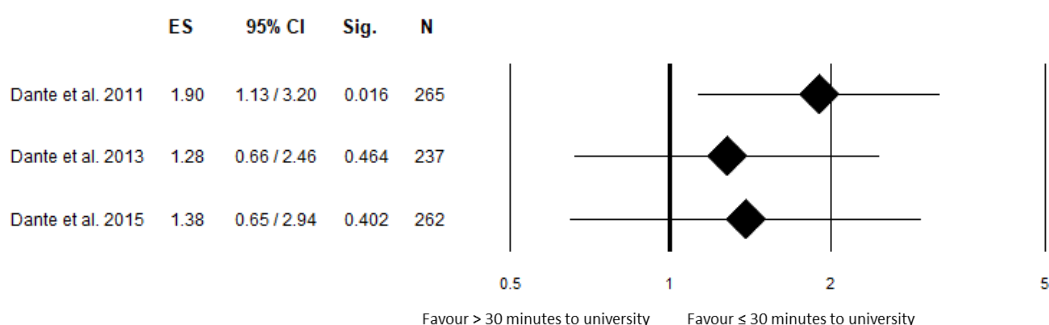
Figure 26. Sensitivity analysis for the meta-analysis comparing students who used to spend ≤ 30 minutes to reach the university with students who used to spend more time [outcome 'graduation within the legal duration of the program' (Odds ratio)].
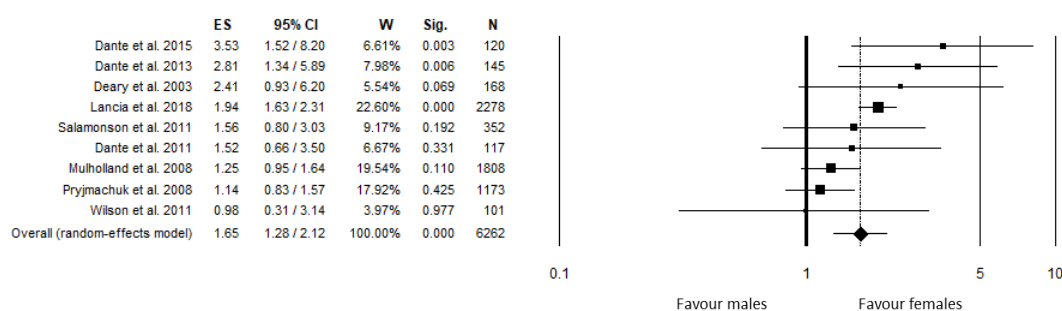ES = Effect size (Odds ratio), 95% CI = 95% Confidence Interval, Sig. = Statistical significance, N = Total sample.

	ES	95% CI	Sig.	N
Dante et al. 2011	1.18	0.80 / 1.74	0.403	497
Dante et al. 2013	1.14	0.76 / 1.71	0.527	469
Salamonson et al. 2011	0.97	0.58 / 1.61	0.892	262

Favour students who did not use to work — Favour students who used to work
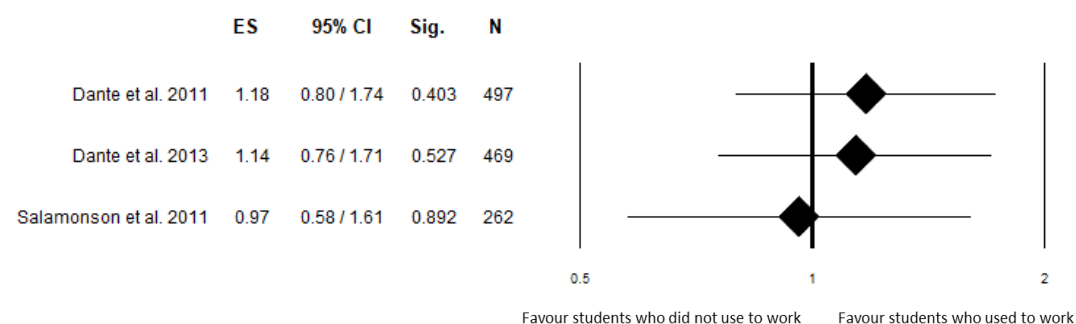
Figure 27. Sensitivity analysis for the meta-analysis comparing students who used to work while attending the nursing program with students who did not use to work [outcome 'graduation within the legal duration of the program' (Odds ratio)].
ES = Effect size (Odds ratio), 95% CI = 95% Confidence Interval, Sig. = Statistical significance, N = Total sample.

| Investigated variable	k	Meta-analysis results	Heterogeneity	Study design as possible cause of heterogeneity	Sensitivity analysis
Students were native speaker of the language of the Country where the study was conducted	4	Not associated with the outcome	Substantial	Yes. In prospective cohort studies the variable was significantly associated with the outcome, as opposed to retrospective cohort studies	Confirmed the meta-analysis results
Age	6	Not associated with the outcome	Moderate	No. In both the groups of prospective and retrospective cohort studies the variable was not associated with the outcome	Did not completely confirm the meta-analysis results
Female gender	8	Associated with the outcome	Moderate	Yes. In both the groups of prospective and retrospective cohort studies the variable was significantly associated with the outcome	Confirmed the meta-analysis results
Students had attended Classical, Science, Academic, or Ordinary secondary schools	6	Associated with the outcome	Absent	Subgroup analysis not needed	Confirmed the meta-analysis results
Secondary school grades	5	Higher grades were associated with the outcome	Substantial	No. In prospective cohort studies higher grades were significantly associated with the outcome, as opposed to retrospective cohort studies	Confirmed the meta-analysis results
Students have had work experience before attending the nursing program	2	Not associated with the outcome	Absent	Subgroup analysis not needed	Not feasible

Students have had work experience in the nursing field before attending the nursing program	3	Not associated with the outcome	Substantial	Not performed: it is overlapping with the sensitivity analysis	Confirmed the meta-analysis results
Students used to spend ≤ 30 minutes to reach the university with students	3	Not associated with the outcome	Very low	Subgroup analysis not needed	Confirmed the meta-analysis results
Students used to work while attending the nursing program	3	Not associated with the outcome	Absent	Subgroup analysis not needed	Confirmed the meta-analysis results
Weekly hours of work while attending the nursing program	2	Not associated with the outcome	Considerable	Subgroup analysis not feasible	Not feasible
Students used to volunteer while attending the nursing program	2	Not associated with the outcome	Absent	Subgroup analysis not needed	Not feasible
Students had experienced life events while attending the nursing program	2	Not associated with the outcome	Considerable	Subgroup analysis not feasible	Not feasible
Students had experienced economic hardship while attending the nursing program	2	Not associated with the outcome	Absent	Subgroup analysis not needed	Not feasible
Students had faced family commitments while attending the nursing program	2	Not associated with the outcome	Considerable	Subgroup analysis not feasible	Not feasible

Table 7. Summary of the results of meta-analysis, assessment of heterogeneity considering the study design for subgroup analysis, and sensitivity analysis as regards the outcome 'graduation within the legal duration of the program'.

2.3.4.1.2 Assessment of reporting biases

The assessment of the publication bias was feasible for the meta-analysis regarding the association of the academic success with the variables 'native speaker of the language of the Country where the study was conducted', 'age', 'gender', 'secondary school attended', 'secondary school grades', 'having had work experience in the nursing field before attending the nursing program', 'time spent to reach the university', and 'working while attending the nursing program'. For all the meta-analyses no publication bias was detected since the results of the tests Begg and Mazumdar's rank correlation as well as Egger's linear regression were not statistically significant. However, in some meta-analyses the failsafe number was very low or equal to zero, highlighting the need of further research regarding some potentially associated factors (Figure 28 to 35).
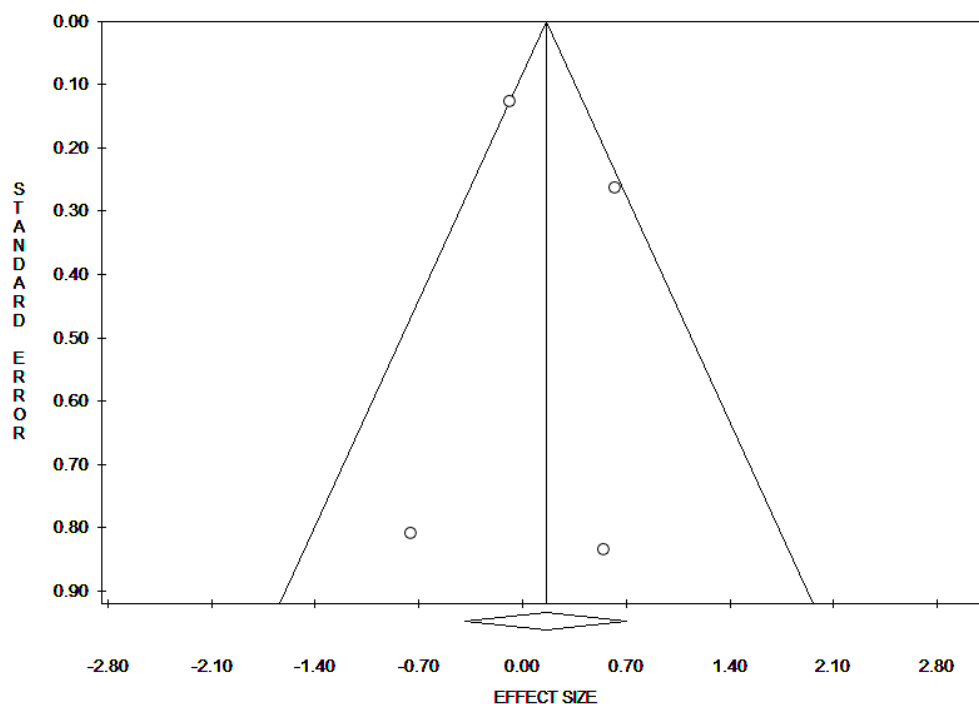
Figure 28. Funnel plot to assess the publication bias for the meta-analysis comparing students who were native speaker of the language of the Country where the study was conducted and students who were not [outcome 'graduation within the legal duration of the program' (Effect size = Odds ratio)].
Begg and Mazumdar's rank correlation test p = 0.497, Egger's linear regression test p = 0.746.
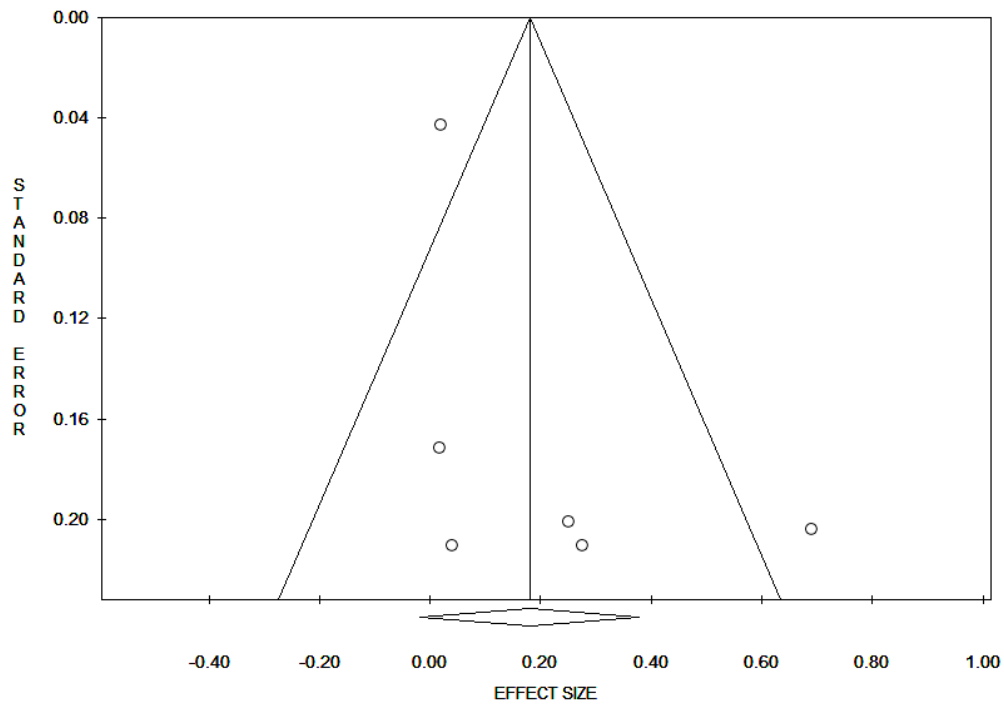
Figure 29. Funnel plot to assess the publication bias for the meta-analysis comparing standardized mean differences of students' age [outcome 'graduation within the legal duration of the program' (Effect size = Cohen's *d*)].
Begg and Mazumdar's rank correlation test p = 0.091, Egger's linear regression test p = 0.149.
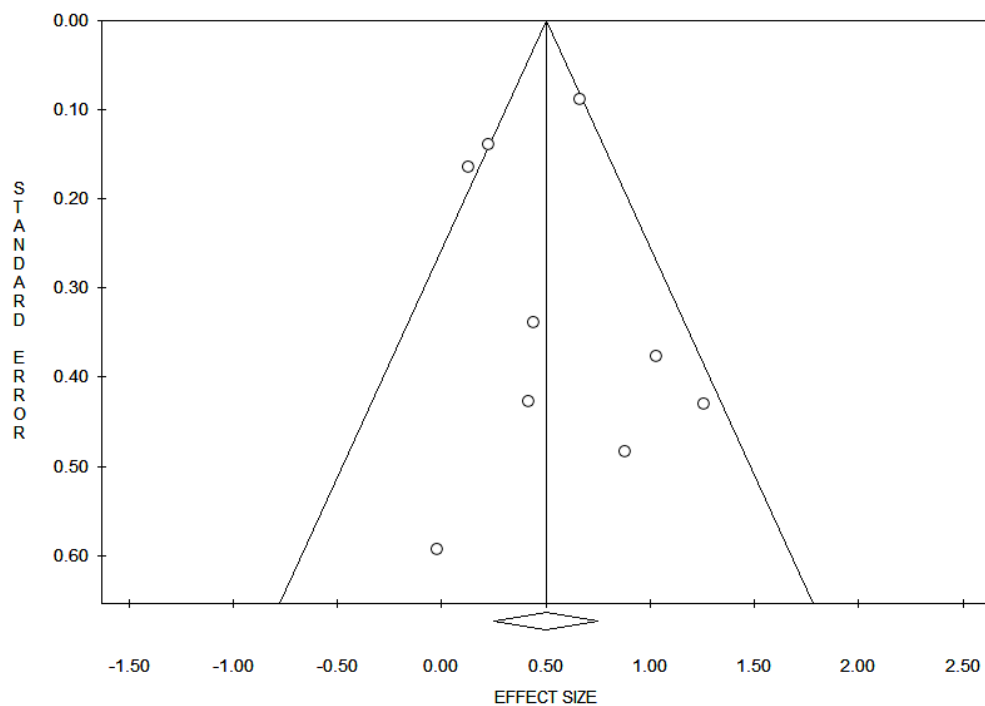
Figure 30. Funnel plot to assess the publication bias for the meta-analysis comparing males and females [outcome 'graduation within the legal duration of the program' (Effect size = Odds ratio)].
Begg and Mazumdar's rank correlation test p = 1.000, Egger's linear regression test p = 0.901.
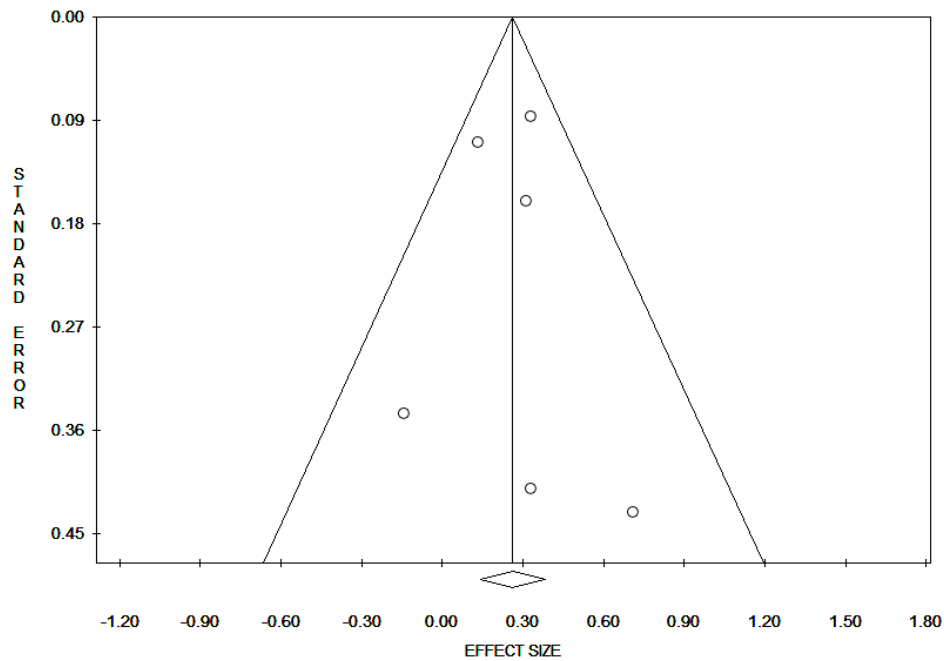
Figure 31. Funnel plot to assess the publication bias for the meta-analysis comparing schools and those who had attended Technical or Vocational secondary schools [outcome 'graduation within the legal duration of the program' (Effect size = Odds ratio)].
Begg and Mazumdar's rank correlation test p = 0.851, Egger's linear regression test p = 0.995.
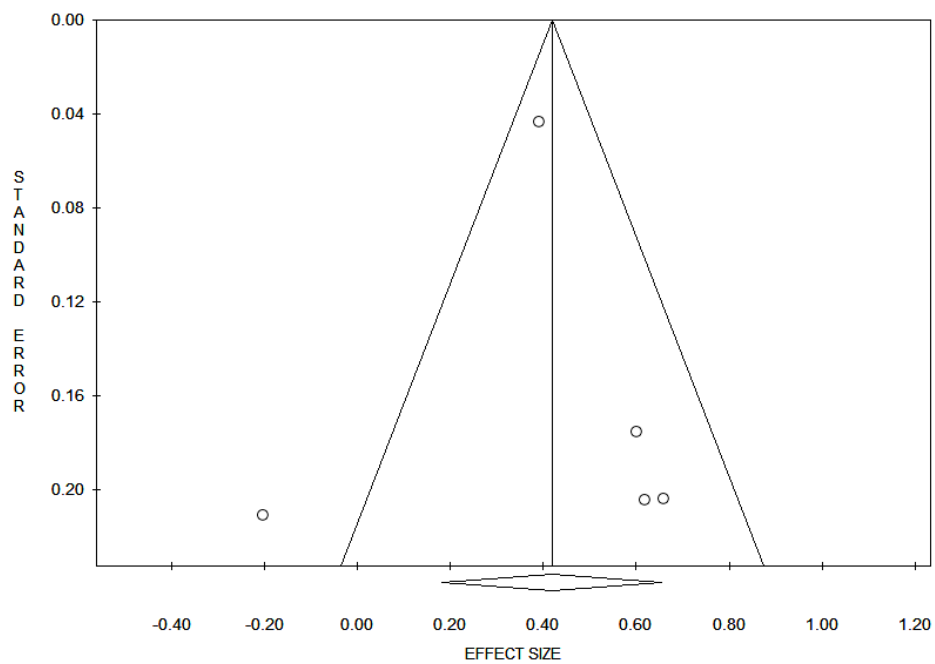
Figure 32. Funnel plot to assess the publication bias for the meta-analysis comparing standardized mean differences of students' secondary school grades [outcome 'graduation within the legal duration of the program' (Effect size = Cohen's *d*)].
Begg and Mazumdar's rank correlation test p = 0.624, Egger's linear regression test p = 0.890.

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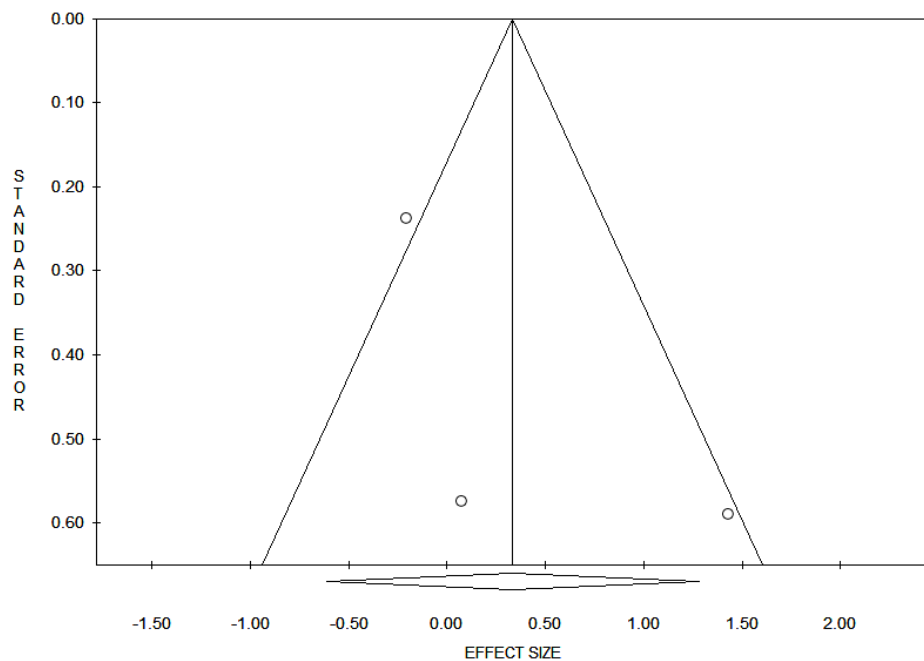
Figure 33. Funnel plot to assess the publication bias for the meta-analysis comparing students who have had working experiences in the nursing field before attending the nursing program and those who have not [outcome 'graduation within the legal duration of the program' (Effect size = Odds ratio)].

Begg and Mazumdar's rank correlation test p = 0.117, Egger's linear regression test p = 0.425.
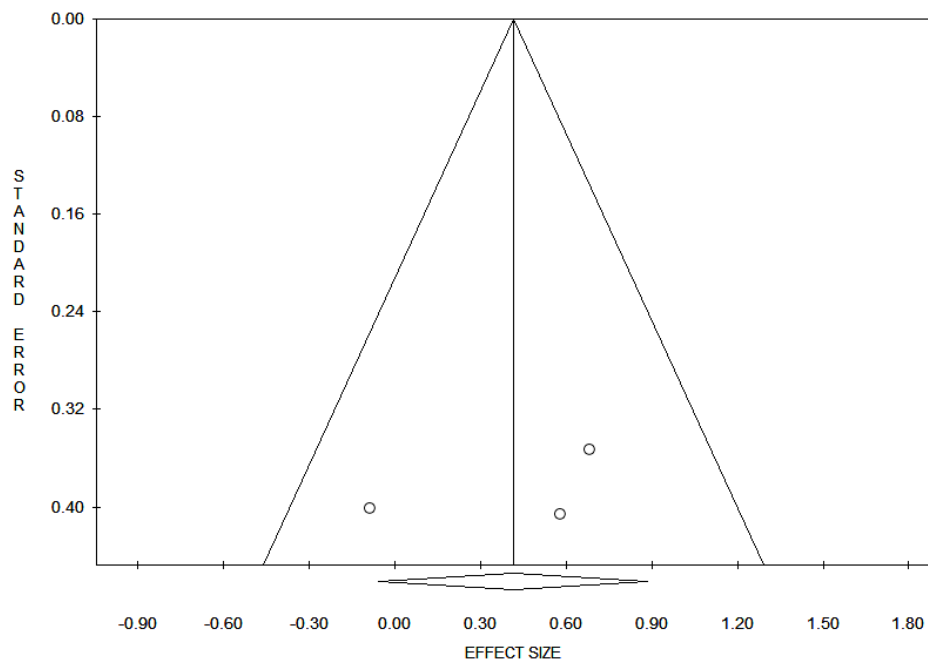
Figure 34. Funnel plot to assess the publication bias for the meta-analysis comparing students who used to spend ≤ 30 minutes to reach the university with students who used to spend more time [outcome 'graduation within the legal duration of the program' (Effect size = Odds ratio)].

Begg and Mazumdar's rank correlation test p = 0.602, Egger's linear regression test p = 0.610.
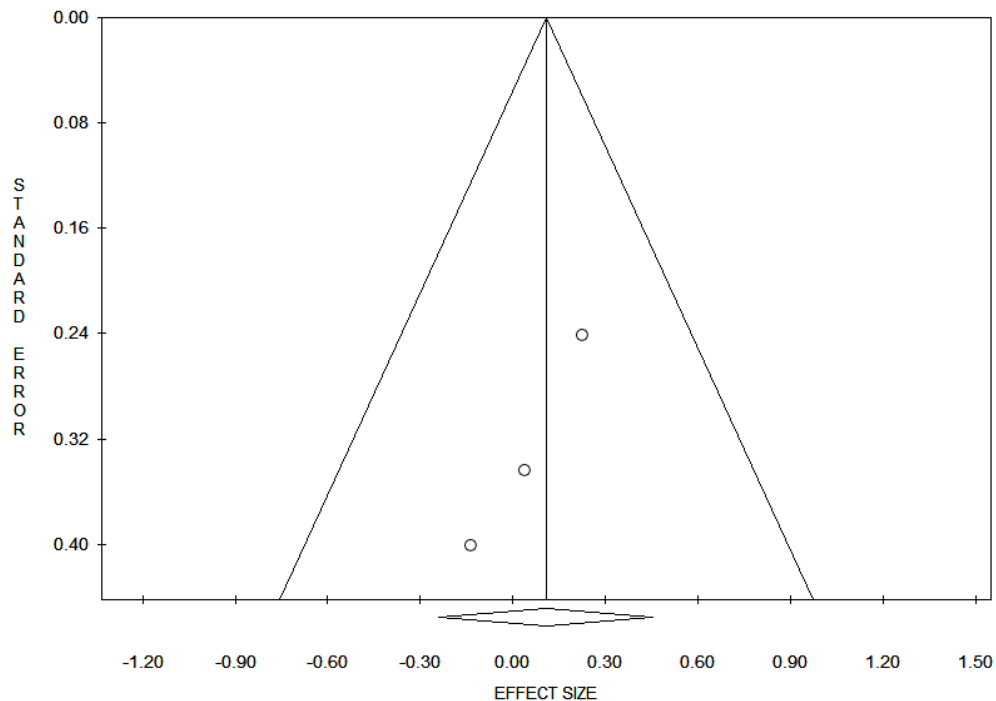
Figure 35. Funnel plot to assess the publication bias for the meta-analysis comparing students who used to work while attending the nursing program with students who used not [outcome 'graduation within the legal duration of the program' (Effect size = Odds ratio)].
Begg and Mazumdar's rank correlation test p = 0.117, Egger's linear regression test p = 0.081.

2.3.4.2 Narrative synthesis of studies not meta-analyzed for the outcome academic success defined as graduation within the legal duration of the program

In regard to the associated variables for which meta-analyses were conducted referring to the outcome academic success defined as 'graduation within the legal duration of the program', studies performed by Dante et al., in 2011, and Mulholland et al., in 2008, reported an adjunctive piece of information that was not included in meta-analyses. In Dante et al., 2011, such data are referred to the role of the variable range of age of the students (≥ 26 years and < 25 years) that did not reveal to be a significant predictor of the outcome in a multivariate predictive model (15). Nevertheless, Mulholland et al. pointed out a significant difference among the groups of students with different age (cut-offs considered: 21, 26, and 33 years), highlighting an association between the frequency of success and older age of students (28).

Moreover, data that cannot be included in a meta-analysis assessing the role of several other variables referring to the outcome academic success defined as 'graduation within the legal duration of the program' were collected from the included studies. In this regard, one study focused on students' origin: Mulholland et al., in 2008, investigated the role of the ethnicity

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of the students and found the ethnic groups Irish and African American to be positively associated with the outcome. Moreover, they found an association between the requirement of a visa for students to stay in UK as associated positively associated with the outcome (28). Other studies focused on the cultural background of students before applying to the nursing program: Dante et al., in 2011, questioned whether having awarded the secondary school diploma in Countries with different school systems than the Country of conduction of the study (Italy) and revealed no association with the outcome, even though it was assessed on very few students (15); Wilson et al., in 2011, found and association between academic success and having known a nurse, as opposed to the subjects studied during the secondary school education and the type of secondary school attended (private or government) (51). However, also the role of another variable regarding students before applying the nursing program were assessed in one study: Dante et al., in 2013, investigated the role of having attended a period of volunteer work and found no association with the academic success (43). The role of the personality traits and other mental features of students were assessed in three studies and always revealed to be associated with the academic success: conscientious and agreeable personality traits were found as positively associated and predictive of the outcome by Deary et al., in 2003, differently from students' general mental ability, other personality traits (i.e., neuroticism, extraversion, and openness), psychological distress, and degree of use of coping strategies (44); Pitt et al. assessed the role of personal qualities and critical thinking skills of the same sample of students in 2014 and 2015, respectively, and found resilience and entry critical thinking scores of students as predictive of academic success through multivariate models, differently from other personal qualities of students (i.e., narcissism, aloofness, confidence, empathy, involvement, detached, moral orientation, and self-control) (48, 49).

Several studies focused on the moment of application to the nursing program, both from the student's and institution point of view: Dante et al., in 2013, assessed whether students who had chosen to enroll in a nursing program after having achieved another academic degree reported higher frequency of success and found no association (43); Dante et al., in 2015, assessed whether students who had chosen to enroll in a nursing program as first choice reported higher frequency of success and found no association (13); Lancia et al., in 2018, and Wilson et al., in 2011, reported no predictive power and association, respectively, of the admission score to the nursing program (described as a written test in Lancia et al. and with an entrance interview in Wilson et al.) referring to the outcome (17, 51); conversely, Dante et al., in 2011, described both an association and a positive predictive power of an higher

ranking awarded in the admission written test score to the nursing program (15); finally, also Brimble, in 2015, and Mulholland et al., in 2008, reported contrasting results about the role of the entry route of nursing students in the program since Brimble reported a difference in the academic success of students in accordance with their method of enrolment, as opposed to Mulholland et al. (28, 42).

Finally, three studies also focused on variables regarding the period in which students attended the nursing program: Dante et al., in 2011, described a positive association between the outcome and the variables working less than 16 hours/week while attending the program, not having had learning difficulties during the program, having never failed the annual practical clinical assessment, not having had intention to leave the program, differently form the variable number of exams failed on theoretical courses which was not associated with the outcome (15); Dante et al., in 2013, found no association between the outcome and both having performed or not volunteer work and hours of volunteer work eventually performed while attending the nursing program (43); finally, Mulholland et al., in 2008, reported no association between the outcome and student's absence rates (28).

2.3.5 Synthesis of data: academic success defined as graduation not considering the time spent

Among the 1,687 students involved in the studies that considered 'graduation not considering the time spent' as the definition of academic success (n = 3), 73.0% of them graduated, with a slight variability among the studies (range 71.0% - 81.8%) (Table 8).

Study ID	First author, year	Sample	Success students (N)	% of success students
2	Byrd et al., 1999	278	197	71.0%
14	Pryjmachuk et al., 2008	1,173	841	71.7%
15	Sadler, 2003	236	193	81.8%
	Total	**1,687**	**1,231**	**73.0%**

Table 8. Frequency of academic success defined as graduation not considering the time spent.

In regard to the associated variables, two studies focused on students' origin: Byrd et al., 1999 and Pryjmachuk et al., 2008, investigating the role of the ethnicity of the students and found contrasting results since Pryjmachuk et al. revealed no significant association with the outcome (50), while Byrd et al. included such variable in two out of three significant

predictive models, revealing that nonwhites had a lesser probability for success (27). As regards demographic variables, two studies focused on students' age: Byrd et al., in 1999, included such variable in three multivariate analyses, along with other variables referred to different time points of students' educational pathway, and reported younger age as a predictor of success (27); however, Pryjmachuk et al., in 2008, reported a model where a significant predictive power of older age referring to the academic outcome was highlighted (50). Pryjmachuk et al. also investigated about the association of gender and revealed no significant association regarding; moreover, they highlighted a significant predictive power of success for the lower educational qualification owned by students at entry compared to others entry qualifications (regression model) (50). Finally, the role of the Grade Point Average (GPA) achieved by students in the secondary school was assessed by Byrd et al., 1999 and Sadler, 2003. In this regard, Sadler found an higher GPA to be associated with graduation (29), while Byrd et al. assessed the predictive power of overall, science, and social science GPA and included overall and science GPA as positive significant predictors of the outcome only when considered at enrollment; the overall GPA remained in the model as significant predictor after the first semester of the nursing program, while the social science GPA revealed to be a negative significant predictors of the outcome when considered at the end of the second semester (27).

The study performed by Sadler in 2003 focused on the moment of application to the nursing program, revealing lower scores achieved in the admission essay by 'lack of success' students (29).

Finally, two studies also focused on variables regarding the period in which students attended the nursing program: Byrd et al., 1999 and Pryjmachuk et al., 2008. In the first study, the authors tested different predictive models including variables collected at different time points of the educational pathway of nursing students assessed and highlighted the positive predictive power of pharmacology grades at the end of the first semester (model 2A, Table 4, in Appendix), as well as the negative and positive predictive power of social science and first med-surg course at the end of the second semester, respectively (model 3A, Table 4, in Appendix) (27). The authors of the second study investigated the association of the outcome with the cohort of which the student was a member, the nursing specialty the student was attending, the healthcare provider the student was allocated to, as well as the 'localness' of the students (i.e. the distance of their original town and domicile from the campus) and they just revealed a significant difference regarding academic success among the ten 'host trusts'

attended by students, despite they did not specify which trust reported higher frequency of graduated students (50).

2.3.6 Synthesis of data: academic lack of success defined as failure (due to not achieving the required standards)

The study performed by Byrd et al., in 1999 (27), considered the definition of academic lack of success as failure (due to not achieving the required standards) and was not complementary to the definition of success considered in the study. Among the 278 included students, 7.9% failed in the achievement of the required standards and were dismissed from the program (after a second failure in a nursing course or two failures in different nursing courses) (Table 9).

Study ID	First author, year	Sample	Failure students (N)	% of failure students
2	Byrd et al., 1999	278	22	7.9%
	Total	**278**	**22**	**7.9%**

Table 9. Frequency of academic lack of success defined as failure (due to not achieving the required standards).

In Byrd et al., 1999 the authors tested different predictive models including variables collected at different time points of the educational pathway of nursing students and highlighted that significant predictors of failure at enrollment were older age, nonwhite ethnicity, and lower science and pre-nursing GPA; significant predictors of failure at the end of the first semester were older age, lower science GPA (before enrollment), lower grades achieved in pharmacology and introduction to nursing; significant predictors of failure at the end of the second semester were nonwhite ethnicity and lower grades achieved in pharmacology, introduction to nursing, first medical-surgical course, and fundamental of nursing (27).

2.3.7 Synthesis of data: academic lack of success defined as voluntarily drop out/withdrawal

Among the 4,355 students involved in the studies that considered 'voluntarily drop out/withdrawal' as the definition of academic lack of success (n = 7), 12.0% of them dropped out form the nursing programs, with great variability among the studies (range 5.7% - 35.5%) (Table 10).

Study ID	First author, year	Sample	Drop out students (N)	% of drop out students
7	Eherenfield et al., 1997	2,102	120	5.7%
8	Kevern et al., 1999	354	89	25.1%
9	Knopke, 1979	236	63	26.7%
12[+]	Pitt et al., 2014	138	49	35.5%
13[+]	Pitt et al., 2015			
14	Pryjmachuck et al., 2008	1,173	86	7.3%
16	Salamonson et al., 2011	352	113	32.1%
	Total	**4,355**	**520**	**12.0%**

Table 10. Frequency of academic lack of success defined as voluntarily drop out/withdrawal.

[+] Studies reporting data on the same sample, but different variables regarding the academic outcome.

In regard to the associated variables, three studies focused on students' origin and cultural background: Pryjmachuk et al., in 2008, found a significant association of the outcome with students' ethnicity, despite they did not specify which category reported a higher frequency of drop out (50); Eherenfield et al., in 1997, investigated about the possible association of the outcome with the immigrant status of students and did not find significant results (45); finally, Salamonson et al., in 2011, found that students who were not native speakers of the language of the Country where the study was conducted dropped out more frequently than their colleagues (30). In this regard, also Eherenfield et al., in 1997, reported a significant association of the outcome with low English pre-admission grades (45).

As regards demographic variables, three studies investigated the role of students' age and in two studies no association with the outcome was reported (30, 46), while in Pryjmachuk et al. a significant difference in students age based on the academic outcome was found, despite the authors did not specify which academic outcome category reported older age (50). Similarly, Pryjmachuk et al. investigated the role of gender and reported a significant association of the outcome with students' gender, despite they did not specify which category reported a higher frequency of drop out (50). However, other three studies assessed the role of gender and two of them reported no association with drop out (30, 46), while Eherenfield et al., in 1997, documented a higher frequency of drop out in males (45). Finally, Salamonson

et al., in 2011, questioned whether the marital status could be associated with the academic outcome and found not significant association (30).

Regarding features of students before applying the nursing program, Eherenfield et al., in 1997, documented a higher frequency of drop out in those who had not performed the army service before enrollment (45) and Salamonson et al., in 2011, reported no differences in the academic outcome according to previous nursing experiences owned by students (30). Moreover, the entry qualification owned by students at enrolment was significantly associated with drop out in the study performed by Pryjmachuk et al. (50), as opposed to the study performed by Kevern et al. in 1999 (46), despite Pryjmachuk et al. did not specify which category reported a higher frequency of drop out (50). In this regard, also a lower admission high school GPA revealed to be significantly associated with drop out in two studies (30, 47). The role of the personality traits and other mental features of students were assessed in three studies: order, dominance, and aggression personality traits were found as positively associated with the outcome by Knopke, 1979, differently from other personality traits, i.e. achievement, autonomy, succorance, change, and endurance (47); Pitt et al. assessed the role of personal qualities and critical thinking skills of the same sample of students in 2014 and 2015, respectively, and found them as not predictive of dropout through multivariate models (48, 49).

Two studies focused on the moment of application to the nursing program, highlighting no association of the outcome with the entry route of nursing students (46) and a lower science admission score awarded by drop out students compared to successful colleagues (47).

Finally, five studies also focused on variables regarding the period in which students attended the nursing program: Kevern et al., in 1999, and Pryjmachuck et al., in 2008, questioned whether the nursing specialty (branch) attended by students, the cohort they belong, and their hosting educational centre could be associated with students drop out. Kevern et al. highlighted no association of the outcome with such variables (46), while Pryjmachuck et al. found significant differences among the outcome categories according to the variables 'nursing branch' and 'host trust', despite they did not specify in which branch or trust they revealed and higher frequency of drop out (50). Moreover, lower GPA in the first (45, 47) and second (45) semester were pointed out to be associated with drop out, as opposed to students' perceived learning style (47). Finally, two studies assessed the possible association of the life conditions of students while attending the program: Pryjmachuck et al., in 2008, considered the 'localness' of the students (i.e. the distance of their original town and domicile

from the campus) and found no association with the outcome (50); while Salamonson et al., in 2011, investigated about the role of being employed in paid work and the average time spent working and pointed out no association of being employed with drop out, despite they revealed that drop out students used to work significantly more hours than their colleagues (30).

2.3.8 Synthesis of data: academic lack of success defined as continuous enrolment in the program

Among the 1,663 students involved in the studies that considered 'continuous enrolment in the program' as the definition of academic lack of success (n = 4), 25.4% of them were still enrolled in the nursing program, with moderate variability among the studies (range 21.0% - 37.8%) (Table 11).

Study ID	First author, year	Sample	Still enrolled students (N)	% of still enrolled students
12[+]	Pitt et al., 2014	138	43	31.2%
13[+]	Pitt et al., 2015			
14	Pryjmachuck et al., 2008	1,173	246	21.0%
16	Salamonson et al., 2011	352	133	37.8%
	Total	**1,663**	**422**	**25.4%**

Table 11. Frequency of academic lack of success defined as continuous enrolment in the program.
[+] Studies reporting data on the same sample, but different variables regarding the academic outcome.

In regard to the associated variables, two studies focused on students' origin and cultural background: Pryjmachuk et al., in 2008, found a significant association of the outcome with students' ethnicity, despite they did not specify which category reported a higher frequency of drop out (50); Salamonson et al., in 2011, found that students who were not native speakers of the language of the Country where the study was conducted continued to be enrolled over the legal duration of the program more frequently than their colleagues (30).

As regards demographic variables, two studies investigated the role of students' age and Salamonson et al., in 2011, pointed out no association with the outcome (30), while in Pryjmachuk et al. a significant difference in students age based on the academic outcome was found, despite the authors did not specify which academic outcome category reported older

age (50). Similarly, Pryjmachuk et al. investigated the role of gender and reported a significant association of the outcome with students' gender, despite they did not specify which category reported a higher frequency of continuous enrollment (50). However, also Salamonson et al. assessed the role of gender and documented no association with continuous enrollment (30). Finally, Salamonson et al., in 2011, questioned whether the marital status could be associated with the academic outcome and found not significant association (30).

Regarding features of students before applying the nursing program, Salamonson et al., in 2011, reported no differences in the academic outcome according to previous nursing experiences owned by students (30). The entry qualification owned by students at enrolment was significantly associated with continuous enrollment in the study performed by Pryjmachuk et al. (50), despite the authors did not specify which category reported a higher frequency of the outcome. Moreover, also a lower admission secondary school GPA revealed to be significantly associated with continuous enrollment (30). No predictive power of the outcome was pointed out for the personality traits (personal qualities and critical thinking skills) assessed by Pitt et al. in 2014 and 2015 on the same sample of students (48, 49).

Finally, two studies also focused on variables regarding the period in which students attended the nursing program. Pryjmachuck et al., in 2008, questioned whether the nursing specialty (branch) attended by students, the cohort they belong, and their hosting educational centre could be associated with students continuous enrollment and found significant differences among the outcome categories according to the variables 'nursing branch' and 'host trust', despite they did not specify in which branch or trust they revealed and higher frequency of continuous enrollment (50). Moreover, Pryjmachuck et al. considered the 'localness' of the students (i.e. the distance of their original town and domicile from the campus) and found no association with the outcome (50); while Salamonson et al., in 2011, investigated about the role of being employed in paid work and the average time spent working and pointed out no association of being employed with continuous enrollment, despite they revealed that still enrolled students used to work significantly more hours than their colleagues (30).

2.3.9 Synthesis of data: academic lack of success defined as drop out at seven years of follow-up

The study performed by Salamonson et al., in 2014 (31), considered the definition of academic lack of success as drop out at seven years of follow-up since they observed the same cohort of students included in Salamonson et al. in 2011 (30) for seven years since their enrollment. Among the 352 involved students, 33.5% dropped out after seven years (Table 12).

Study ID	First author, year	Sample	Drop out at seven years students (N)	% of drop out at seven years students
17	Salamonson et al., 2014	352	118	33.5%
	Total	**352**	**118**	**33.5%**

Table 12. Frequency of academic lack of success defined as drop out at seven years of follow-up.

Salamonson et al., in 2014, pointed out that at the six-year follow-up, students who had selected nursing as their first choice were more likely to have completed the program than those students who had not selected nursing as their first choice; there were no significant differences in drop out based on type of enrolment (part-time versus full-time) or students' enrolment category (local students versus international students). Moreover, logistic regression revealed that male students, students who worked more than 16 h per week during semester, and students who indicated nursing was not their first choice at entry into the program were significantly more likely to have dropped out of the program by the six-year follow-up (31).

2.4 Discussions

2.4.1 Characteristics of the included studies

The included studies were published from 1979 to 2018, identifying nursing students' academic pathway as both historical and still of current interest in the international literature. Such interest is likely due to the global nursing shortage and to the interest of HEIs to identify the best strategies to maximize nursing students' academic success, considering the social and economic implications of these issues (7, 10, 52, 53). However, the available evidence on this topic is still not enough to draw strong conclusions, especially concerning modifiable students' factors. Moreover, considering the lack of data from several European Countries, it would be valuable to obtain information about the academic progression pathway of nursing students in Europe after the Bologna Declaration (54). This would allow to compare data across different Countries and understand whether the standardization of the nursing programs produced similar results and improved students' academic outcomes in the involved Countries. Moreover, in order to improve the critical comparability of the evidence and the external validity of the research results, a more detailed description of the setting where the studies are conducted is recommended, especially considering the large heterogeneity of nursing programs worldwide.

In regard to the research methods, most studies revealed to be retrospective cohort, which likely ensured data availability. However, such methodology, usually performed through the analysis of administrative records, rarely allowed for the collection of data in multiple time points during the educational pathway. In fact, the analysis of administrative records was often integrated with the administration of questionnaires or interviews to the students, ensuring the internal validity of the studies. Therefore, it is recommended the future conduction of prospective longitudinal studies with multiple time points to investigate associated/predictive factors of nursing students' academic outcome. This methodology would ensure a better accuracy of data collection and allow to identify factors able to influence the academic outcomes, the evolution and changings of such factors during the program, as well as the periods of the educational pathway in which these factors particularly influence students' pathway. Therefore, after having identified crucial factors and time points during the educational pathway, HEIs will be able to quickly and better intervene in supporting students.

Seven different definitions of the academic outcome were considered in the included studies, highlighting a large heterogeneity in the investigation of the phenomenon in the literature. This pointed out the different methods of measures adopted in the involved HEIs and Countries to evaluate students' pathway and did not allow a complete summary of the literature. Therefore, it is strongly recommended to adopt a shared definition of the outcome for future research considering the point of view of HEIs and students, as well as the current healthcare needs of the population worldwide (4, 5). In this regard, a meeting point among the involved stakeholders could be to provide, in future studies, stratified results in accordance with different definitions of the outcome. However, the definition 'graduation within the legal duration of the program' should be always included in future investigations since it would ensure the comparability of the results and could allow to also perform cost-effectiveness analyses of the adopted supporting strategies. Instead, data on the academic outcome measured in longer time points would allow to evaluate the eventual need of lengthening the legal duration of the educational pathway.

2.4.2 Academic outcomes

Meta-analyses about the role of female gender, having attended a Classical, Scientific or Academic high school, and having reported higher final grades at the secondary school revealed a strong association of such variables with the academic success defined as graduation within the legal duration of the program. In fact, no publication bias was detected,

and the sensitivity analyses confirmed the meta-analytic results, despite some studies reported weaknesses regarding the external validity. Moreover, the detected heterogeneity in the meta-analyses about students' gender and secondary school grades seemed to be due to the study design, since the significant positive association of both female gender and higher grades with the outcome was confirmed in the prospective cohort studies group without heterogeneity among the pooled data. Therefore, these results contribute to outline the profile of the 'successful nursing student'. However, their main limitation is due to the nature of some of the involved variables, which, if used as selection criteria for nursing students, a part for the secondary school grades, would often be unethical and discriminatory. In this regard, secondary school grades, which mainly depend on students' commitment, should be considered when selecting nursing students. Future research should focus on modifiable student variables which HEIs and national policies are able to influence, as well as on the career progression of nurses (55, 56). In particular, considering the limited availability of evidence providing not significant but often heterogeneous results about the role of life and work conditions of students while attending the nursing program, as well as the quality of the clinical learning environment where the clinical placement is performed, further research is needed to explore the role of such variables in order to consider the implementation of organizational strategies for nursing students.

The limited availability of research about modifiable nursing students' factors was also highlighted in the narrative syntheses performed for all the definition of academic outcomes, since the literature revealed to be mainly focused on the role of students' unmodifiable factors, such as age, ethnicity, type of secondary school attended, and activities performed before enrolling in the program. In this regard, it would be useful to develop and assess the effectiveness of strategies aimed at early identifying and supporting students with high probability of lack of success. For example, after having identified modifiable factors and time points during the educational pathway that are crucial for students' success, it would be useful to develop a screening instrument that HEIs could administer during the educational pathway to detect student's risk of 'lack of success' and then develop appropriate tutoring strategies based on their risk level. The results of the narrative synthesis also suggest that some apparently unmodifiable factors of nursing students, such as personality traits and critical thinking, could influence students' pathway. Therefore, further research is needed to better outline their role and whether it is possible to enhance these cognitive features in order to support student's success. In fact, personality traits may be some of the unknown and modifiable factors that influence students' success. Moreover, contrasting results were found

about the role of the admission criteria and tests to access to the Nursing program, highlighting the wide differences of nursing student selection methods worldwide and their lack of effectiveness. Finally, as methodological issue related to the reporting of research results, the presentation of regression models results both through univariate and multivariate analyses is strongly recommended to ensure the external validity of the results.

Therefore, a radical change in the orientation of the future research on this topic is recommended to discover the influence of modifiable factors on students' success which have been underestimated thus far.

2.5 Conclusions

Being female, attending a Classical, Scientific or Academic high school, and reporting higher final grades in secondary school were strongly associated with academic success. In contrast, conflicting and limited evidence were found for the other factors assessed in the literature and it is strongly recommended to further investigate the role of modifiable student variables which HEIs and national policies are able to influence. This could allow for better selection of nursing students as well as the development and evaluation of strategies aimed at early supporting students identified with a high probability of lack of success. Further, the career progression of nurses should be considered when assessing academic success.

Chapter 3. International longitudinal study

3.1 Rationale and aim

In order to standardize and improve nursing educational pathways, as well as to encourage students' mobility, several efforts have been made in the European Union (EU) since 1999 with the Bologna Declaration (54). However, the homogeneity of nursing pathways still needs to be improved (25). Moreover, in the following years, also other Countries belonging to 'European space' but not included in the EU adhered to this Declaration (57-61). Among the Countries that adhered to the Bologna Declaration in 2003 (58), there is Albania. Therefore, the standardized curriculum features described in the Bologna Declaration have been adopted in a Country with a different socio-economic and cultural background compared to EU Countries. In this regard, nursing students' academic outcomes after such adoption have not been explored thus far. Therefore, the aim of this international longitudinal study was to critically evaluate and assess nursing students' academic success in the Albanian context, as well as its associated and predictive factors, after the adoption of the Bologna Declaration that was expected to standardize nursing educational pathways across the European space. Moreover, the study aim was to contribute to the international debate about the effects of micro- and meso-level variables on the academic outcomes of nursing students.

3.2 Methods

3.2.1 Study design

An international longitudinal study was conducted and reported according to the 'Strengthening the Reporting of Observational Studies in Epidemiology' (STROBE) guidelines (62).

3.2.2 Setting

The study was conducted in the Nursing Bachelor Program (NBP) of the University of Elbasan, which is the second largest university in Albania.

In Albania, nurses have been educated in academic programs since 1994, but they have been only in Bachelor Programs since 2009 (63) and, according to the Bologna Declaration (1999) and national law (64), Programs' features are homogeneous throughout Albania, giving local HEIs little possibility to customize the educational plans (54). In Albania, students must have had at least 12 years formal education (i.e. they have achieved a high school diploma) to be admitted in the NBP. To achieve the diploma from the high school, students must pass the

mandatory final exams (i.e. about Albanian language and literature, mathematics, and foreign language). However, students are allowed to apply to all university programs if the mean of all the grades achieved before performing the final exams (i.e. during the high school) is equal or above 6.5/10.0. In this case, students can perform final optional exams (i.e. about subjects chosen by the students) in addition to the mandatory ones. The minimum and maximum possible scores for each final exam are 20 and 60, respectively. Both mandatory and optional exams are designed, administered, and evaluated by the Educational Services Center. The Center also combines the scores achieved in the final exams (both mandatory and optional) and the grades achieved by the students during the high school, providing a total ranking of the students. According to such ranking and to ten preferences that the students are supposed to indicate when applying, they are admitted to a university program (64).

The NBP lasts 3 academic years (6 semesters) and requires students to obtain 180 university formative credits, which are equivalent to 4500 hours of academic education (1 credit = 25 hours) (64). Students acquire credits performing the following activities: 1) pass theoretical exams and attend practical workshops for a total of 150 credits during three years (19, 18, and 13 theoretical exams during the first, second, and third year, respectively); 2) attend the clinical placement and pass clinical placement exams for a total of 30 credits during three years (1 clinical placement exam per year). The academic year starts in October and each year the theoretical lessons are given from October to January and from March to June. Students must attend at least 75% of the theoretical lessons of each course to be admitted to each exam. During the three years, the students carry out 640 hours of clinical placement. Students start the clinical placement during the first year after 12 weeks of theoretical lessons (at the end of January) and perform it in March and April. They are expected to perform a scheduled number of hours per year (200 hours). For the placement, they have a 'reference guide', an experienced nurse who schedules students' activities, manage the organizational issues related to the placement, and act as a mentor. In the regular floors they attend during the placement, students are managed by the head nurse and usually follows the activities performed by the nurses employed in the floor. At the end of the year, the students are examined by nursing faculties (clinical placement exam). If students fail one or more exam, they are able to repeat the exam for an unlimited number of times during the designated exam periods (i.e. February-March, June-July, and September). In this situation students may end up needing more than three years to graduate and are considered 'out of program' with the expectation to pay regular taxes each year until they graduate or make the decision to drop out of the program. Students must take a minimum of 30 credits collected from

theoretical and clinical training to pass on to the following year. During the three years, students have the possibility to ask for a scholarship which is granted according to their income and academic results (65, 66). Moreover, students can apply for a scholarship that is granted to spend one semester in a European University (i.e. Italy, Poland, Romania or Turkey) where they can regularly perform their educational activities, according to the 'Erasmus Project' (67).

After acquiring 180 credits, students must pass a written examination or discuss a final dissertation in order to graduate. The final grade, which can vary from a minimum of 5 to a maximum of 10, is awarded based on the evaluation of the final exam or dissertation. In fact, each HEI sets the average grade threshold that students must have at the end of the first year to graduate only preparing and defending a final thesis. Graduation sessions can be scheduled in February, July, and September. In the involved university, sessions are scheduled in July and September (68). After graduating, nurses register in the national official list of nurses and perform three months of clinical placement with a tutor designed by the national nurses register organization. Afterwards, they undergo an interview and a written test to become a Licensed Nurse (63).

3.2.3 Participants

In October 2017 and 2018, all students at the end of the first year of the NBP were invited to participate in the study, involving two cohorts of students in the study.

3.2.4 Variables

At the end of each academic year, both micro- and meso-level independent variables of the students were collected. In order to ensure a complete investigation of the phenomenon and contribute to fill the literature gap, a discussion among three researchers and the Albanian Head of Nursing Department was performed, also considering the literature. The selected factors that have been investigated are reported as follows:

- Sociodemographic characteristics and previous education, i.e. academic year attended, matriculation number, birth date, gender, number of family members and number of children (if any), parents' highest educational level achieved and current job, type of secondary school attended and final grade achieved, and whether students had ever had a relative employed as nurse in their family. Moreover, students' level of cognitive empathy was assessed. Empathy is a personality trait

defined as the ability to understand the experience and point of view of the other human beings, as well as the ability to connect with their feelings (69).

- Activities performed before applying for the NBP, i.e. whether students had ever worked (and in which field) or attended any other educational program without graduating.

- Motivation to choose to be a nurse and perceived image of nurses, i.e. main reason of the choice, in which life period students decided to apply for the NBP, whether students indicated Nursing as first preference when applied at the university, approval of the family about the choice and whether students would advise a relative to become a nurse, whether students had participated in the 'open days' at the university, and the comparison between students' perceived image of nurses before enrolling and when filling the questionnaire, as well as the image of nurses provided by the media and the image perceived when filling the questionnaire.

- Life and study conditions while attending the just passed academic year of the NBP, i.e. place where students lived and cohabitants, distance from the university, mean used and time spent to reach the university, main source of economic support for the academic career, and whether students received a scholarship.

- Other activities performed, and trouble faced while attending the just passed academic year of the NBP (if any), i.e. whether students: worked or volunteered (and in which field, how long in months, and weekly time spent), participated in the 'Erasmus Project' (attending a semester abroad), faced familial burden (e.g. caregiving) and for how many months, experienced significant life events (e.g. family bereavement, wedding) or financial difficulties, faced personal health issues that did not allow to undertake one or more exams.

- Study sources and methods while attending the just passed academic year of the NBP, i.e. whether students: mainly utilized official (e.g. textbooks) or unofficial (e.g. web) sources of information, used to study alone or in group, and used to study every day or periodically during the semester or just before the exams.

- Learning difficulties experienced (if any) with main reason during the just passed academic year of the NBP and intention to leave the program during the just passed academic year of the NBP and main reason.

- Program evaluation referring to the just passed academic year of the NBP, i.e. whether students: experienced an educational pathway meeting their expectations regarding the study load, agreed if the NBP lasting would have been lengthened up

to four years. Moreover, always referring to the just passed academic year of the NBP, students were asked to express the perceived level of importance towards their education and their level of satisfaction about organizational features and services offered by the attended institutions. Such features and services concerned the following areas: relationship with persons, teaching, physical environments, clinical placement, and others. Finally, students were asked to express their global level of satisfaction about the program.

- Information about the very first clinical placement performed during the NBP, i.e. whether students: performed it in medical, surgical or other types of floors and had ever experienced a biological contamination (and number).

- Information about the clinical placement performed during the just passed academic year of the NBP, i.e. number of attended floors, whether in the attended floors students witnessed to any organizational changings, whether they met the 'reference guide' or electronically communicated with the guide and number of electronical communications (if any), whether students interrupted the placement for a period for any reason, which person was perceived as the main contributor to students' learning process, initial motivation of the students to attend the placement, and final level of satisfaction. Moreover, students' perception of the Clinical Learning Environment (CLE), defined as 'an interactive network of forces within the clinical setting that influence the students' learning outcomes' (70), was investigated.

The outcome considered was the academic success of the students defined as graduation within the legal duration of the program.

3.2.5 Data sources and measurement

Three data collection sessions were performed. In October 2017 and 2018, on three random chosen days of lesson, two researchers explained students that were at the end of their first year, the aim of the study and asked them to fulfill a paper-pencil questionnaire (in Attachment) after signing a written informed consent. Students were informed that participating in the study would never affect their academic career and that the matriculation number was needed just to ensure to be re-contacted for the following administrations of the questionnaire. Moreover, students were informed that after the final administration, data would have been anonymized to be analyzed and presented in aggregate form. In order to avoid data missing, the questionnaires were checked in the classroom before the end of the lesson and, in the case of missing data, the students were immediately asked to integrate the

information. For the cohort matriculated in the academic year 2016-2017, the administration of the questionnaire begun in October 2017 (T_0, i.e. the end of the first year), repeated in October 2018 (T_1, i.e. the end of the second year), and September 2019 (T_2, i.e. the end of the third year). For the cohort matriculated in the academic year 2017-2018, the administration of the questionnaire begun in October 2018 (T_0, i.e. the end of the first year) and repeated in October 2019 (T_1, i.e. the end of the second year). Figure 36 represents all the administrations of the questionnaire performed for each involved cohort. In September 2020, the cohort of students matriculated in 2017-2018 will undergo to the last administration of the questionnaire (T_2, i.e. the end of the third year).

Figure 36. Administrations of the questionnaire performed for each involved cohort.

The questionnaire included all the independent variables. Complex constructs were assessed through the following validated scales included in the questionnaire:

- 'Jefferson Scale of Empathy – Health Professional Students' (JSE-HPS) was used to assess students' cognitive empathy (71). The JSE-HPS underwent to the back-translation process in Albanian (72); factor analysis and validation were performed. The Albanian scale was valid and reliable ($\alpha = 0.72$); the manuscript about the validation is being prepared. The JSE-HPS is a self-administered scale composed of 20 items. The score is attributed to each item through a seven-level Likert scale, where 1 corresponds to 'strongly disagree' and 7 to 'strongly in agreement'. The overall score is obtained from the sum of the individual item scores and can range from a minimum of 20 to a maximum of 140 (73); no cut-off value has been established (71, 74, 75).

- 'Clinical Learning Environment and Supervision evaluation scale plus Nurse Teacher scale' (CLES+T) was used to evaluate students' perception of CLE (76). The CLES+T underwent to the back-translation process in Albanian (72); factor analysis and validation are under conduction. The CLES+T is a self-administered scale

composed of 34 items and five different factors, i.e. 'Pedagogical atmosphere' (9 items), 'Leadership style of the ward manager' (4 items), 'Premises of nursing in the ward' (4 items), 'Supervisory relationship' (7 items), 'Role of the nurse teacher' (0 items). For each item, students had to answer according to a five-level Likert scale where 1 corresponds to 'strongly disagree' and 5 to 'strongly in agreement'. The final score (for each factor and whole scale) is provided through a mean score; a higher score corresponds to a better perception of CLE (77).

The outcome was obtained through the list of graduates in the sessions of July and September 2019. The list was provided by the administrative office of the university.

A questionnaire identical to the paper one was created online by two researchers through the Google Modules platform during November and December 2017 and January 2018. Data entering was carried out in February and March 2018 after the first paper-administration, February and March 2019 after the second paper-administration, and in October 2019 after the last paper-administration. After each data entering, the compliance of data with the information reported in the paper-questionnaires was checked by two researchers independently to avoid the information bias. In October 2019, the outcome about the cohort matriculated in 2016-2017 was recorded in the Excel databases obtained from the Google Modules platform. Afterwards, the accuracy of data entering process was checked by two researchers independently to avoid the information bias.

3.2.6 Ethical considerations

The study complied with current legislation in Europe, Italy, and Albania on the protection of personal data. The ethical principles of the Declaration of Helsinki were respected throughout the study conduction (beneficence, nonmaleficence, autonomy and justice) (78).

3.2.7 Statistical methods

Only data regarding students matriculated in 2016-2017 were analyzed since the observation (and data collection) of students matriculated in 2017-2018 is not concluded yet. For data collected at each time point, descriptive (count with frequencies and mean with SD) and inferential statistics were carried out for data description and hypothesis testing, respectively. For data collected at each time point, bivariate analyses were performed for all the potential predictors (independent variables) referring to the outcome academic success. The features of 'success' and 'not success' students were compared through the χ^2 test (or, for dichotomic variables, Fisher exact when required) for categorical variables. For continuous variables, the features of 'success' and 'not success' students were compared through Mann-Whitney U

test considering the explorative nature of the study in the Albanian context. Variables associated with the outcome in the bivariate analyses ($p \leq 0.05$) were included in multivariate logistic regression models to predict students' academic success when feasible. All analyses were performed with SPSS software version 25.0 (IBM Corp., Armonk, NY, USA) with an accepted statistical error level ≤5%.

3.3 Results

Overall, n = 188 students matriculated in 2016-2017 were invited to participate and most of them were enrolled and participated in the first questionnaire administration at T_0 (n = 165). The 75.2% of students (n = 124) who participated at T_0 also participated at T_1; no statistically significant differences were found regarding the academic success frequency between drop out students and those who participated at T_1 (p = 0.751). The 60.5% of students (n = 75) who participated at T_1 also participated at T_2; however, the percentage of 'not success' students was significantly higher among drop out students compared to students who participated at T_2 (p = 0.022). Figure 37 shows participants study flow in detail.
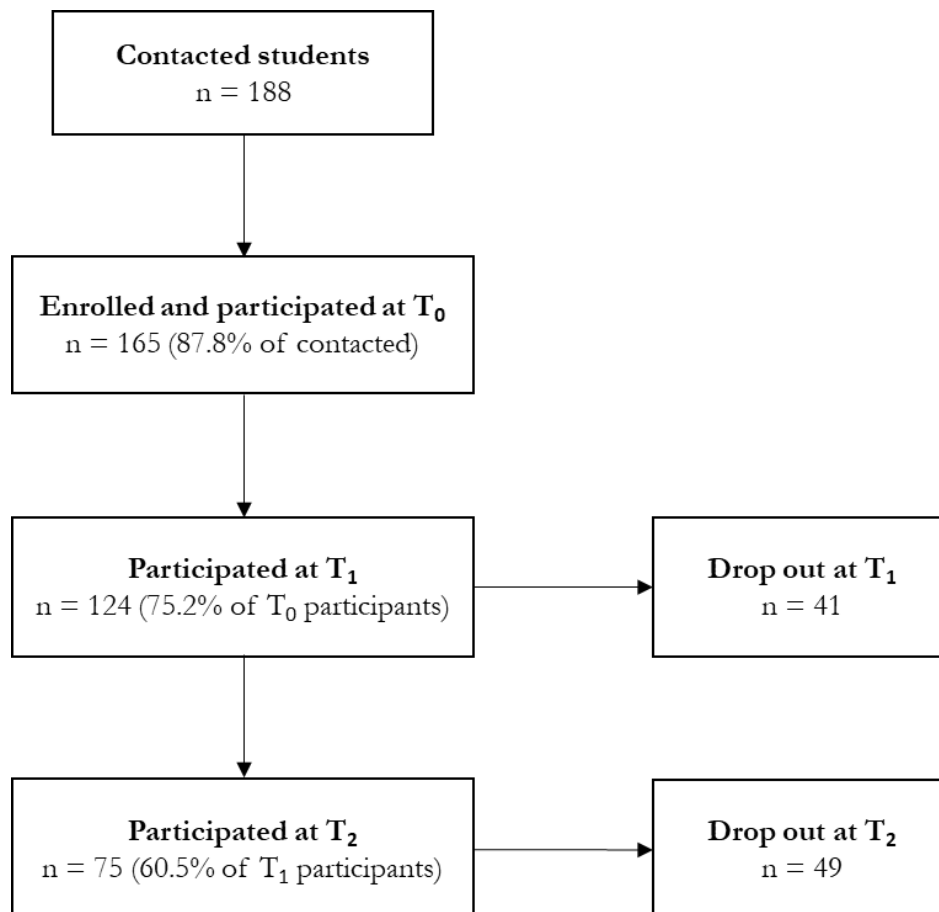
Figure 37. Participants study flow (students matriculated in 2016-2017).

3.3.1 First time point of data assessment: end of the first academic year (T_0)

3.3.1.1 Characteristics of the sample at T_0

At T_0, n = 165 students were enrolled and participated in the study. The involved students were very young (mean age was 19.2 years, SD = 0.7), lived in quite big families (mean number of family members was 5.0, SD = 1.3), did not have children, and most of them were female (84.8%). In regard to parents' educational level and job, most of students' parents had not achieve an academic degree and were mainly employed in low or medium qualified jobs. Moreover, a high frequency of unemployed parents was detected, especially among students' mothers, who were mainly housewives. Referring further to students' family characteristics, a few students declared to have had a family member employed as nurse (7.3%). Almost all the students had attended the high school before applying for the NBP, reported a mean final grade of 85.2 (SD = 7.4, maximum possible 100.0), and a mean level of empathy of 85.9 (SD = 6.9) (Table 13, in Appendix). Few students have had experiences as workers (13.3%) or in other educational programs without graduating (1.8%) (Table 14, in Appendix). Almost half of the students participated in the 'open days' at the university and 53.7% of the sample had indicated Nursing as first preference when applying for the NBP; most of the students indicated at T_0 an 'internal' motivation for choosing Nursing (e.g. aptitude for aiding people), declared at T_0 to have been approved from the family for the career choice and would advise a relative to become a nurse (Table 15, in Appendix). Most of the sample has been living in the city where the university was during the first year, while 33.9% of them were commuters. In this regard, despite students lived quite closer to the university (mean distance 5.9 km, SD = 13.6), students used to spend 24.1 (SD = 25.1) minutes on average to reach the university and 75.8% of them used to reach the university on feet. Regarding main students' financial support for the first academic year, most the sample indicated their family and 27.9% of the students received a scholarship (Table 16, in Appendix). During the first academic year of the NBP, few students worked or volunteered, attended the 'Erasmus Project', faced familial burden, and faced personal health issues that did not allow to undertake one or more exams. Instead, around half the sample experienced life events while attending the first academic year of the NBP and 59.4% of the students experienced financial difficulties (Table 17, in Appendix). In regard to students' study sources and methods, most of the students declared to study mainly individually and they mainly consulted official sources of information when studying during the first year. Moreover, they mainly used to study every day after lessons (64.2%) or periodically (26.7%) (Table 18, in

Appendix). However, most of the students experienced learning difficulties during the first year, that were mainly due to excessive material and lack of time to study. The 23.0% of the students declared to have thought to leave the NBP mainly for being concerned about their academic outcomes (Table 19, in Appendix). In regard to the program evaluation, students mainly perceived the first-year study load as more than expected (55.8%) and around half of the sample declared to agree if the NBP lasting would have been lengthened up to four years. Albanian students acknowledged a quite high level of importance towards their education to all the investigated organizational features and services offered by the university and reported lower level of satisfaction for these factors. In this regard, the difference between students' level of satisfaction and perceived level of importance was negative for all the investigated factors (Table 20, in Appendix). During their very first clinical placement, students mainly attended medical floors and 23.0% of them declared to have been exposed to biological material with 4.6 mean (SD = 4.8) expositions per student (Table 21, in Appendix). During the whole first-year clinical placement, students attended on average 4.1 (SD = 1.0) floors and were poorly aware of the occurrence of organizational changings in the attended floors. Most of the students declared to have been motivated before attending the first-year clinical placement and only the 8.5% of them declared to have interrupted the placement for a period during the first year. Moreover, almost all the students met the reference guide before or during the placement, while few of them electronically communicated with the guide. Finally, half of the students indicated both reference guide and clinical tutors as the person perceived as the main contributor to their learning process and reported a good perception of CLE in all the dimensions (total mean score 3.8, SD = 0.7) (Table 22, in Appendix).

3.3.1.2 Associated factors and predictive models about students' academic success and factors assessed at T_0

The detected frequency of students' academic success was 65.5% (i.e. n = 108 out of 165 students). Academic success revealed to be associated with having never worked before enrolling in the NBP (p = 0.009) and 'individual' as study method during the first year (p = 0.049) (Table 23 to 32, in Appendix).

Both variables that were associated with the outcome in the bivariate analyses revealed to be significant predictors of students' success. In fact, students who had never worked before applying for the NBP and students who used to study individually during the first year reported a higher probability of academic success compared to their counterpart (Table 33).

	β	OR	95% CI	p-value
Had ever worked				
Yes*	--	--	--	--
No	1.264	3.539	1.402 to 8.934	0.007
Study method				
In group*	--	--	--	--
Individual	2.282	9.800	1.062 to 90.408	0.044

Table 33. Academic success predictive model in Albanian students at the end of the first year.
*Reference category

3.3.2 Second time point of data assessment: end of the second academic year (T_1)

3.3.2.1 Characteristics of the sample at T_1

At T_1, n = 124 students participated in the study. The involved students were very young (mean age was 20.2 years, SD = 0.7), lived in quite big families (mean number of family members was 4.9, SD = 1.1), did not have children, and most of them were female (85.5%). In regard to parents' educational level and job, most of students' parents had not achieve an academic degree and were mainly employed in low or medium qualified jobs. Moreover, a high frequency of unemployed parents was detected, especially among students' mothers, who were mainly housewives. Referring further to students' family characteristics, a few students declared to have had a family member employed as nurse (15.3%). Almost all the students had attended the high school before applying for the NBP, reported a mean final grade of 86.3 (SD = 6.9, maximum possible 100.0), and a mean level of empathy of 111.8 (SD = 12.7) (Table 34, in Appendix). Few students have had experiences as workers (17.7%) or in other educational programs without graduating (0.8%) (Table 35, in Appendix). Slightly more than half of the students participated in the 'open days' at the university and 58.7% of the sample had indicated Nursing as first preference when applying for the NBP; most of the students indicated at T_1 an 'internal' motivation for choosing Nursing (e.g. aptitude for aiding people), would advise a relative to become a nurse, and all the students declared at T_1 to have been approved from the family for the career choice (Table 36, in Appendix). Most of the sample has been living in the city where the university was during the second year, while 27.4% of them were commuters. In this regard, despite students lived quite closer to the university (mean distance 6.1 km, SD = 12.7), students used to spend 27.6 (SD = 28.3)

minutes on average to reach the university and 69.4% of them used to reach the university on feet. Regarding main students' financial support for the second academic year, most the sample indicated their family and 27.4% of the students received a scholarship (Table 37, in Appendix). During the second academic year of the NBP, few students worked or volunteered, attended the 'Erasmus Project', and faced personal health issues that did not allow to undertake one or more exams. Instead, 25.0% of the students faced familial burden, half the sample experienced life events and financial difficulties while attending the second academic year of the NBP (Table 38, in Appendix). In regard to students' study sources and methods, almost all the students declared to study individually, and they mainly consulted official sources of information when studying during the second year. Moreover, they mainly used to study every day after lessons (63.7%) or periodically (30.6%) (Table 39, in Appendix). However, most of the students experienced learning difficulties during the first year, that were mainly due to excessive material and lack of time to study. The 9.7% of the students declared to have thought to leave the NBP mainly for being concerned about their academic outcomes (Table 40, in Appendix). In regard to the program evaluation, students mainly perceived the second-year study load as adequate (58.1%), though 40.3% of them perceived it as more than expected and 29.0% of the sample declared to agree if the NBP lasting would have been lengthened up to four years. Albanian students acknowledged a quite high level of importance towards their education to all the investigated organizational features and services offered by the university and reported lower level of satisfaction for these factors. In this regard, the difference between students' level of satisfaction and perceived level of importance was negative for all the investigated factors (Table 41, in Appendix). During their very first clinical placement, students mainly attended medical floors and 25.8% of them declared to have been exposed to biological material with 4.2 mean (SD = 3.2) expositions per student (Table 42, in Appendix). During the whole second-year clinical placement, students attended on average 4.2 (SD = 1.3) floors and were poorly aware of the occurrence of organizational changings in the attended floors. Most of the students declared to have been motivated before attending the second-year clinical placement and only the 4.8% of them declared to have interrupted the placement for a period during the second year. Moreover, almost all the students met the reference guide before or during the placement, while few of them electronically communicated with the guide. Finally, slightly more than half of the students indicated both reference guide and clinical tutors as the person perceived as the main contributor to their learning process and reported a good perception of CLE in all the dimensions (total mean score 4.0, SD = 0.7) (Table 43, in Appendix).

3.3.2.2 Associated factors and predictive models about students' academic success and factors assessed at T_1

The detected frequency of students' academic success was 86.3% (i.e. n = 107 out of 124 participants). When compared with 'not success', 'success' students revealed to be younger (p = 0.044) and reported higher secondary school grades (p < 0.001). Moreover, academic success revealed to be associated with having not faced personal health issues that did not allow to undertake one or more exams during the second year (p < 0.001). 'Success' students also reported lower level of satisfaction about clinical placement (p = 0.044) and negative differences between level of satisfaction and perceived level of importance about relationship with persons in the university (p = 0.010), teaching (p = 0.040), clinical placement (p = 0.001), and other organizational factors (p = 0.005). Finally, 'not success' students better perceived the supervisory relationship in the clinical learning environment during the second-year clinical placement (p = 0.034) (Table 44 to 53, in Appendix).

Three out of the nine variables that were associated with the outcome in the bivariate analyses revealed to be significant predictors of students' success. In fact, students who reported a higher secondary school grade, lower level of satisfaction about the clinical placement, as well as students who did not face personal health issues that did not allow to undertake one or more exams during the second year showed a higher probability of academic success (Table 54).

	β	OR	95% CI	p-value
Secondary school grade	0.128	1.136	1.034 to 1.248	0.008
Faced personal health issues that did not allow to undertake one or more exams				
Yes*	--	--	--	--
No	2.029	7.606	1.657 to 34.901	0.009
Level of satisfaction about the clinical placement	-0.393	0.675	0.473 to 0.965	0.031

Table 54. Academic success predictive model in Albanian students at the end of the second year.
*Reference category

3.3.3 Third time point of data assessment: end of the third academic year (T₂)

3.3.3.1 Characteristics of the sample at T₂

At T_2, n = 75 students participated in the study. The involved students were very young (mean age was 20.8 years, SD = 0.8), lived in quite big families (mean number of family members was 5.0, SD = 1.0), did not have children, and most of them were female (86.7%). In regard to parents' educational level and job, most of students' parents had not achieve an academic degree and were mainly employed in low or medium qualified jobs. Moreover, a high frequency of unemployed parents was detected, especially among students' mothers, who were mainly housewives. Referring further to students' family characteristics, a few students declared to have had a family member employed as nurse (14.7%). Almost all the students had attended the high school before applying for the NBP, reported a mean final grade of 86.6 (SD = 12.0, maximum possible 100.0), and a mean level of empathy of 110.0 (SD = 14.2) (Table 55, in Appendix). Few students have had experiences as workers (12.0%) or in other educational programs without graduating (1.3%) (Table 56, in Appendix). The 33.8% of the students participated in the 'open days' at the university and 62.7% of the sample had indicated Nursing as first preference when applying for the NBP; most of the students indicated at T_2 an 'internal' motivation for choosing Nursing (e.g. aptitude for aiding people), would advise a relative to become a nurse, and all the students declared at T_2 to have been approved from the family for the career choice (Table 57, in Appendix). Most of the sample has been living in the city where the university was during the third year, while 25.3% of them were commuters. In this regard, despite students lived quite closer to the university (mean distance 7.0 km, SD = 13.6), students used to spend 31.3 (SD = 33.7) minutes on average to reach the university and 69.3% of them used to reach the university on feet. Regarding main students' financial support for the third academic year, most the sample indicated their family and 29.3% of the students received a scholarship (Table 58, in Appendix). During the third academic year of the NBP, few students worked or volunteered, attended the 'Erasmus Project', and faced personal health issues that did not allow to undertake one or more exams. Instead, 29.3% of the students faced familial burden, almost half the sample experienced life events and 56.0% of the participants experienced financial difficulties while attending the third academic year of the NBP (Table 59, in Appendix). In regard to students' study sources and methods, all the students declared to study individually, and they mainly consulted official sources of information when studying during the third year. Moreover, they mainly used to study every day after lessons (58.7%) or periodically

(32.0%) (Table 60, in Appendix). However, most of the students experienced learning difficulties during the first year, that were mainly due to excessive material and lack of time to study. The 10.7% of the students declared to have thought to leave the NBP mainly for being concerned about their academic outcomes (Table 61, in Appendix). In regard to the program evaluation, students mainly perceived the third-year study load as more than expected (58.1%), though 40.3% of them perceived it as adequate and 30.7% of the sample declared to agree if the NBP lasting would have been lengthened up to four years. Albanian students acknowledged a quite high level of importance towards their education to all the investigated organizational features and services offered by the university and reported lower level of satisfaction for these factors. In this regard, the difference between students' level of satisfaction and perceived level of importance was negative for all the investigated factors (Table 62, in Appendix). During their very first clinical placement, students mainly attended medical floors and 17.3% of them declared to have been exposed to biological material with 4.1 mean (SD = 3.2) expositions per student (Table 63, in Appendix). During the whole third-year clinical placement, students attended on average 4.2 (SD = 1.3) floors and were poorly aware of the occurrence of organizational changings in the attended floors. Most of the students declared to have been motivated before attending the third-year clinical placement and only the 4.0% of them declared to have interrupted the placement for a period during the third year. Moreover, almost all the students met the reference guide before or during the placement, while few of them electronically communicated with the guide. Finally, more than half of the students indicated both reference guide and clinical tutors as the person perceived as the main contributor to their learning process and reported a good perception of CLE in all the dimensions (total mean score 3.9, SD = 0.7) (Table 64, in Appendix).

3.3.3.2 Associated factors and predictive models about students' academic success and factors assessed at T_2

The detected frequency of students' academic success was 92.0% (i.e. n = 69 out of 75 participants), though, as said, the percentage of 'not success' students was significantly higher among drop out students compared to students who participated at T_2 (p = 0.022). 'Success' students reported higher level of cognitive empathy compared to 'not success' students (p = 0.002), as well as higher level of perceived importance towards their education about teaching (p = 0.036) and others organizational features of the university (p = 0.033) (Table 65 to 77, in Appendix).

Despite the above-mentioned associations, considering the small number of students in the 'not success' group in both samples and the higher percentage of 'not success' students who

dropped out from the study at T_2, predictive analyses were not performed regarding data collected at T_2.

3.4 Discussions

3.4.1 Characteristics of the sample

In the Albanian context, the historical predominance of the female gender among nursing students (79-81) was confirmed, highlighting the cultural perception of the nurse as female, which is still present also in other European contexts (25, 82). However, when compared to other European students, Albanian students were often younger and less often reported to have attended other educational programs before enrollment in the NBP (25, 82). Moreover, few of them have had previous working experiences; most of them had attended the high school and reported quite high final grades. Therefore, it seems that the secondary school final grade as selection criterion induces students to plan their academic pathway already during secondary school and ensure their early orientation for future perspectives. In regard to the social and familial background, students belonged to the low-medium social class, highlighting the more frequent social origins of students who decide to apply for the NBP, which is similar, for example, to the Italian context (25, 82). Considering that nursing has been acknowledged as a scientific discipline quite recently in Albania, a change in the social origins of nursing students is expected in the following years. However, the high awareness of students about the 'helping' connotation of the nursing profession, as well as the higher levels of empathy reported at T_1 and T_2 (compared to T_0) from the sample that remained in the educational pathway, suggest that the choice to be a nurse could be mainly related to individual attitude rather than the perceived image of the profession (83). Moreover, Albanian students seems to be more aware of the authority of the educational institution compared to other European colleagues, considering their participation in the 'open days' at the university (25).

In regard to students' modifiable factors, most of the characteristics of the Albanian students involved in the study remained quite stable during the educational pathway. In this regard, the financial difficulties, life events, and means used to reach the university further highlight the social and economic conditions of the students. However, the low frequency of working experiences performed by the students during the pathway, learning difficulties they reported (despite their individual and every-day study method), and high study load they perceived may indicate a high study burden, which could be related to the number of theoretical exams faced each year. These results further highlight the already reported heterogeneity among Countries belonging to the European space that adhered to the Bologna Declaration

regarding such factors (25). Moreover, a high frequency of the students has had contacts with faculties, probably leading to a high perception of the 'presence' of the educational institution as well as to a high perceived importance of the organizational features on their pathway. Such model may have contributed to motivate students, as highlighted by the decreased number of students during the pathway that did not attend the clinical placement. However, this model may have also played a role in increasing both issues and expectations of the students, as highlighted from their low levels of satisfaction compared to the importance they acknowledged to the organizational features of the institution, and from the reasons indicated about students' intention to leave (mainly concerns about their academic achievements). Finally, students highly acknowledged the role of the reference guide and clinical tutors and reported a good motivation towards the clinical placement as well as a good perception of the clinical learning environment. However, it seems that students did not have the possibility to be deeply involved in the floors' environment, considering that they were poorly aware of the organizational changings occurred and the high number of floors attended each year.

3.4.2 Associated and predictive factors of academic success

Different associated/predictive factors were identified in the time points of data collection. This highlight both the dynamic and complex nature of the phenomenon and the need of assessing students' status at several time points during the educational pathway in order to early detect their risk of 'not success'.

At T_0, Albanian students who had never worked before applying for the NBP along with those who used to study individually during the first year demonstrated a higher probability of success. This could indicate that 'success' students were intrinsically more motivated than 'not success' since they were more oriented to choose the nursing career and were individually focused to reach their learning objectives (84, 85). Such observation could be also confirmed at T_1 since an association with younger age and students' success was detected. Moreover, at T_1, 'success' students reported negative differences between level of satisfaction and perceived level of importance about most of the assessed organizational features of the institution, worse perceived the supervisory relationship in the clinical learning environment during placement, and their lower level of satisfaction about clinical placement revealed to be predictive of 'success'. This could indicate the higher expectations, and maybe self-esteem, of 'success' Albanian students compared to 'not success', highlighting further the need to assess the role (and possible training strategies) of students' non-intellective constructs (e.g. personality traits, motivational factors, self-regulatory learning strategies, and

psychosocial contextual influences) in future research (84, 85). The knowledge of such role could be useful when selecting nursing students, designing curricula, and implementing support strategies for students (86). Finally, the importance of the secondary school grade as selection criterion emerged at T_1 since 'success' students reported higher grades. This result, along with the high frequency of students' academic success assessed at T_1, further highlights the role of the previous education during the academic pathway and towards students' success, confirming also the results obtained in the meta-analysis. At T_2, the higher expectations of 'success' students about organizational features of the university further emerged, highlighting their intrinsic higher motivation. Moreover, such attention to the organizational features could be linked to 'success' students' higher level of empathy as a personality trait (33). However, results obtained at T_2 should be considered with caution since the 'not success' percentage of students was significantly higher among drop out students compared to students who remained in the study.

To our knowledge, this is the first study that investigated the associated and predictive factors of academic success of Albanian nursing students. The high number of variables collected allowed to evaluate several micro- and meso-level factors that may have a role towards students' educational pathway and outcomes. The main limit of this study was the impossibility to evaluate the qualitative academic success of the students, such as their level of acquired knowledge and skills, as well as their future career progression as nurses, which is acknowledged as the definitive academic success of nursing students (32). Moreover, the high number of drop out, which also depends on students who dropped out from the educational pathway, implies to cautiously generalize the results.

3.5 Conclusions

The characteristics of both Albanian students and educational organization involved revealed to be very different compared to other European settings, as expected. Even considering the quite high frequency of nursing students' academic success in Albania, its occurrence could be further improved. In this regard, the second year of the educational pathway seems to be the most crucial considering the higher number of variables associated with the academic 'not success'. The usefulness of the secondary school grade as selection criterion was confirmed and younger students who did not have previous working experiences reported higher frequency of success. Therefore, also considering the higher expectations, and maybe self-esteem, of 'success' Albanian students compared to 'not success', there is the need to investigate the role of non-intellective features regarding academic success in Albanian

students. Through the knowledge of such relationship, significant non-intellective features could be routinely assessed and trained in nursing students to improve their success.

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Attachment

Research project about academic success in the Nursing Bachelor Program (NBP)

1. Socio-demographic characteristics and education

Academic year _____ Matriculation number _____ Gender: (1) F, (2) M

Birth date (dd/mm/yyyy) _____/_____/_____

Number of family members _____ Number of children _____ (if any)

Please indicate your parents' highest educational level:

Father	Mother
(1) Primary school	(1) Primary school
(2) Secondary school	(2) Secondary school
(3) High school	(3) High school
(4) Bachelor	(4) Bachelor
(5) Master (any level)	(5) Master (any level)
(6) PhD	(6) PhD

Describe your parents' current job:

Father	Mother

Has a member of your family ever worked as nurse?
(1) Yes
(2) No

Type of secondary school attended:
(1) High school
(2) Technical or professional school
(3) Other

Please indicate your secondary school final grade _____

2. Empathy levels

JEFFERSON EMPHATY SCALE-HPS

Instructions: Using a ball-point pen, please indicate the extent of your agreement or disagreement with *each* of the following statements by marking a number to the right of each statement.

Please use the following 7-point scale (*a higher number on the scale indicates more agreement*):

1-------2-------3-------4-------5-------6-------7

Strongly Disagree   *Strongly Agree*

Mark one and only one response for each statement.

Statements	Level of agreement						
Health care providers' understanding of their patients' feelings and the feelings of their patients' families does not influence treatment outcomes	1	2	3	4	5	6	7
Patients feel better when their health care providers understand their feelings	1	2	3	4	5	6	7
It is difficult for a health care provider to view things from patients' perspectives	1	2	3	4	5	6	7
Understanding body language is as important as verbal communication in health care provider - patient relationships	1	2	3	4	5	6	7
A health care provider's sense of humor contributes to a better clinical outcome	1	2	3	4	5	6	7
Because people are different, it is difficult to see things from patients' perspectives	1	2	3	4	5	6	7
Attention to patients' emotions is not important in patient interview	1	2	3	4	5	6	7
Attentiveness to patients' personal experiences does not influence treatment outcomes	1	2	3	4	5	6	7
Health care providers should try to stand in their patients' shoes when providing care to them	1	2	3	4	5	6	7
Patients value a health care provider's understanding of their feelings which is therapeutic in its own right	1	2	3	4	5	6	7
Patients' illnesses can be cured only by targeted treatment; therefore, health care providers' emotional ties with their patients do not have a significant influence in treatment outcomes	1	2	3	4	5	6	7
Asking patients about what is happening in their personal lives is not helpful in understanding their physical complaints	1	2	3	4	5	6	7
Health care providers should try to understand what is going on in their patients' minds by paying attention to their non-verbal cues and body language	1	2	3	4	5	6	7

I believe that emotion has no place in the treatment of medical illness	1	2	3	4	5	6	7
Empathy is a therapeutic skill without which a health care provider's success is limited	1	2	3	4	5	6	7
Health care providers' understanding of the emotional status of their patients, as well as that of their families is one important component of the health care provider – patient relationship	1	2	3	4	5	6	7
Health care providers should try to think like their patients in order to render better care	1	2	3	4	5	6	7
Health care providers should not allow themselves to be influenced by strong personal bonds between their patients and their family members	1	2	3	4	5	6	7
I do not enjoy reading non-medical literature or the arts	1	2	3	4	5	6	7
I believe that empathy is an important factor in patients' treatment	1	2	3	4	5	6	7

3. Activities performed before applying for the NBP

Have you ever worked before applying for the NBP?
(1) Yes
(2) No

If yes, please indicate in which field:
(1) Healthcare
(2) Not healthcare
(3) Both

Before applying for the NBP, have you attended any other educational program without graduating?
(1) Yes
(2) No

4. Motivation to choose to be a nurse and perceived image of nurses

Did you participated in the 'open days' at the university before applying for the NBP?
(1) Yes
(2) No

In which life period did you decide to apply for the NBP?
(1) After completing the secondary school, as a first educational choice
(2) After attending other educational programs (academic or not)
(3) After working for a period

When you applied at the university, did you indicate Nursing as first preference to be enrolled?
(1) Yes

(2) No

Please indicate your main reason for applying to the NBP:
(1) Aptitude for aiding people
(2) Employment opportunity
(3) Personal experiences
(4) Interest in healthcare subjects
(5) Family advice/influence
(6) Other _____

Did your family approve your career choice?
(1) Yes
(2) No

Would you suggest a relative to become a nurse?
(1) Yes
(2) No

Is nurses' image you perceived before enrolling in the NBP consistent with the image you have now?
(1) Yes
(2) No
(3) Partially

Is nurses' image you have now consistent with the image provided by the media?
(1) Yes
(2) No, the image provided by the media is worse
(3) No, the image provided by the media is better

5. Life and study conditions while attending the just passed academic year of the NBP

During the just passed academic year of the NBP, did you live in the city where the university is?
(1) Yes, with my family
(2) Yes, with cohabitants
(3) Yes, alone
(4) No

How did you usually reach the university during the just passed academic year of the NBP?
(1) On feet
(2) With public transport
(3) With own or friends' vehicle

Please indicate the distance (in kn) university-your home and time (in minutes) daily spent to reach the university during the just passed academic year of the NBP:
Distance _____ (km)

Time _____ (minutes)

During the just passed academic year of the NBP, did you receive a scholarship?
(1) Yes
(2) No

Please indicate your main source of economic support for the academic career during the just passed academic year of the NBP:
(1) My family
(2) Relatives/friends
(3) Scholarship
(4) Me, working while studying

6. Other activities performed, and trouble faced while attending the just passed academic year of the NBP

During the just passed academic year of the NBP, did you work?
(1) Yes, please indicate the number of weekly hours of work _____
(2) No

If yes, was the working activity continuous during the year?
(1) Yes, please indicate the number of months _____
(2) No

If yes, indicate in which field:
(1) Healthcare
(2) Not healthcare
(3) Both

During the just passed academic year of the NBP, did you perform volunteering activities?
(1) Yes, please indicate the number of weekly hours of work _____
(2) No

If yes, was the volunteering activity continuous during the year?
(1) Yes, please indicate the number of months _____
(2) No

If yes, please indicate in which field:
(1) Healthcare
(2) Not healthcare
(3) Both

During the just passed academic year of the NBP, did you participate in the 'Erasmus Project' attending a semester abroad?
(1) Yes

(2) No

During the just passed academic year of the NBP, did you face a familial burden (e.g. caregiving)?
(1) Yes
(2) No

If yes, how long did the burden last?
(1) Whole year
(2) Limited period, please indicate the number of months _____

During the just passed academic year of the NBP, did you face financial difficulties?
(1) Yes
(2) No

During the just passed academic year of the NBP, did you face significant life events (e.g. family bereavement, wedding)?
(1) Yes
(2) No

During the just passed academic year of the NBP, did you face personal health issues that did not allow to undertake one or more exams?
(1) Yes
(2) No

7. Study sources and methods during the just passed academic year of the NBP

During the just passed academic year of the NBP, which was your main source of information when studying?
(1) Personal notes taken in class
(2) Didactic material provided by the teacher
(3) Textbooks
(4) Web
(5) Others _____

During the just passed academic year of the NBP, did you mainly use to:
(1) Study alone
(2) Study in group

During the just passed academic year of the NBP, did you mainly use to study:
(1) Just before the exams
(2) Periodically during the semester
(3) Every day after lessons

8. Learning difficulties and intention to leave the program during the just passed academic year of the NBP

During the just passed academic year of the NBP, did you experience any learning difficulties?
(1) Yes
(2) No

If yes, please indicate the main reason for learning difficulties:
(1) Poor teaching effectiveness of teachers
(2) Ineffective study method
(3) Inappropriate organization of exam sessions
(4) Inadequacy of previous education
(5) Excessive material to study
(6) Excessive complexity of the disciplines
(7) Language difficulties
(8) Lack of time to study
(9) Others _____

During the just passed academic year of the NBP, have you ever thought to leave the NBP?
(1) Yes
(2) No

If yes, please indicate the main reason for having though to leave:
(1) Fear of not being able to successfully complete the program
(2) Difficult impact in the first clinical placement
(3) Failure in one or more exams
(4) Doubt having made a wrong choice
(5) Personal organizational difficulties
(6) Difficulties in studying
(7) Difficulties in the clinical placement
(8) Difficult relationship with clinical tutors
(9) Difficult relationship with the reference guide
(10) Others _____

9. Program evaluation referring to the just passed academic year of the NBP

During the just passed academic year of the NBP, did the educational pathway meet your expectations regarding the study load?
(1) Yes
(2) No, study load was less than expected
(3) No, study load was more than expected

Would you agree if the NBP lasting would be lengthened up to four years?
(1) Yes
(2) No

Instructions: Using a ball-point pen, please indicate the level of importance, according to your opinion, towards your education and the level of satisfaction about what the university provided.

Please use the following 10-point scale for the level of importance (*a higher number on the scale indicates more importance of the factor)* and mark one and only one response for each factor:

1-------2-------3-------4-------5-------6-------7-------8-------9-------10

Totally irrelevant   *Fundamental*

Please use the following 10-point scale for the level of satisfaction (*a higher number on the scale indicates more satisfaction about what university provided)* and mark one and only one response for each factor:

1-------2-------3-------4-------5-------6-------7-------8-------9-------10

Totally dissatisfied   *Very satisfied*

Factors	Level of importance											Level of satisfaction										
Relationship with persons																						
Relationship with the reference guide and assistants	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Relationship with clinical tutors (i.e. nurses in floors)	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Relationship with students attending my academic year	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Relationship with students attending others academic year	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Relationship with the administrative offices	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Teaching																						
Relationship with teachers of subjects other than Nursing	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10

Relationship with teachers of Nursing	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Adequacy for studying of the didactic material	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Easiness in retrieving the didactic material	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Teachers' clarity when explaining concepts	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Clarity in communicating exam modality	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Compliance with the timetable of lessons and other activities	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Teachers' ability to engage and motivate	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Consistency between topics faced in the courses and what declared in the university web site	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Availableness of teachers for further explanations	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Physical environments																						
Spaces for students (where attending lessons)	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Library	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Classes	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Laboratories	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Computer workstations	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10

Spaces for students (where attending the clinical placement)	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Number of students in class during lessons	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Clinical placement																						
Individual tutoring during the placement (especially during the first experiences)	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Clinical placement experiences	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Others																						
Availability of adequate information about the nursing profession before applying to the NBP	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Support in accommodation searching if needed	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Direct (e.g. scholarship) and indirect (e.g. meal vouchers, services cost reduction) financial support	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
General organization of the NBP	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Global level of satisfaction about the program	-	-	-	-	-	-	-	-	-	-	-	0	1	2	3	4	5	6	7	8	9	10

10. Information about the very first clinical placement performed during the NBP

THE FOLLOWING QUESTIONS ARE REFERRED TO THE VERY FIRST CLINICAL PLACEMENT PERFORMED DURING THE NBP

Where did you perform your very first clinical placement?
(1) Medical floors
(2) Surgical floors
(3) Others _____

During your very first clinical placement, have you ever experienced a biological contamination?
(1) Yes, please indicate how many times _____
(2) No

11. Information about the clinical placement performed during the just passed academic year of the NBP

THE FOLLOWING QUESTIONS ARE REFERRED TO THE WHOLE CLINICAL PLACEMENT PERFORMED DURING THE JUST PASSED ACADEMIC YEAR

Please indicate the number of attended floors during the just passed academic year of the NBP _____

Did you witness to any organizational changings in the floors you attended for the clinical placement performed during the just passed academic year?
(1) Yes
(2) No
(3) I do not know

During the clinical placement performed during the just passed academic year, have you ever met the reference guide?
(1) Yes
(2) No

During the clinical placement performed during the just passed academic year, have you ever electronically communicated with the reference guide?
(1) Yes, please indicate how many times _____
(2) No

During the clinical placement performed during the just passed academic year, did you interrupt the placement for a period for any reason?
(1) Yes
(2) No

According to your experience in the clinical placement performed during the just passed academic year, which person was the main contributor to your learning process?
(1) Reference guide
(2) Clinical tutors (i.e. nurses in floors)
(3) Both

When beginning the clinical placement performed during the just passed academic year:
(1) I was motivated
(2) I was not motivated

Are you satisfied about the clinical placement performed during the just passed academic year?
(1) I am satisfied
(2) Neutral opinion
(3) I am not satisfied

CLINICAL LEARNING ENVIRONMENT AND SUPERVISION (CLES)
evaluation scale plus NURSE TEACHER scale

Instructions: Using a ball-point pen, please indicate the extent of your agreement or disagreement with *each* of the following statements by marking a number to the right of each statement.

Please use the following 5-point scale (*a higher number on the scale indicates more agreement*):

1-------2-------3-------4-------5

Strongly Disagree   ***Strongly Agree***

Mark one and only one response for each statement.

Pedagogical atmosphere	Level of agreement				
1. The staff was easy to approach	1	2	3	4	5
2. During staff meetings (e.g. before shifts) I felt comfortable taking part in the discussion	1	2	3	4	5
3. I felt comfortable going to the ward at the start of my shift	1	2	3	4	5
4. There was a positive atmosphere on the ward	1	2	3	4	5
5. The staff was generally interested in student Supervision	1	2	3	4	5
6. The staff learned to know the students by their personal names	1	2	3	4	5

7. There were sufficient meaningful learning situations on the ward	1	2	3	4	5
8. The learning situations were multidimensional in terms of content	1	2	3	4	5
9. The ward can be regarded as a good learning environment	1	2	3	4	5

Leadership style of the ward manager	**Level of agreement**				
10. The ward manager regarded the staff on her/his ward as key resource	1	2	3	4	5
11. The ward manager was a team member	1	2	3	4	5
12. Feedback from the ward manager could easily be considered a learning situation	1	2	3	4	5
13. The effort of individual employees was appreciated	1	2	3	4	5

Premises of nursing in the ward	**Level of agreement**				
14. The ward's nursing philosophy was clearly defined	1	2	3	4	5
15. Patients received individual nursing care	1	2	3	4	5
16. There were no problems in the information flow related to patients' care	1	2	3	4	5
17. Documentation of nursing (e.g. nursing plans, daily recording of nursing procedures, etc.) was clear	1	2	3	4	5

Supervisory relationship *In this area the concept of clinical tutoring refers to guiding, supporting, and evaluating nursing students by nurses employed in the attended floors.*	**Level of agreement**				
18. My supervisor showed a positive attitude towards supervision	1	2	3	4	5
19. I felt that I received individual supervision	1	2	3	4	5
20. I continuously received feedback from my supervisor	1	2	3	4	5
21. Overall I am satisfied with the supervision I received	1	2	3	4	5
22. The supervision was based on a relationship of equality and promoted my learning	1	2	3	4	5
23. There was a mutual interaction in the supervisory relationship	1	2	3	4	5

24. Mutual respect and approval prevailed in the supervisory relationship	1	2	3	4	5
25. The supervisory relationship was characterized by a sense of trust	1	2	3	4	5

Role of the nurse teacher

The nurse teacher is the university tutor who manages the clinical placements. **Level of agreement**

26. In my opinion, the nurse teacher was capable to integrate theoretical knowledge and everyday practice of nursing	1	2	3	4	5
27. The nurse teacher was capable of operationalize the learning goals of this clinical placement	1	2	3	4	5
28. The nurse teacher helped me to reduce the theory-practice gap	1	2	3	4	5
29. The nurse teacher was like a member of the nursing team	1	2	3	4	5
30. The nurse teacher was capable to give his or her pedagogical expertise to the clinical team	1	2	3	4	5
31. The nurse teacher and the clinical team worked together supporting my learning	1	2	3	4	5
32. The common meetings between myself, mentor and nurse teacher were comfortable experience	1	2	3	4	5
33. Climate of the meetings was congenial	1	2	3	4	5
34. Focus on the meetings was in my learning needs	1	2	3	4	5

Place and date _____, ____/_____/_____

Appendix

Database	Search strings
PubMed	("students, nursing"[MeSH Terms] OR ("students"[All Fields] AND "nursing"[All Fields]) OR "nursing students"[All Fields] OR ("nursing"[All Fields] AND "students"[All Fields])) AND ("tooth attrition"[MeSH Terms] OR ("tooth"[All Fields] AND "attrition"[All Fields]) OR "tooth attrition"[All Fields] OR "attrition"[All Fields])
	("students, nursing"[MeSH Terms] OR ("students"[All Fields] AND "nursing"[All Fields]) OR "nursing students"[All Fields] OR ("nursing"[All Fields] AND "students"[All Fields])) AND academic[All Fields] AND failure[All Fields]
	("students, nursing"[MeSH Terms] OR ("students"[All Fields] AND "nursing"[All Fields]) OR "nursing students"[All Fields] OR ("nursing"[All Fields] AND "students"[All Fields])) AND ("student dropouts"[MeSH Terms] OR ("student"[All Fields] AND "dropouts"[All Fields]) OR "student dropouts"[All Fields])
	("students, nursing"[MeSH Terms] OR ("students"[All Fields] AND "nursing"[All Fields]) OR "nursing students"[All Fields] OR ("nursing"[All Fields] AND "students"[All Fields])) AND wastage[All Fields]
	("students, nursing"[MeSH Terms] OR ("students"[All Fields] AND "nursing"[All Fields]) OR "nursing students"[All Fields] OR ("nursing"[All Fields] AND "students"[All Fields])) AND withdrawal[All Fields]
	("students, nursing"[MeSH Terms] OR ("students"[All Fields] AND "nursing"[All Fields]) OR "nursing students"[All Fields] OR ("nursing"[All Fields] AND "students"[All Fields])) AND academic[All Fields] AND success[All Fields]
	("students, nursing"[MeSH Terms] OR ("students"[All Fields] AND "nursing"[All Fields]) OR "nursing students"[All Fields] OR ("nursing"[All Fields] AND "students"[All Fields])) AND ("achievement"[MeSH Terms] OR "achievement"[All Fields])
	("students, nursing"[MeSH Terms] OR ("students"[All Fields] AND "nursing"[All Fields]) OR "nursing students"[All Fields] OR ("nursing"[All Fields] AND "students"[All Fields])) AND ("retention (psychology)"[MeSH Terms] OR ("retention"[All Fields] AND "(psychology)"[All Fields]) OR "retention (psychology)"[All Fields] OR "retention"[All Fields])

	nursing students AND attrition
	nursing students AND academic failure
	nursing students AND student dropouts
Scopus	nursing students AND wastage
	nursing students AND withdrawal
	nursing students AND academic success
	nursing students AND achievement
	nursing students AND retention
	nursing students AND attrition
	nursing students AND academic failure
	nursing students AND student dropouts
Education Resources Information Center (ERIC)	nursing students AND wastage
	nursing students AND withdrawal
	nursing students AND academic success
	nursing students AND achievement
	nursing students AND retention

	nursing students AND attrition
	nursing students AND academic failure
	nursing students AND student dropouts
Open Grey	nursing students AND wastage
	nursing students AND withdrawal
	nursing students AND academic success
	nursing students AND achievement
	nursing students AND retention

Table 1. Search strategy in electronic databases.

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Study ID	First author, year	Title	Journal	Journal IF (JCR 2017)
1	Brimble, 2015 (42)	Does Entry Route Really Affect Academic Outcome? Academic Achievement of Traditional versus Non Traditional Entrants to BN(Hons) Pre-Registration Nursing Programmes	Journal of Further and Higher Education	--
2	Byrd, et al., 1999 (27)	Predictors of successful completion of a baccalaureate nursing program	Nurse Educator	1.245
3	Dante et al., 2011 (15)	Factors associated with nursing students' academic success or failure: A retrospective Italian multicenter study	Nurse Education Today	2.067
4	Dante et al., 2013 (43)	Time-to-event analysis of individual variables associated with nursing students' academic failure: a longitudinal study	Advances in Health Sciences Education	2.552
5	Dante et al., 2015 (13)	Predictive power of individual factors and clinical learning experience on academic success	Nurse Educator	1.245
6	Deary et al., 2003 (44)	A longitudinal cohort study of burnout and attrition in nursing students	Journal of Advanced Nursing	2.267
7	Ehrenfeld et al., 1997 (45)	Reasons for student attrition on nursing courses: a study	Nursing Standard	--
8	Kevern et al., 1999 (46)	Pre-registration diploma students: a quantitative study of entry characteristics and course outcomes	Journal of Advanced Nursing	2.267
9	Knopke, 1979 (47)	Predicting student attrition in a baccalaureate curriculum	Nursing Research	1.725

10	Lancia et al., 2018 (17)	Analysis of factors potentially associated with nursing students' academic outcomes: A thirteen-year retrospective multi-cohort study	Nurse Education Today	2.067
11	Mulholland et al., 2008 (28)	Diversity, attrition and transition into nursing	Journal of Advanced Nursing	2.267
12	Pitt et al., 2014 (48)	The influence of personal qualities on performance and progression in a pre-registration nursing programme	Nurse Education Today	2.067
13	Pitt et al., 2015 (49)	The influence of critical thinking skills on performance and progression in a pre-registration nursing program	Nurse Education Today	2.067
14	Pryjmachuk et al., 2008 (50)	Nurse education: Factors associated with attrition	Journal of Advanced Nursing	2.267
15	Sadler, 2003 (29)	Effectiveness of student admission essays in identifying attrition	Nurse Education Today	2.067
16	Salamonson et al., 2011 (30)	Linguistic diversity as sociodemographic predictor of nursing program progression and completion	Contemporary Nurse	0.673
17	Salamonson et al., 2014 (31)	Nursing as first choice predicts nursing program completion	Nurse Education today	2.067
18	Wilson et al., 2011 (51)	Should nursing-related work experience be a prerequisite for acceptance into a nursing programme? A study of students' reasons for withdrawing from undergraduate nursing at an Australian university	Nurse Education Today	2.067

Table 2. List and bibliographic information of the included studies (n = 18).

Study ID	Year	Country	Study design*	Multicentric	More than one cohort of students	Program duration (years)	Program denomination‡	Sample	Females	Age [Mean (SD)]	Methods for data collection
1	2015	United Kingdom	RCS	No	Yes	3	PNP	418	--	--	Administrative record
2	1999	United States	RCS	No	Yes	3	BNP	278	263	--	Administrative record
3	2011	Italy	RCS	Yes	No	3	BNS	117	82	23.0 (5.2)	Questionnaire and administrative record
4	2013	Italy	PCS	Yes	No	3	BNS	145	103	22.3 (5.4)	Questionnaire
5	2015	Italy	PCS	No	No	3	NDP	120	86	22.0 (5.0)	Questionnaire and administrative record
6	2003	United Kingdom	PCS	No	No	3	Diploma	168	139	--	Questionnaire
7	1997	State of Israel	RCS	No	Yes	4	BBNC	2,102	1,577	--	Administrative record

No.	Year	Country									Source
8	1999	United Kingdom	RCS	No	Yes	3	Diploma	354	--	26.8 (8.2)	Administrative record
9	1979	United States	CC	No	No	3	SN	236	--	--	Questionnaire and administrative record
10	2018	Italy	RCS	No	Yes	3	NDP	2,278	1,438	22.0 (4.9)	Administrative record
11	2008	United Kingdom	RCS	No	Yes	3	PNP	1,808	1,444	25.1	Administrative record
12[+]	2014	Australia	PCS	No	No	3	BN	138	119	27.0	Questionnaire and administrative record
13[+]	2015	Australia	PCS	No	No	3	BN				Questionnaire and administrative record
14	2008	United Kingdom	RCS	No	Yes	3	DHE	1,173	991		Administrative record
15	2003	United States	RCS	No	Yes	3	BNP	236	--	--	Administrative record

16°	2011	Australia	PCS	No	No	3	BN				Questionnaire and administrative record
								352	296	25.7 (8.9)	
17°	2014	Australia	PCS	No	No	3	BN				Questionnaire and administrative record
18	2011	Australia	RCS	No	Yes	3	BN	101	86	21.3 (7.6)	Administrative record and interviews

Table 3. Main characteristics of the included studies.

[+,°] Studies reporting data on the same sample, but different variables regarding the academic outcome. [*] RCS = Retrospective cohort study; PCS = Prospective cohort study; CC = Case-control study. [‡] PNP = Preregistration Nursing Programme; BNP = Baccalaureate Nursing Program; BNS = Bachelor in Nursing Science; NDP = Nursing Degree Program; BBNC = Baccalaureate Basic Nursing Course; SN = School of Nursing; BN = Bachelor on Nursing; DHE = Diploma of Higher Education.

Study ID: 1

Aim	To investigate the influence of the type of entry route on academic achievement
Outcome definition	Academic success: graduation within the legal duration of the program *Academic lack of success: withdrawal*
Independent variables	Type of entry route, i.e. achieving a combination of A-levels that equate to 240 Universities and Colleges Admission Service (UCAS) points, an Access program pass, or a triple merit in a Business and Technology Education Council (BTEC) National Diploma
Statistical analyses	Not performed for the outcome of interest of the review
Results and conclusions	BTEC students appeared more likely to complete and Access entry route student least likely. Withdrawal from the program for personal reasons or discontinuation for academic failure is more likely in students who enter via the Access program route

Study ID: 2

Aim	To determine the predictors of successful completion of the baccalaureate nursing program versus failure or dropout, as well as only versus failure
Outcome definition	Academic success: graduation during the period of the study Academic lack of success: failure (second failure of a nursing course) and drop out
Independent variables	Model A - Success vs lack of success (failure and drop out): 1) age, ethnicity, previous baccalaureate degree, science GPA, social science GPA, and pre-nursing GPA (before enrollment) 2) age, ethnicity, previous baccalaureate degree, science GPA, social science GPA, pre-nursing GPA, and letter grades achieved in each nursing course (end of the first semester)

	3) age, ethnicity, previous baccalaureate degree, science GPA, social science GPA, pre-nursing GPA, and letter grades achieved in each nursing course (end of the second semester) Model B - Success vs only failure: 1) age, ethnicity, previous baccalaureate degree, science GPA, social science GPA, and pre-nursing GPA (before enrollment) 2) age, ethnicity, previous baccalaureate degree, science GPA, social science GPA, pre-nursing GPA, and letter grades achieved in each nursing course (end of the first semester) 3) age, ethnicity, previous baccalaureate degree, science GPA, social science GPA, pre-nursing GPA, and letter grades achieved in each nursing course (end of the second semester)
Statistical analyses	Predictive model (logistic regression)
Results and conclusions	Model A - Success vs lack of success (failure and drop out): 1) age, ethnicity, science GPA, and pre-nursing GPA (before enrollment) showed a predictive power of 77.0% 2) age, pre-nursing GPA, and pharmacology grade (end of the first semester) showed a predictive power of 82.6% 3) age, ethnicity, social science GPA, and first medical-surgical course grade (end of the second semester) showed a predictive power of 90.9% Model B - Success vs only failure: 1) age, ethnicity, science GPA, and pre-nursing GPA (before enrolment) showed a predictive power of 87.8% 2) age, science GPA, pharmacology grade, and introduction to nursing grade (end of the first semester) showed a predictive power of 92.3% 3) ethnicity, pharmacology grade, introduction to nursing grade, first medical-surgical course grade, and fundamental of nursing grade (end of the second semester) showed a predictive power of 97.2%

Study ID: 3

Aim	To document the factors associated with academic success or failure in an Italian cohort of nursing students

Outcome definition	Academic success: graduation within the legal duration of the program *Academic lack of success: students who had not been awarded the required credits and continued to be enrolled and students who dropped out during the three years*
Independent variables	Age, gender, nationality, place of residence, distance of faculty from home, ranking in BNS entry exam, type of secondary school diploma, upper-secondary diploma grade, previous and concurrent work experience to the BNS, voluntary work while on BNS program, eventual number of weekly hours of work, eventual previous university experience in other fields, number of exams failed on theoretical courses, number of failure at the annual practical clinical assessment, family commitments during the BNS, life events experienced while studying for the BNS, economic difficulties perceived while studying for the BNS, intention to leave the BNS program
Statistical analyses	Association (t-test and Chi-square test) and predictive model (logistic multivariate regression)
Results and conclusions	Factors associated academic success were higher final grades awarded in secondary education and higher ranking awarded in BNS entry exam. Moreover, as regards the factors present during the BNS program, those associated with academic success were working less than 16 hours/week, not having had family commitments, not having had learning difficulties, having never failed the annual practical clinical assessment, not having had intention to leave the program. Multivariate analysis identified two factors determining academic success/ lack of success: good results in the entry examination for the bachelor's degree in nursing sciences were associated with academic success, while family commitments were associated with academic lack of success

Study ID: 4

Aim	To offer a dynamic analysis of the individual factors affecting student academic failure factors and investigating the predictive power of individual variables in the academic failure
Outcome definition	Academic success: graduation within the legal duration of the program *Academic lack of success: students who had failed to complete the bachelor's degree requirements within a period of three years and continued to be enrolled and students who dropped out*

Independent variables	Gender, age at enrolment, nationality, place of residence, upper-secondary diploma grade, eventual previous university experience in other fields, previous work or other experiences, changes in place of residence during the BNS, life events experienced while studying for the BNS, economic difficulties perceived while studying for the BNS, voluntary work while on BNS program, eventual work experience during the BSN and eventual number of weekly hours of work, other experiences and family commitments during the BNS
Statistical analyses	Association (Chi-square test, U-Mann-Whitney test)
Results and conclusions	Female gender and higher upper-secondary diploma grades were associated with academic success

Study ID: 5

Aim	To examine the effect of selected individual student variables and clinical learning environments as perceived by students on academic success
Outcome definition	Academic success: graduation within the legal duration of the program
Independent variables	Gender, age at enrolment, upper-secondary school attended, nursing as first choice for career, upper-secondary diploma grade, time daily spent to reach university, Clinical Learning Environment Scale, Supervision and Nurse Teacher Scale (CLES+T) score for first and second academic year
Statistical analyses	Association (Chi-square test) and predictive model (logistic regression)
Results and conclusions	Factors associated academic success were female gender and upper-secondary diploma grades. As regards the predictive power of the variables, in addition to some individual factors, i.e. female gender and upper-secondary diploma grade, three factors related to the clinical learning experience affected academic success: supervisory relationship, pedagogical atmosphere, and commitment of the ward

Study ID: 6

Aim	To investigate the personal factors that lead to attrition in nursing students
Outcome definition	Academic success: graduation within the legal duration of the program Academic lack of success: drop out
Independent variables	Gender, age at enrolment, cognitive ability, personality, coping strategies, and psychological distress
Statistical analyses	Association (t-test, Chi-square test) and predictive model (logistic regression)
Results and conclusions	Both the association and predictive analyses showed that less conscientious and 'agreeable' students were more likely to discontinue than other students

Study ID: 7

Aim	To identify factors that lead to attrition in nursing programs and gain insight into possible measures that need to be considered to reduce the attrition rate
Outcome definition	Academic lack of success: drop out
Independent variables	Gender, immigrant status, completion of the army service, English language level, GPA
Statistical analyses	Association (test not declared)
Results and conclusions	Some variables were significant associated with attrition: male gender, no army service, low English pre-admission grade, low first-year GPA, and low second-year GPA

Study ID: 8

Aim	To identify the relationship between student characteristics, retention and academic achievement, as well as the role of organizational factors in retention and achievement

Outcome definition	Academic lack of success: drop out
Independent variables	Gender, age at enrolment, mode of entry, entry qualifications and details of students' branch, cohort and education centre
Statistical analyses	Association (Chi-square test)
Results and conclusions	None of the investigated variables resulted to be associated with the outcome

Study ID: 9

Aim	To investigate the factors associated to attrition in nursing students
Outcome definition	Academic lack of success: drop out during the period of the study
Independent variables	First semester GPA, secondary school percentile rank, science subpart of the College Qualification Test (CQT), student's perception of the learning style (Nursing Student Self-Disclosure Inventory - NSSDI), personality needs (Personality Preference Schedule - EPPS)
Statistical analyses	Association (test not declared)
Results and conclusions	Variables significantly associated with attrition were first semester GPA, secondary school percentile rank, science subpart of the CQT, and three personality traits, i.e. order, dominance, and aggression

Study ID: 10

Aim	To investigate any relation between nursing students' academic success and its potential predictors
Outcome definition	Academic success: graduation within the legal duration of the program

Independent variables	Gender, age at enrolment, upper-secondary school attended, upper-secondary diploma grade, admission test score, grade of intermediate exams
Statistical analyses	Predictive model (logistic regression)
Results and conclusions	Female gender, having attended a classical or scientific upper-secondary school, and having a higher upper-secondary diploma grade are predictive of nursing students' academic success

Study ID: 11

Aim	To explore the relationship between selected diversity variables and nursing students' progression and attrition
Outcome definition	Academic success: graduation within the legal duration of the program
	Academic lack of success: failure (due to not achieving the required standards) and students who voluntarily dropped out
Independent variables	Gender, age at enrolment, Country of birth, ethnicity, educational qualifications, visa status, application route, absence rates
Statistical analyses	Association (Chi-square test) and predictive model (binary logistic regression)
Results and conclusions	The variables associated with academic success were higher age, Ireland, Zimbabwe or other English-speaking countries as Country of birth, Irish or African American as ethnic group, higher entry qualification, and whether the student required a visa.
	The predictive variables of success were higher age, Ireland, Zimbabwe or other English-speaking Countries as Country of birth, and female gender.

Study ID: 12

Aim	To report on the personal qualities, program performance, behaviors and progression of a sample of nursing students over three years

Outcome definition	Academic success: graduation within the legal duration of the program
	Academic lack of success: drop out and students continuing their enrolment
Independent variables	Entry Personal Qualities Assessment (PQA)
Statistical analyses	Predictive model (logistic regression)
Results and conclusions	Resilience was the only significant predictor of students' likelihood of completing the program over 3 years, showing that as students' resilience score increased by 1, their chance of completing the program rather than continuing on after 3 years of study increased by 3%. Resilience had no significant impact of on withdrawal in relation to completion.

Study ID: 13

Aim	To explore entry critical thinking scores relationship to students' demographic characteristics, academic and clinical performance
	and progression
Outcome definition	Academic success: graduation within the legal duration of the program
	Academic lack of success: drop out and students continuing their enrolment
Independent variables	Entry critical thinking skills
Statistical analyses	Predictive model (logistic regression)
Results and conclusions	This study found a significant relationship between student's entry critical thinking scores and their ability to complete the program in three years. No significant relationship was identified between critical thinking scores and drop out.

Study ID: 14

Aim	To identify the factors having an impact on student completion rates in a preregistration nursing program

Outcome definition	Academic success: graduation legal duration of the program or later
	Academic lack of success: continued in their study and voluntarily drop out
Independent variables	Gender, age at enrolment, cohort, pursued specialty (branch), trust of allocation, ethnicity, level and type of the highest qualification on entry, original domicile
Statistical analyses	Association (Chi-square test) and predictive model (logistic regression)
Results and conclusions	Age and educational qualifications on entry, being male or coming from an African American/minority ethnic group increased the risk of discontinuation from a nursing program, whereas attending the child specialty branch, being female or already having a university degree reduced the risk. Pursuing the child branch specialty or having the lowest level entry qualifications increased the risk of resignation from a nursing program, whereas having intermediate-level entry qualifications reduced the risk.

Study ID: 15

Aim	To provide additional knowledge about the effectiveness of admission essays in identifying those students who drop out of a baccalaureate nursing program
Outcome definition	Academic success: graduation
	Academic lack of success: not completion
Independent variables	Mean grade point average on admission test and scores on admission essays
Statistical analyses	Association (t-test)
Results and conclusions	In the group of non-completer students, the mean grade point average on admission was almost identical to the completers; mean scores on the admission essays were significantly higher in the completers

<div align="center">**Study ID: 16**</div>

Aim	To prospectively assess the entry characteristics of students, attrition, progression and completion in an undergraduate nursing program over a three-year period
Outcome definition	Academic success: graduation within the legal duration of the program *Academic lack of success: students who were still enrolled or continuing to study in the program and students who were no longer enrolled and had discontinued (involuntary or voluntary) from the program prior to completing program requirements*
Independent variables	Gender, age at enrolment, marital status, enrolment status, Country of birth, spoken languages, nursing experience, working during the BN program, eventual weekly worked hours, GPA
Statistical analyses	Association (Kruskal-Wallis test, Chi-square test) and predictive model (multivariate logistic regression)
Results and conclusions	Native English speakers and students with a higher GPA score were most likely to complete the program at the end of the three years; program completers at the end of three years had also engaged in less hours of paid work during the semester period. However, the regression analysis revealed that of the sociodemographic factors examined, being a native English speaker was the only significant predictor of program completion

<div align="center">**Study ID: 17**</div>

Aim	To examine the relationship between nursing as the program of first choice on entry into a Bachelor of Nursing (BN) program, and program completion
Outcome definition	Academic lack of success: attrition at the six-year follow-up
Independent variables	Gender, age at enrolment, cultural background, working during the BN program and eventual weekly worked hours, nursing as first choice, type of enrolment, enrolment category

Statistical analyses	Association (Chi-square test) and predictive model (multivariate logistic regression)
Results and conclusions	At the six-year follow-up, students who had selected nursing as their first choice were more likely to have completed the program than those students who had not selected nursing as their first choice; there were no significant differences in attrition based on type of enrolment (part-time versus full-time) or students' enrolment category (local students versus international students). Moreover, logistic regression revealed that male students, students who worked more than 16 h per week during semester, and students who indicated nursing was not their first choice at entry into the program were significantly more likely to have dropped out of the program by the six-year follow-up

Study ID: 18

Aim	To examine the reasons why students withdrew from a Bachelor of Nursing degree
Outcome definition	Academic success: graduation within the legal duration of the program
Independent variables	Gender, age at enrolment, subjects taken during final year of secondary school, prior nursing experience, knowing a nurse previously, matriculation score, whether participants were from a private or government school, and scores from the entrance interview
Statistical analyses	Association (t-test and Chi-square test)
Results and conclusions	Academic success was significantly associated to having had prior nursing experience and having known a nurse

Table 4. Data related to the research question of the review extracted from the included studies.

Italicized outcomes indicate definitions of academic lack of success which are complementary to the definitions of academic success provided in the studies. Such studies were included only in the summary of results about academic success.

	Reporting										External validity				Internal validity – bias				Internal validity - confounding					Total	
Study ID	#1	#2	#3	#4	#5	#6	#7*	#8	Total/Max score	Total std. (%)	#9	#10**	Total/Max score	Total std. (%)	#11	#12	Total/Max score	Total std. (%)	#13	#14	#15*	Total/Max score	Total std. (%)	Total/Max score	Total std. (%)
1	1	0	1	0	1	1	na	1	6/8	**75.0**	1	0	1/2	**50.0**	1	1	2/2	**100.0**	1	1	na	2/2	**100.0**	11/14	**78.6**
2	1	1	1	2	1	1	na	0	7/8	**87.5**	1	0	1/2	**50.0**	1	1	2/2	**100.0**	1	1	na	2/2	**100.0**	12/14	**85.7**
3	1	1	1	2	1	1	na	1	8/8	**100.0**	1	1	2/2	**100.0**	1	1	2/2	**100.0**	1	1	na	2/2	**100.0**	14/14	**100.0**
4	1	1	1	2	1	1	0	1	8/9	**88.9**	1	1	2/2	**100.0**	1	1	2/2	**100.0**	1	1	1	3/3	**100.0**	15/16	**93.8**
5	1	1	1	2	1	1	1	1	9/9	**100.0**	1	1	2/2	**100.0**	1	1	2/2	**100.0**	1	1	1	3/3	**100.0**	16/16	**100.0**
6	1	1	1	1	1	1	1	1	8/9	**88.9**	1	0	2/2	**100.0**	0	1	1/2	**50.0**	1	1	1	3/3	**100.0**	14/16	**87.5**
7	1	1	0	0	1	1	na	0	4/8	**50.0**	1	0	1/2	**50.0**	0	1	1/2	**50.0**	1	1	na	2/2	**100.0**	8/14	**57.1**

8	1	1	1	2	1	1	na	1	8/8	100.0	1	0	1/2	50.0	1	1	2/2	100.0	1	1	na	2/2	100.0	13/14	92.9
9	1	1	1	0	1	1	na	1	6/8	75.0	0	na	0/1	0.0	1	1	2/2	100.0	1	1	na	2/2	100.0	10/13	76.9
10	1	1	1	1	1	1	na	1	7/8	87.5	1	1	2/2	100.0	1	1	2/2	100.0	1	1	na	2/2	100.0	13/14	92.9
11	1	1	1	1	1	1	na	1	7/8	87.5	1	1	2/2	100.0	1	1	2/2	100.0	1	1	na	2/2	100.0	13/14	92.9
12	1	1	1	1	1	1	1	1	8/9	88.9	1	0	1/2	50.0	0	1	1/2	50.0	1	1	1	3/3	100.0	13/16	81.3
13	1	1	1	2	1	1	1	1	9/9	100.0	1	1	2/2	100.0	0	1	1/2	50.0	1	1	1	3/3	100.0	15/16	93.8
14	1	1	1	2	1	1	na	1	8/8	100.0	1	1	2/2	100.0	1	1	2/2	100.0	1	1	na	2/2	100.0	14/14	100.0
15	1	1	0	0	1	1	na	0	4/8	50.0	1	1	2/2	100.0	1	1	2/2	100.0	1	1	na	2/2	100.0	10/14	71.4
16	1	1	1	2	1	1	1	1	9/9	100.0	1	1	2/2	100.0	1	1	2/2	100.0	1	1	1	3/3	100.0	16/16	100.0
17	1	1	1	2	1	1	1	1	9/9	100.0	1	1	2/2	100.0	1	1	2/2	100.0	1	1	1	3/3	100.0	16/16	100.0

18	1	1	1	1	1	1	na	0	6/8	**75.0**	1	0	1/2	**50.0**	0	1	1/2	**50.0**	1	1	na	2/2	**100.0**	10/14	**71.4**

Table 5. Evaluation of risk of bias in the included studies.

#1: Is the hypothesis/aim/objective of the study clearly described? (0 = No; 1 = Yes) - #2: Are the main outcomes to be measured clearly described in the Introduction or Methods section? (0 = No; 1 = Yes) - #3: Are the characteristics of the patients included in the study clearly described? (0 = No; 1 = Yes) - #4: Are the distributions of principal confounders in each group of subjects to be compared clearly described? (0 = No; 1 = Partially; 2 = Yes) - #5: Are the main findings of the study clearly described? (0 = No; 1 = Yes) - #6: Does the study provide estimates of the random variability in the data for the main outcomes? (0 = No; 1 = Yes) - #7: Have the characteristics of patients lost to follow-up been described? (0 = No; 1 =Yes) - #8: Have actual probability values been reported (e.g. 0.035 rather than <0.05) for the main outcomes except where the probability value is less than 0.001? (0 = No; 1 = Yes) - #9: Were the subjects asked to participate in the study representative of the entire population from which they were recruited? (0 = No; 0 = Unable to determine; 1 = Yes) - #10: Were those subjects who were prepared to participate representative of the entire population from which they were recruited? (0 = No; 0 = Unable to determine; 1 = Yes) - #11: Were the statistical tests used to assess the main outcomes appropriate? (0 = No; 0 = Unable to determine; 1 = Yes) - #12: Were the main outcome measures used accurate (valid and reliable)? (0 = No; 0 = Unable to determine; 1 = Yes) - #13: Were the patients in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited from the same population? (0 = No; 0 = Unable to determine; 1 = Yes) - #14: Were study subjects in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited over the same period of time? (0 = No; 0 = Unable to determine; 1 = Yes) - #15: Were losses of patients to follow-up taken into account? (0 = No; 0 = Unable to determine; 1 = Yes).

* Items not considered for retrospective cohort and case-control studies.

** Item not considered for case-control studies.

na = not applicable.

Age (Mean - SD)	19.2	0.7
Gender (N - %)		
Female	140	84.8
Male	25	15.2
Number of family members (Mean - SD)	5.0	1.3
Number of children (Mean - SD)	0.0	0.0
Father's highest educational level (N - %)		
Up to the middle school	58	35.2
Secondary professional or high school	98	59.4
Academic	9	5.5
Mother's highest educational level (N - %)		
Up to the middle school	64	38.8
Secondary professional or high school	85	51.5
Academic	16	9.7
Father's job (N - %)		
Legislator, businessman, manager	16	10.3
Intellectual, scientific, and high specialized professions	0	0.0
Technical profession	5	3.2
Executive profession in the office work	10	6.5
Qualified profession in commercial activities and services	1	0.6
Artisan, specialized worker or farmer	70	45.2
System conductor, fixed and mobile machinery worker or vehicle drivers	4	2.6
Not qualified profession	3	1.9
Army	5	3.2
Unemployed/Invalid	41	26.5
Mother's job (N - %)		
Legislator, businessman, manager	2	1.2
Intellectual, scientific, and high specialized professions	0	0.0
Technical profession	7	4.3
Executive profession in the office work	10	6.1
Qualified profession in commercial activities and services	5	3.0
Artisan, specialized worker or farmer	22	13.4
System conductor, fixed and mobile machinery worker or vehicle drivers	0	0.0
Not qualified profession	0	0.0
Army	0	0.0
Unemployed/Housewife	118	72.0
Have had a family member employed as nurse (N - %)		
Yes	12	7.3
No	153	92.7

Type of secondary school attended (N - %)		
High school	160	97.0
Technical and professional school	3	1.8
Other	2	1.2
Secondary school grade (Mean - SD)	85.2	7.4
JSE-HPS score (Mean - SD)	85.9	6.9

Table 2. Sociodemographic characteristics, education, and cognitive empathy assessed at T_0 (n = 165).

Had ever worked (N - %)		
No	143	86.7
Yes	22	13.3
Field of the previous work activity (N - %)		
Healthcare	0	0.0
Not healthcare	22	100.0
Both	0	0.0
Had attended any other educational program without graduating (N - %)		
Yes	3	1.8
No	162	98.2

Table 3. Activities performed before applying for the NBP assessed at T_0 (n = 165).

Had participated in the 'open days' at the university (N - %)		
Yes	70	42.4
No	95	57.6
Life period in which students decided to apply for the NBP (N - %)		
After completing the secondary school, as a first educational choice	159	96.4
After attending other educational programs (academic or not)	3	1.8
After working for a period	3	1.8
Nursing indicated as first preference when applied (N - %)		
Yes	88	53.7
No	76	46.3
Main reason for choosing Nursing (N - %)		
'Internal' motivation (i.e. aptitude for aiding people, personal experiences or interest in healthcare subjects)	125	75.8
'External' motivation (i.e. employment opportunity, family advice/influence)	30	18.2
Both	10	6.1
Family approval of the career choice (N - %)		
Yes	163	98.8
No	2	1.2
Would advise a relative to become a nurse (N - %)		
Yes	144	87.3

No	21	12.7
Conformity between nurses' image perceived before enrolling and when filling the questionnaire (N - %)		
Yes	65	39.4
No	12	7.3
Partially	88	53.3
Conformity between nurses' image perceived through the media and when filling the questionnaire (N - %)		
Yes	74	44.8
No, the image provided by the media is worse	28	17.0
No, the image provided by the media is better	63	38.2

Table 4. Motivation to choose to be a nurse and perceived image of nurses assessed at T_0 (n = 165).

Lived in the city where the university is (N - %)		
Yes, with the family	50	30.3
Yes, with cohabitants	57	34.5
Yes, alone	2	1.2
No	56	33.9
How the university was usually reached (N - %)		
On feet	125	75.8
With public transport	36	21.8
With own or friends' vehicle	4	2.4
Distance university-home (km, Mean - SD)	5.9	13.6
Time daily spent to reach the university (minutes, Mean - SD)	24.1	25.1
Received a scholarship (N - %)		
Yes	46	27.9
No	119	72.1
Main source of economic support for the academic career (N - %)		
Student's family	156	95.7
Relatives/friends	0	0.0
Scholarship	1	0.6
Student, working while studying	6	3.7

Table 5. Life and study conditions while attending the first academic year of the NBP (n = 165).

Worked (N - %)		
No	154	93.3
Yes	11	6.7
Weekly hours of work (Mean - SD)	26.7	18.4
Continuous work during the year (N - %)		
No	1	9.1
Yes	10	90.9

Number of months of continuous work (Mean - SD)		5.0	2.4
Continuous work field (N - %)			
	Healthcare	0	0.0
	Not healthcare	10	100.0
	Both	0	0.0
Volunteered (N - %)			
No		129	78.2
Yes		36	21.8
	Weekly hours of volunteering (Mean - SD)	4.7	5.6
	Continuous volunteering during the year (N - %)		
	No	0	0.0
	Yes	34	100.0
	Number of months of continuous volunteering (Mean - SD)	3.8	3.1
	Continuous volunteering field (N - %)		
	Healthcare	6	17.6
	Not healthcare	16	47.1
	Both	12	35.3
Attended the 'Erasmus Project' (N - %)			
Yes		4	2.4
No		161	97.6
Faced familial burden (N - %)			
No		123	74.5
Yes		42	25.5
	Familial burden lasting (N - %)		
	Whole year	7	16.7
	Limited period	35	83.3
	Number of months (Mean - SD)	2.8	1.6
Faced personal health issues that did not allow to undertake one or more exams (N - %)			
Yes		14	8.5
No		151	91.5
Experienced financial difficulties (N - %)			
Yes		98	59.4
No		67	40.6
Experienced life events (N - %)			
Yes		70	42.4
No		95	57.6

Table 6. Other activities performed and trouble faced while attending the first academic year of the NBP (n = 165).

Main study sources (N - %)			
	Official (e.g. textbooks)	120	72.7
	Unofficial (e.g. web)	43	26.1
	Both	2	1.2

Study method (N - %)		
Individual	160	97.0
In group	5	3.0
Study organization (N - %)		
Just before the exams	15	9.1
Periodically during the semester	44	26.7
Every day after lessons	106	64.2

Table 18. Study sources and methods while attending the first academic year of the NBP (n = 165).

Experienced learning difficulties (N - %)		
No	3	1.8
Yes	162	98.2
Main reason for difficulties (N - %)		
Poor teaching effectiveness of teachers	1	0.6
Ineffective study method	6	3.7
Appropriate organization of exam sessions	3	1.9
Inadequacy of previous education	13	8.0
Excessive material to study	85	52.5
Excessive complexity of the disciplines	5	3.1
Language difficulties	8	4.9
Lack of time to study	40	24.7
Other	1	0.6
Intention to leave the NBP (N - %)		
No	127	77.0
Yes	38	23.0
Main reason (N - %)		
Fear of not being able to successfully complete the program	14	46.7
Difficult impact in the first clinical placement	1	3.3
Failure in one or more exams	6	20.0
Doubt having made a wrong choice	4	13.3
Personal organizational difficulties	1	3.3
Difficulties in studying	4	13.3
Difficulties in the clinical placement	0	0.0
Difficult relationship with clinical tutors	0	0.0
Difficult relationship with the reference guide	0	0.0
Other	0	0.0

Table 197. Learning difficulties and intention to leave the program during the first academic year of the NBP (n = 165).

Educational pathway met students' expectations regarding the study load (N - %)		
Yes	69	41.8
No, study load was less than expected	4	2.4

No, study load was more than expected	92	55.8
Agreed if the NBP lasting would have been lengthened up to four years (N - %)		
Yes	69	41.8
No	96	58.2
Perceived level of importance towards students' education about organizational features and services offered by the attended institutions		
Relationship with persons (Mean - SD)	7.7	1.8
Teaching (Mean - SD)	8.9	1.4
Physical environments (Mean - SD)	8.5	1.8
Clinical placement (Mean - SD)	9.1	1.7
Others (Mean - SD)	8.0	2.0
Level of satisfaction about organizational features and services offered by the attended institutions (Mean - SD)		
Relationship with persons (Mean - SD)	7.2	2.0
Teaching (Mean - SD)	8.5	1.7
Physical environments (Mean - SD)	7.4	2.1
Clinical placement (Mean - SD)	7.3	2.6
Others (Mean - SD)	6.4	2.5
Global level of satisfaction about the program (Mean - SD)	7.8	2.3
Level of satisfaction – Perceived level of importance about organizational features and services offered by the attended institutions (Mean - SD)		
Relationship with persons (Mean - SD)	-0.5	1.7
Teaching (Mean - SD)	-0.4	1.5
Physical environments (Mean - SD)	-1.1	2.3
Clinical placement (Mean - SD)	-1.8	2.7
Others (Mean - SD)	-1.6	2.6

Table 20. Program evaluation assessed at T_0 (n = 165).

Clinical area attended (N - %)		
Medical	139	84.8
Surgical	25	15.2
Outpatient	0	0.0
Biological contamination (N - %)		
No	127	77.0
Yes	38	23.0
Number of biological contaminations (Mean - SD)	4.6	4.8

Table 8. Information about the very first clinical placement assessed T_0 (n = 165).

Number of attended floors (Mean - SD)	4.1	1.0

Witnessed to organizational changings in the attended floors (N - %)			
	Yes	8	4.8
	No	57	34.5
	I do not know	100	60.6
Met the 'reference guide' (N - %)			
	Yes	148	89.7
	No	17	10.3
Electronically communicated with the 'reference guide' (N - %)			
	No	160	97.0
	Yes	5	3.0
	Number of electronical communications with the 'reference guide' (Mean - SD)	3.0	1.4
Interrupted the placement for a period (N - %)			
	Yes	14	8.5
	No	151	91.5
Person perceived as the main contributor to students' learning process (N - %)			
	Reference guide	19	11.5
	Clinical tutors (i.e. nurses in floors)	61	37.0
	Both	85	51.5
Initial motivation to attend the placement (N - %)			
	Motivated	157	95.2
	Not motivated	8	4.8
Final level of satisfaction for the placement (N - %)			
	Satisfied	112	67.9
	Neutral	3	1.8
	Not satisfied	50	30.3
CLES+T score			
	Pedagogical atmosphere (Mean - SD)	3.8	0.8
	Leadership style of the ward manager (Mean - SD)	4.0	0.8
	Premises of nursing in the ward (Mean - SD)	3.9	0.7
	Supervisory relationship (Mean - SD)	3.7	0.9
	Role of the nurse teacher (Mean - SD)	3.9	0.7
	Total (Mean - SD)	3.8	0.7

Table 9. Information about the clinical placement performed during the first academic year of the NBP (n = 165).

	Success students (N = 108)		Not success students (N = 57)		p-value
Age (Mean - SD)	19.2	0.5	19.4	0.9	0.163
Gender (N - %)					
Female	92	65.7	48	34.3	0.868
Male	16	64.0	9	36.0	
Number of family members (Mean - SD)	4.9	1.2	5.2	1.3	0.107
Number of children (Mean - SD)	0.0	0.0	0.0	0.0	--
Father's highest educational level (N - %)					
Up to the middle school	36	62.1	22	37.9	
Secondary professional or high school	65	66.3	33	33.7	--
Academic	7	77.8	2	22.2	
Mother's highest educational level (N - %)					
Up to the middle school	42	65.6	22	34.4	
Secondary professional or high school	55	64.7	30	35.3	0.952
Academic	11	68.8	5	31.3	
Father's job (N - %)					
Legislator, businessman, manager	11	68.8	5	31.3	
Intellectual, scientific, and high specialized professions	0	0.0	0	0.0	
Technical profession	2	40.0	3	60.0	
Executive profession in the office work	7	70.0	3	30.0	
Qualified profession in commercial activities and services	0	0.0	1	100.0	--
Artisan, specialized worker or farmer	46	65.7	24	34.3	
System conductor, fixed and mobile machinery worker or vehicle drivers	3	75.0	1	25.0	
Not qualified profession	2	66.7	1	33.3	
Army	3	60.0	2	40.0	
Unemployed/Invalid	28	68.3	13	31.7	
Mother's job (N - %)					
Legislator, businessman, manager	1	50.0	1	50.0	
Intellectual, scientific, and high specialized professions	0	0.0	0	0.0	
Technical profession	5	71.4	2	28.6	
Executive profession in the office work	7	70.0	3	30.0	
Qualified profession in commercial activities and services	4	80.0	1	20.0	--
Artisan, specialized worker or farmer	13	59.1	9	40.9	
System conductor, fixed and mobile machinery worker or vehicle drivers	0	0.0	0	0.0	
Not qualified profession	0	0.0	0	0.0	
Army	0	0.0	0	0.0	
Unemployed/Housewife	77	65.3	41	34.7	

	Success students (N = 108)		Not success students (N = 57)		p-value
Have had a family member employed as nurse (N - %)					
Yes	9	75.0	3	25.0	0.547
No	99	64.7	54	35.3	
Type of secondary school attended (N - %)					
High school	106	66.3	54	33.8	
Technical and professional school	1	33.3	2	66.7	--
Other	1	50.0	1	50.0	
Secondary school grade (Mean - SD)	85.9	6.5	83.7	8.7	0.088
JSE-HPS score (Mean - SD)	86.3	7.2	84.9	6.1	0.235

Table 23. Association between academic success and sociodemographic characteristics, education, and cognitive empathy measured at T_0 (n = 165).

	Success students (N = 108)		Not success students (N = 57)		p-value
Had ever worked (N - %)					
No	99	69.2	44	30.8	**0.009**
Yes	9	40.9	13	59.1	
Field of the previous work activity (N - %)					
Healthcare	0	0.0	0	0.0	
Not healthcare	9	40.9	13	59.1	--
Both	0	0.0	0	0.0	
Had attended any other educational program without graduating (N - %)					
Yes	2	66.7	1	33.3	1.000
No	106	65.4	56	34.6	

Table 10. Association between academic success and activities performed before enrolling in the NBP measured at T_0 (n = 165).

	Success students (N = 108)		Not success students (N = 57)		p-value
Had participated in the 'open days' at the university (N - %)					
Yes	42	60.0	28	40.0	0.206
No	66	69.5	29	30.5	
Life period in which students decided to apply for the NBP (N - %)					
After completing the secondary school, as a first educational choice	107	67.3	52	32.7	--
After attending other educational programs (academic or not)	1	33.3	2	66.7	

After working for a period	0	0.0	3	100.0	
Nursing indicated as first preference when applied (N - %)					
Yes	63	71.6	25	28.4	0.066
No	44	57.9	32	42.1	
Main reason for choosing Nursing (N - %)					
'Internal' motivation (i.e. aptitude for aiding people, personal experiences or interest in healthcare subjects)	86	68.8	39	31.2	--
'External' motivation (i.e. employment opportunity, family advice/influence)	14	46.7	16	53.3	
Both	8	80.0	2	20.0	
Family approval of the career choice (N - %)					
Yes	107	65.6	56	34.4	1.000
No	1	50.0	1	50.0	
Would advise a relative to become a nurse (N - %)					
Yes	94	65.3	50	34.7	0.900
No	14	66.7	7	33.3	
Conformity between nurses' image perceived before enrolling and when filling the questionnaire (N - %)					
Yes	43	66.2	22	33.8	
No	10	83.3	2	16.7	--
Partially	55	62.5	33	37.5	
Conformity between nurses' image perceived through the media and when filling the questionnaire (N - %)					
Yes	51	68.9	23	31.1	
No, the image provided by the media is worse	38	60.3	25	39.7	0.549
No, the image provided by the media is better	19	67.9	9	32.1	

Table 11. Association between academic success and motivation to choose to be a nurse and perceived image of nurses assessed at T_0 (n = 165).

	Success students (N = 108)		Not success students (N = 57)		p-value
Lived in the city where the university is (N - %)					
Yes, with the family	37	74.0	13	26.0	
Yes, with cohabitants	32	56.1	25	43.9	--
Yes, alone	2	100.0	0	0.0	

	Success		Not success		p-value
No	37	66.1	19	33.9	
How the university was usually reached (N - %)					
On feet	84	67.2	41	32.8	
With public transport	22	61.1	14	38.9	--
With own or friends' vehicle	2	50.0	2	50.0	
Distance university-home (km, Mean - SD)	4.4	9.8	8.6	18.5	0.937
Time daily spent to reach the university (minutes, Mean - SD)	23.4	20.9	25.6	31.6	0.682
Received a scholarship (N - %)					
Yes	30	65.2	16	34.8	0.968
No	78	65.5	41	34.5	
Main source of economic support for the academic career (N - %)					
Student's family	103	66.0	53	34.0	
Relatives/friends	0	0.0	0	0.0	--
Scholarship	0	0.0	1	100.0	
Student, working while studying	3	50.0	3	50.0	

Table 12. Association between academic success and life and study conditions while attending the first academic year of the NBP (n = 165).

	Success students (N = 108)		Not success students (N = 57)		p-value
Worked (N - %)					
No	102	66.2	52	33.8	0.431
Yes	6	54.5	5	45.5	
Weekly hours of work (Mean - SD)	32.0	20.2	20.4	15.6	0.329
Continuous work during the year (N - %)					
No	1	100.0	0	0.0	1.000
Yes	5	50.0	5	50.0	
Number of months of continuous work (Mean - SD)	3.6	2.1	6.4	2.1	0.095
Continuous work field (N - %)					
Healthcare	0	0.0	0	0.0	
Not healthcare	5	50.0	5	50.0	--
Both	0	0.0	0	0.0	
Volunteered (N - %)					
No	87	67.4	42	32.6	0.310
Yes	21	58.3	15	41.7	
Weekly hours of volunteering (Mean - SD)	3.1	2.0	6.5	7.7	0.433

	Success (N)	Success (%)	Not success (N)	Not success (%)	p-value
Continuous volunteering during the year (N - %)					
No	0	0.0	0	0.0	--
Yes	19	55.9	15	44.1	
Number of months of continuous volunteering (Mean - SD)	4.1	3.3	3.5	2.9	0.706
Continuous volunteering field (N - %)					
Healthcare	2	33.3	4	66.7	
Not healthcare	11	68.8	5	31.3	--
Both	6	50.0	6	50.0	
Attended the 'Erasmus Project' (N - %)					
Yes	3	75.0	1	25.0	1.000
No	105	65.2	56	34.8	
Faced familial burden (N - %)					
No	79	64.2	44	35.8	0.571
Yes	29	69.0	13	31.0	
Familial burden lasting (N - %)					
Whole year	7	100.0	0	0.0	0.079
Limited period	22	62.9	13	37.1	
Number of months (Mean - SD)	2.7	1.5	2.8	1.8	0.960
Faced personal health issues that did not allow to undertake one or more exams (N - %)					
Yes	8	57.1	6	42.9	0.494
No	100	66.2	51	33.8	
Experienced financial difficulties (N - %)					
Yes	64	65.3	34	34.7	0.961
No	44	65.7	23	34.3	
Experienced life events (N - %)					
Yes	49	70.0	21	30.0	0.292
No	59	62.1	36	37.9	

Table 13. Association between academic success and other activities performed and trouble faced while attending the first academic year of the NBP (n = 165).

	Success students (N = 108)		Not success students (N = 57)		p-value
Main study sources (N - %)					
Official (e.g. textbooks)	76	63.3	44	36.7	
Unofficial (e.g. web)	30	69.8	13	30.2	--
Both	2	100.0	0	0.0	
Study method (N - %)					

	Success students (N = 108)		Not success students (N = 57)		p-value
Individual	107	66.9	53	33.1	**0.049**
In group	1	20.0	4	80.0	
Study organization (N - %)					
Just before the exams	12	80.0	3	20.0	
Periodically during the semester	25	56.8	19	43.2	--
Every day after lessons	71	67.0	35	33.0	

Table 28. Association between academic success and study sources and methods while attending the first academic year of the NBP (n = 165).

	Success students (N = 108)		Not success students (N = 57)		p-value
Experienced learning difficulties (N - %)					
No	2	66.7	1	33.3	1.000
Yes	106	65.4	56	34.6	
Main reason for difficulties (N - %)					
Poor teaching effectiveness of teachers	1	100.0	0	0.0	
Ineffective study method	3	50.0	3	50.0	
Appropriate organization of exam sessions	1	33.3	2	66.7	
Inadequacy of previous education	9	69.2	4	30.8	
Excessive material to study	61	71.8	24	28.2	--
Excessive complexity of the disciplines	3	60.0	2	40.0	
Language difficulties	8	100.0	0	0.0	
Lack of time to study	20	50.0	20	50.0	
Other	0	0.0	1	100.0	
Intention to leave the NBP (N - %)					
No	83	65.4	44	34.6	0.961
Yes	25	65.8	13	34.2	
Main reason (N - %)					
Fear of not being able to successfully complete the program	8	57.1	6	42.9	
Difficult impact in the first clinical placement	1	100.0	0	0.0	
Failure in one or more exams	4	66.7	2	33.3	--
Doubt having made a wrong choice	2	50.0	2	50.0	
Personal organizational difficulties	1	100.0	0	0.0	
Difficulties in studying	2	50.0	2	50.0	
Difficulties in the clinical placement	0	0.0	0	0.0	

Difficult relationship with clinical tutors	0	0.0	0	0.0
Difficult relationship with the reference guide	0	0.0	0	0.0
Other	0	0.0	0	0.0

Table 29. Association between academic success and learning difficulties and intention to leave the program during the first academic year of the NBP (n = 165).

	Success students (N = 108)		Not success students (N = 57)		p-value
Educational pathway met students' expectations regarding the study load (N - %)					
Yes	45	65.2	24	34.8	
No, study load was less than expected	3	75.0	1	25.0	--
No, study load was more than expected	60	65.2	32	34.8	
Agreed if the NBP lasting would have been lengthened up to four years (N - %)					
Yes	41	59.4	28	40.6	0.167
No	67	69.8	29	30.2	
Perceived level of importance towards students' education about organizational features and services offered by the attended institutions					
Relationship with persons (Mean - SD)	7.7	1.9	7.7	1.6	0.974
Teaching (Mean - SD)	8.9	1.6	9.0	1.0	0.631
Physical environments (Mean - SD)	8.5	1.9	8.4	1.6	0.203
Clinical placement (Mean - SD)	9.0	1.9	9.3	1.4	0.973
Others (Mean - SD)	7.9	2.2	8.3	1.7	0.489
Level of satisfaction about organizational features and services offered by the attended institutions					
Relationship with persons (Mean - SD)	7.1	2.1	7.5	1.7	0.373
Teaching (Mean - SD)	8.4	1.8	8.7	1.2	0.665
Physical environments (Mean - SD)	7.3	2.2	7.5	1.9	0.679
Clinical placement (Mean - SD)	7.2	2.6	7.6	2.5	0.432
Others (Mean - SD)	6.2	2.6	6.8	2.4	0.201

Global level of satisfaction about the program (Mean - SD)	7.5	2.5	8.1	1.9	0.204
Level of satisfaction – Perceived level of importance about organizational features and services offered by the attended institutions					
Relationship with persons (Mean - SD)	-0.6	1.8	-0.3	1.3	0.254
Teaching (Mean - SD)	-0.5	1.7	-0.3	1.2	0.516
Physical environments (Mean - SD)	-1.2	2.3	-0.9	2.2	0.880
Clinical placement (Mean - SD)	-1.8	2.7	-1.7	2.6	0.646
Others (Mean - SD)	-1.6	2.7	-1.5	2.5	0.604

Table 14. Association between academic success and program evaluation provided at T_0 (n = 165).

	Success students (N = 108)		Not success students (N = 57)		p-value
Clinical area attended (N - %)					
Medical	92	66.2	47	33.8	
Surgical	15	60.0	10	40.0	0.649
Outpatient	0	0.0	0	0.0	
Biological contamination (N - %)					
No	85	66.9	42	33.1	0.466
Yes	23	60.5	15	39.5	
Number of biological contaminations (Mean - SD)	5.7	5.4	3.4	3.7	0.085

Table 15. Association between academic success and information on the very first clinical placement provided at T_0 (n =165).

	Success students (N = 108)		Not success students (N = 57)		p-value
Number of attended floors (Mean - SD)	4.1	1.0	4.0	1.0	0.965
Witnessed to organizational changings in the attended floors (N - %)					
Yes	6	75.0	2	25.0	
No	39	68.4	18	31.6	--
I do not know	63	63.0	37	37.0	
Met the 'reference guide' (N - %)					
Yes	93	62.8	55	37.2	0.056

No	15	88.2	2	11.8	
Electronically communicated with the 'reference guide' (N - %)					
No	106	66.3	54	33.8	0.341
Yes	2	40.0	3	60.0	
Number of electronical communications with the 'reference guide' (Mean - SD)	3.5	2.1	2.5	0.7	0.667
Interrupted the placement for a period (N - %)					
Yes	8	57.1	6	42.9	0.494
No	100	66.2	51	33.8	
Person perceived as the main contributor to students' learning process (N - %)					
Reference guide	14	73.7	5	26.3	
Clinical tutors (i.e. nurses in floors)	40	65.6	21	34.4	0.702
Both	54	63.5	31	36.5	
Initial motivation to attend the placement (N - %)					
Motivated	104	66.2	53	33.8	0.449
Not motivated	4	50.0	4	50.0	
Final level of satisfaction for the placement (N - %)					
Satisfied	73	65.2	39	34.8	
Neutral	2	66.7	1	33.3	--
Not satisfied	33	66.0	17	34.0	
CLES+T score					
Pedagogical atmosphere (Mean - SD)	3.8	0.8	3.9	0.7	0.342
Leadership style of the ward manager (Mean - SD)	4.0	0.8	4.1	0.7	0.579
Premises of nursing in the ward (Mean - SD)	3.9	0.8	4.0	0.6	0.513
Supervisory relationship (Mean - SD)	3.6	0.9	3.8	0.9	0.204
Role of the nurse teacher (Mean - SD)	3.9	0.7	4.0	0.7	0.316
Total (Mean - SD)	3.8	0.7	3.9	0.6	0.192

Table 16. Association between academic success and information on clinical placement performed during the first academic year (n = 165).

Age (Mean - SD)	20.2	0.7
Gender (N - %)		
Female	106	85.5
Male	18	14.5

Number of family members (Mean - SD)	4.9	1.1
Number of children (Mean - SD)	0.0	0.0
Father's highest educational level (N - %)		
Up to the middle school	33	26.6
Secondary professional or high school	82	66.1
Academic	9	7.3
Mother's highest educational level (N - %)		
Up to the middle school	38	30.6
Secondary professional or high school	73	58.9
Academic	13	10.5
Father's job (N - %)		
Legislator, businessman, manager	15	13.0
Intellectual, scientific, and high specialized professions	1	0.9
Technical profession	5	4.3
Executive profession in the office work	9	7.8
Qualified profession in commercial activities and services	0	0.0
Artisan, specialized worker or farmer	53	46.1
System conductor, fixed and mobile machinery worker or vehicle drivers	4	3.5
Not qualified profession	2	1.7
Army	3	2.6
Unemployed/Invalid	23	20.0
Mother's job (N - %)		
Legislator, businessman, manager	1	0.8
Intellectual, scientific, and high specialized professions	0	0.0
Technical profession	7	5.7
Executive profession in the office work	9	7.4
Qualified profession in commercial activities and services	7	5.7
Artisan, specialized worker or farmer	15	12.3
System conductor, fixed and mobile machinery worker or vehicle drivers	0	0.0
Not qualified profession	1	0.8
Army	1	0.8
Unemployed/Housewife	81	66.4
Have had a family member employed as nurse (N - %)		
Yes	19	15.3
No	105	84.7
Type of secondary school attended (N - %)		
High school	120	96.8
Technical and professional school	3	2.4
Other	1	0.8
Secondary school grade (Mean - SD)	86.3	6.9

JSE-HPS score (Mean - SD)	111.8	12.7

Table 17. Sociodemographic characteristics, education, and cognitive empathy assessed at T_1 (n = 124).

Had ever worked (N - %)		
No	102	82.3
Yes	22	17.7
Field of the previous work activity (N - %)		
Healthcare	0	0.0
Not healthcare	21	95.5
Both	1	4.5
Had attended any other educational program without graduating (N - %)		
Yes	1	0.8
No	123	99.2

Table 18. Activities performed before applying for the NBP assessed at T_1 (n = 124).

Had participated in the 'open days' at the university (N - %)		
Yes	63	51.2
No	60	48.8
Life period in which students decided to apply for the NBP (N - %)		
After completing the secondary school, as a first educational choice	116	93.5
After attending other educational programs (academic or not)	4	3.2
After working for a period	4	3.2
Nursing indicated as first preference when applied (N - %)		
Yes	72	58.1
No	52	41.9
Main reason for choosing Nursing (N - %)		
'Internal' motivation (i.e. aptitude for aiding people, personal experiences or interest in healthcare subjects)	93	75.0
'External' motivation (i.e. employment opportunity, family advice/influence)	28	22.6
Both	3	2.4
Family approval of the career choice (N - %)		
Yes	124	100.0
No	0	0.0
Would advise a relative to become a nurse (N - %)		
Yes	113	91.1
No	11	8.9
Conformity between nurses' image perceived before enrolling and when filling the questionnaire (N - %)		

Yes	51	41.1
No	8	6.5
Partially	65	52.4
Conformity between nurses' image perceived through the media and when filling the questionnaire (N - %)		
Yes	55	44.4
No, the image provided by the media is worse	45	36.3
No, the image provided by the media is better	24	19.4

Table 19. Motivation to choose to be a nurse and perceived image of nurses assessed at T_1 (n = 124).

Lived in the city where the university is (N - %)		
Yes, with the family	38	30.6
Yes, with cohabitants	46	37.1
Yes, alone	6	4.8
No	34	27.4
How the university was usually reached (N - %)		
On feet	86	69.4
With public transport	34	27.4
With own or friends' vehicle	4	3.2
Distance university-home (km, Mean - SD)	6.1	12.7
Time daily spent to reach the university (minutes, Mean - SD)	27.6	28.3
Received a scholarship (N - %)		
Yes	34	27.4
No	90	72.6
Main source of economic support for the academic career (N - %)		
Student's family	121	97.6
Relatives/friends	0	0.0
Scholarship	1	0.8
Student, working while studying	2	1.6

Table 20. Life and study conditions while attending the second academic year of the NBP (n = 124).

Worked (N - %)		
No	115	92.7
Yes	9	7.3
Weekly hours of work (Mean - SD)	20.3	18.2
Continuous work during the year (N - %)		
No	3	33.3
Yes	6	66.7
Number of months of continuous work (Mean - SD)	7.8	4.9

Continuous work field (N - %)			
	Healthcare	0	0.0
	Not healthcare	5	83.3
	Both	1	16.7
Volunteered (N - %)			
No		111	89.5
Yes		13	10.5
	Weekly hours of volunteering (Mean - SD)	7.5	6.8
	Continuous volunteering during the year (N - %)		
	No	1	8.3
	Yes	11	91.7
	Number of months of continuous volunteering (Mean - SD)	2.0	0.9
	Continuous volunteering field (N - %)		
	Healthcare	4	36.4
	Not healthcare	4	36.4
	Both	3	27.3
Attended the 'Erasmus Project' (N - %)			
Yes		2	1.6
No		122	98.4
Faced familial burden (N - %)			
No		93	75.0
Yes		31	25.0
	Familial burden lasting (N - %)		
	Whole year	6	20.0
	Limited period	24	80.0
	Number of months (Mean - SD)	2.3	1.7
Faced personal health issues that did not allow to undertake one or more exams (N - %)			
Yes		13	10.5
No		111	89.5
Experienced financial difficulties (N - %)			
Yes		62	50.0
No		62	50.0
Experienced life events (N - %)			
Yes		62	50.0
No		62	50.0

Table 21. Other activities performed and trouble faced while attending the second academic year of the NBP (n = 124).

Main study sources (N - %)			
Official (e.g. textbooks)	82	66.1	

Unofficial (e.g. web)	42	33.9
Both	--	--
Study method (N - %)		
Individual	122	98.4
In group	2	1.6
Study organization (N - %)		
Just before the exams	7	5.6
Periodically during the semester	38	30.6
Every day after lessons	79	63.7

Table 3922. Study sources and methods while attending the second academic year of the NBP (n = 124).

Experienced learning difficulties (N - %)		
No	13	10.5
Yes	111	89.5
Main reason for difficulties (N - %)		
Poor teaching effectiveness of teachers	0	0.0
Ineffective study method	7	6.3
Inappropriate organization of exam sessions	3	2.7
Inadequacy of previous education	13	11.7
Excessive material to study	65	58.6
Excessive complexity of the disciplines	1	0.9
Language difficulties	5	4.5
Lack of time to study	17	15.3
Other	0	0.0
Intention to leave the NBP (N - %)		
No	112	90.3
Yes	12	9.7
Main reason (N - %)		
Fear of not being able to successfully complete the program	2	28.6
Difficult impact in the first clinical placement	0	0.0
Failure in one or more exams	3	42.9
Doubt having made a wrong choice	1	14.3
Personal organizational difficulties	0	0.0
Difficulties in studying	0	0.0
Difficulties in the clinical placement	0	0.0
Difficult relationship with clinical tutors	0	0.0
Difficult relationship with the reference guide	0	0.0
Other	1	14.3

Table 23. Learning difficulties and intention to leave the program during the second academic year of the NBP (n = 124).

Educational pathway met students' expectations regarding the study load (N - %)		
Yes	72	58.1
No, study load was less than expected	2	1.6
No, study load was more than expected	50	40.3
Agreed if the NBP lasting would have been lengthened up to four years (N - %)		
Yes	36	29.0
No	88	71.0
Perceived level of importance towards students' education about organizational features and services offered by the attended institutions		
Relationship with persons (Mean - SD)	8.0	1.7
Teaching (Mean - SD)	8.9	1.6
Physical environments (Mean - SD)	8.4	2.0
Clinical placement (Mean - SD)	9.0	2.0
Others (Mean - SD)	8.1	2.3
Level of satisfaction about organizational features and services offered by the attended institutions (Mean - SD)		
Relationship with persons (Mean - SD)	7.8	1.7
Teaching (Mean - SD)	8.6	1.5
Physical environments (Mean - SD)	7.1	2.4
Clinical placement (Mean - SD)	7.4	2.5
Others (Mean - SD)	6.9	2.4
Global level of satisfaction about the program (Mean - SD)	8.1	2.0
Level of satisfaction – Perceived level of importance about organizational features and services offered by the attended institutions (Mean - SD)		
Relationship with persons (Mean - SD)	-0.3	1.8
Teaching (Mean - SD)	-0.3	1.5
Physical environments (Mean - SD)	-1.3	2.5
Clinical placement (Mean - SD)	-1.7	2.8
Others (Mean - SD)	-1.2	2.3

Table 24. Program evaluation assessed at T_1 (n = 124).

Clinical area attended (N - %)		
Medical	111	89.5
Surgical	13	10.5
Outpatient	--	--
Biological contamination (N - %)		

No	92	74.2
Yes	32	25.8
Number of biological contaminations (Mean - SD)	4.2	3.2

Table 25. Information about the very first clinical placement assessed at T_1 (n = 124).

Number of attended floors (Mean - SD)	4.2	1.3
Witnessed to organizational changings in the attended floors (N - %)		
Yes	7	5.6
No	35	28.2
I do not know	82	66.1
Met the 'reference guide' (N - %)		
Yes	101	81.5
No	23	18.5
Electronically communicated with the 'reference guide' (N - %)		
No	122	98.4
Yes	2	1.6
Number of electronical communications with the 'reference guide' (Mean - SD)	5.0	--
Interrupted the placement for a period (N - %)		
Yes	6	4.8
No	118	95.2
Person perceived as the main contributor to students' learning process (N - %)		
Reference guide	20	16.1
Clinical tutors (i.e. nurses in floors)	37	29.8
Both	67	54.0
Initial motivation to attend the placement (N - %)		
Motivated	119	96.0
Not motivated	5	4.0
Final level of satisfaction for the placement (N - %)		
Satisfied	97	78.2
Neutral	1	0.8
Not satisfied	26	21.0
CLES+T score		
Pedagogical atmosphere (Mean - SD)	4.0	0.7
Leadership style of the ward manager (Mean - SD)	4.1	0.8
Premises of nursing in the ward (Mean - SD)	4.1	0.8
Supervisory relationship (Mean - SD)	3.9	0.9
Role of the nurse teacher (Mean - SD)	4.1	0.7

	Total (Mean - SD)					
				4.0	0.7	

Table 26. Information about the clinical placement performed during the second academic year of the NBP (n = 124).

	Success students (N = 107)		Not success students (N = 17)		p-value
Age (Mean - SD)	20.1	0.6	20.6	1.2	**0.044**
Gender (N - %)					
Female	93	87.7	13	12.3	0.271
Male	14	77.8	4	22.2	
Number of family members (Mean - SD)	4.9	1.1	5.0	0.9	0.420
Number of children (Mean - SD)	0.0	0.0	0.0	0.0	--
Father's highest educational level (N - %)					
Up to the middle school	25	75.8	8	24.2	
Secondary professional or high school	75	91.5	7	8.5	--
Academic	7	77.8	2	22.2	
Mother's highest educational level (N - %)					
Up to the middle school	33	86.8	5	13.2	
Secondary professional or high school	63	86.3	10	13.7	--
Academic	11	84.6	2	15.4	
Father's job (N - %)					
Legislator, businessman, manager	14	93.3	1	6.7	
Intellectual, scientific, and high specialized professions	1	100.0	0	0.0	
Technical profession	3	60.0	2	40.0	
Executive profession in the office work	7	77.8	2	22.2	
Qualified profession in commercial activities and services	0	0.0	0	0.0	--
Artisan, specialized worker or farmer	49	92.5	4	7.5	
System conductor, fixed and mobile machinery worker or vehicle drivers	3	75.0	1	25.0	
Not qualified profession	2	100.0	0	0.0	
Army	3	100.0	0	0.0	
Unemployed/Invalid	18	78.3	5	21.7	
Mother's job (N - %)					
Legislator, businessman, manager	1	100.0	0	0.0	
Intellectual, scientific, and high specialized professions	0	0.0	0	0.0	--
Technical profession	5	71.4	2	28.6	
Executive profession in the office work	7	77.8	2	22.2	

Qualified profession in commercial activities and services	7	100.0	0	0.0	
Artisan, specialized worker or farmer	12	80.0	3	20.0	
System conductor, fixed and mobile machinery worker or vehicle drivers	0	0.0	0	0.0	
Not qualified profession	1	100.0	0	0.0	
Army	1	100.0	0	0.0	
Unemployed/Housewife	71	87.7	10	12.3	
Have had a family member employed as nurse (N - %)					
Yes	18	94.7	1	5.3	0.467
No	89	84.8	16	15.2	
Type of secondary school attended (N - %)					
High school	104	86.7	16	13.3	
Technical and professional school	2	66.7	1	33.3	--
Other	1	100.0	0	0.0	
Secondary school grade (Mean - SD)	87.3	6.4	80.2	6.7	**<0.001**
JSE-HPS score (Mean - SD)	112.6	12.5	105.0	13.1	0.080

Table 27. Association between academic success and sociodemographic characteristics, education, and cognitive empathy measured at T_1 (n = 124).

	Success students (N = 107)		Not success students (N = 17)		p-value
Had ever worked (N - %)					
No	89	87.3	13	12.7	0.501
Yes	18	81.8	4	18.2	
Field of the previous work activity (N - %)					
Healthcare	0	0.0	0	0.0	
Not healthcare	18	85.7	3	14.3	0.182
Both	0	0.0	1	100.0	
Had attended any other educational program without graduating (N - %)					
Yes	0	0.0	1	100.0	0.137
No	107	87.0	16	13.0	

Table 28. Association between academic success and activities performed before enrolling in the NBP measured at T_1 (n = 124).

	Success students (N = 107)		Not success students (N = 17)		p-value
Had participated in the 'open days' at the university (N - %)					
Yes	55	87.3	8	12.7	0.712
No	51	85.0	9	15.0	
Life period in which students decided to apply for the NBP (N - %)					
After completing the secondary school, as a first educational choice	105	90.5	11	9.5	--
After attending other educational programs (academic or not)	1	25.0	3	75.0	
After working for a period	1	25.0	3	75.0	
Nursing indicated as first preference when applied (N - %)					
Yes	62	86.1	10	13.9	0.946
No	45	86.5	7	13.5	
Main reason for choosing Nursing (N - %)					
'Internal' motivation (i.e. aptitude for aiding people, personal experiences or interest in healthcare subjects)	81	87.1	12	12.9	--
'External' motivation (i.e. employment opportunity, family advice/influence)	23	82.1	5	17.9	
Both	3	100.0	0	0.0	
Family approval of the career choice (N - %)					
Yes	107	86.3	17	13.7	--
No	0	0.0	0	0.0	
Would advise a relative to become a nurse (N - %)					
Yes	98	86.7	15	13.3	0.647
No	9	81.8	2	18.2	
Conformity between nurses' image perceived before enrolling and when filling the questionnaire (N - %)					
Yes	43	84.3	8	15.7	--
No	7	87.5	1	12.5	
Partially	57	87.7	8	12.3	
Conformity between nurses' image perceived through the media and when filling the questionnaire (N - %)					
Yes	48	87.3	7	12.7	--

	Success students (N = 107)		Not success students (N = 17)		p-value
No, the image provided by the media is worse	39	86.7	6	13.3	
No, the image provided by the media is better	20	83.3	4	16.7	

Table 46. Association between academic success and motivation to choose to be a nurse and perceived image of nurses assessed at T_1 (n = 124).

	Success students (N = 107)		Not success students (N = 17)		p-value
Lived in the city where the university is (N - %)					
Yes, with the family	37	97.4	1	2.6	
Yes, with cohabitants	42	91.3	4	8.7	
Yes, alone	5	83.3	1	16.7	--
No	23	67.6	11	32.4	
How the university was usually reached (N - %)					
On feet	74	86.0	12	14.0	
With public transport	30	88.2	4	11.8	--
With own or friends' vehicle	3	75.0	1	25.0	
Distance university-home (km, Mean - SD)	4.8	9.7	14.4	23.1	0.134
Time daily spent to reach the university (minutes, Mean - SD)	25.7	22.1	39.5	52.2	0.840
Received a scholarship (N - %)					
Yes	31	91.2	3	8.8	0.396
No	76	84.4	14	15.6	
Main source of economic support for the academic career (N - %)					
Student's family	105	86.8	16	13.2	
Relatives/friends	0	0.0	0	0.0	
Scholarship	1	100.0	0	0.0	--
Student, working while studying	1	50.0	1	50.0	

Table 29. Association between academic success and life and study conditions while attending the second academic year of the NBP (n = 124).

	Success students (N = 107)		Not success students (N = 17)		p-value
Worked (N - %)					
No	99	86.1	16	13.9	1.000
Yes	8	88.9	1	11.1	
Weekly hours of work (Mean - SD)	18.1	18.5	35.0	--	0.500

	N	%	N	%	p-value
Continuous work during the year (N - %)					
No	3	100.0	0	0.0	1.000
Yes	5	83.3	1	16.7	
Number of months of continuous work (Mean - SD)	9.3	4.3	2.0	--	0.400
Continuous work field (N - %)					
Healthcare	0	0.0	0	0.0	
Not healthcare	4	80.0	1	20.0	1.000
Both	1	100.0	0	0.0	
Volunteered (N - %)					
No	95	85.6	16	14.4	1.000
Yes	12	92.3	1	7.7	
Weekly hours of volunteering (Mean - SD)	7.8	7.1	5.0	--	--
Continuous volunteering during the year (N - %)					
No	1	100.0	0	0.0	1.000
Yes	10	90.9	1	9.1	
Number of months of continuous volunteering (Mean - SD)	1.9	0.9	3.0	--	0.364
Continuous volunteering field (N - %)					
Healthcare	4	100.0	0	0.0	
Not healthcare	3	75.0	1	25.0	--
Both	3	100.0	0	0.0	
Attended the 'Erasmus Project' (N - %)					
Yes	2	100.0	0	0.0	1.000
No	105	86.1	17	13.9	
Faced familial burden (N - %)					
No	80	86.0	13	14.0	1.000
Yes	27	87.1	4	12.9	
Familial burden lasting (N - %)					
Whole year	6	100.0	0	0.0	0.557
Limited period	20	83.3	4	16.7	
Number of months (Mean - SD)	2.2	1.5	3.0	2.6	0.718
Faced personal health issues that did not allow to undertake one or more exams (N - %)					
Yes	6	46.2	7	53.8	**<0.001**
No	101	91.0	10	9.0	

	Success students (N = 107)		Not success students (N = 17)		p-value
Experienced financial difficulties (N - %)					
Yes	54	87.1	8	12.9	0.794
No	53	85.5	9	14.5	
Experienced life events (N - %)					
Yes	52	83.9	10	16.1	0.433
No	55	88.7	7	11.3	

Table 30. Association between academic success and other activities performed and trouble faced while attending the second academic year of the NBP (n = 124).

	Success students (N = 107)		Not success students (N = 17)		p-value
Main study sources (N - %)					
Official (e.g. textbooks)	71	86.6	11	13.4	0.894
Unofficial (e.g. web)	36	85.7	6	14.3	
Study method (N - %)					
Individual	106	86.9	16	13.1	0.256
In group	1	50.0	1	50.0	
Study organization (N - %)					
Just before the exams	5	71.4	2	28.6	
Periodically during the semester	29	76.3	9	23.7	--
Every day after lessons	73	92.4	6	7.6	

Table 49. Association between academic success and study sources and methods while attending the second academic year of the NBP (n = 124).

	Success students (N = 107)		Not success students (N = 17)		p-value
Experienced learning difficulties (N - %)					
No	13	100.0	0	0.0	0.212
Yes	94	84.7	17	15.3	
Main reason for difficulties (N - %)					
Poor teaching effectiveness of teachers	0	0.0	0	0.0	
Ineffective study method	7	100.0	0	0.0	
Inappropriate organization of exam sessions	2	66.7	1	33.3	
Inadequacy of previous education	11	84.6	2	15.4	--
Excessive material to study	58	89.2	7	10.8	
Excessive complexity of the disciplines	1	100.0	0	0.0	
Language difficulties	4	80.0	1	20.0	
Lack of time to study	11	64.7	6	35.3	

	Success students		Not success students		
Others	0	0.0	0	0.0	
Intention to leave the NBP (N - %)					
No	98	87.5	14	12.5	0.213
Yes	9	75.0	3	25.0	
Main reason (N - %)					
Fear of not being able to successfully complete the program	2	100.0	0	0.0	
Difficult impact in the first clinical placement	0	0.0	0	0.0	
Failure in one or more exams	1	33.3	2	66.7	
Doubt having made a wrong choice	1	100.0	0	0.0	
Personal organizational difficulties	0	0.0	0	0.0	--
Difficulties in studying	0	0.0	0	0.0	
Difficulties in the clinical placement	0	0.0	0	0.0	
Difficult relationship with clinical tutors	0	0.0	0	0.0	
Difficult relationship with the reference guide	0	0.0	0	0.0	
Other	1	100.0	0	0.0	

Table 31. Association between academic success and learning difficulties and intention to leave the program during the second academic year of the NBP (n = 124).

	Success students (N = 107)		Not success students (N = 17)		p-value
Educational pathway met students' expectations regarding the study load (N - %)					
Yes	61	84.7	11	15.3	
No, study load was less than expected	1	50.0	1	50.0	--
No, study load was more than expected	45	90.0	5	10.0	
Agreed if the NBP lasting would have been lengthened up to four years (N - %)					
Yes	29	80.6	7	19.4	0.235
No	78	88.6	10	11.4	
Perceived level of importance towards students' education about organizational features and services offered by the attended institutions					

	Mean	SD	Mean	SD	p-value
Relationship with persons (Mean - SD)	8.1	1.7	7.8	1.7	0.428
Teaching (Mean - SD)	8.9	1.7	8.9	1.2	0.259
Physical environments (Mean - SD)	8.4	2.0	8.5	1.4	0.458
Clinical placement (Mean - SD)	9.1	1.8	8.4	2.6	0.213
Others (Mean - SD)	8.2	2.2	7.3	2.9	0.186
Level of satisfaction about organizational features and services offered by the attended institutions					
Relationship with persons (Mean - SD)	7.7	1.7	8.4	1.2	0.110
Teaching (Mean - SD)	8.6	1.5	8.9	1.2	0.501
Physical environments (Mean - SD)	7.0	2.5	7.8	1.8	0.422
Clinical placement (Mean - SD)	7.2	2.5	8.4	2.0	**0.044**
Others (Mean - SD)	6.9	2.4	7.4	2.0	0.489
Global level of satisfaction about the program (Mean - SD)	8.1	2.0	8.1	1.6	0.605
Level of satisfaction – Perceived level of importance about organizational features and services offered by the attended institutions					
Relationship with persons (Mean - SD)	-0.4	1.9	0.6	1.4	**0.010**
Teaching (Mean - SD)	-0.3	1.6	0.0	0.6	**0.040**
Physical environments (Mean - SD)	-1.4	2.6	-0.8	1.5	0.348
Clinical placement (Mean - SD)	-1.9	2.9	0.0	1.5	**0.001**
Others (Mean - SD)	-1.4	2.4	0.1	1.3	**0.005**

Table 32. Association between academic success and program evaluation provided at T_1 (n = 124).

	Success students (N = 107)		Not success students (N = 17)		p-value
Clinical area attended (N - %)					
Medical	97	87.4	14	12.6	
Surgical	10	76.9	3	23.1	0.386
Outpatient	--	--	--	--	
Biological contamination (N - %)					
No	78	84.8	14	15.2	
Yes	29	90.6	3	9.4	0.556
Number of biological contaminations (Mean - SD)	4.2	3.1	4.3	4.9	0.600

Table 33. Association between academic success and information on the very first clinical placement provided at T_1 (n = 124).

	Success students (N = 107)		Not success students (N = 17)		p-value
Number of attended floors (Mean - SD)	4.2	1.3	4.2	1.2	0.784
Witnessed to organizational changings in the attended floors (N - %)					
Yes	7	100.0	0	0.0	
No	30	85.7	5	14.3	--
I do not know	70	85.4	12	14.6	
Met the 'reference guide' (N - %)					
Yes	85	84.2	16	15.8	0.193
No	22	95.7	1	4.3	
Electronically communicated with the 'reference guide' (N - %)					
No	105	86.1	17	13.9	1.000
Yes	2	100.0	0	0.0	
Number of electronical communications with the 'reference guide' (Mean - SD)	5.0	--	--	--	--
Interrupted the placement for a period (N - %)					
Yes	5	83.3	1	16.7	1.000
No	102	86.4	16	13.6	
Person perceived as the main contributor to students' learning process (N - %)					
Reference guide	17	85.0	3	15.0	
Clinical tutors (i.e. nurses in floors)	31	83.8	6	16.2	--
Both	59	88.1	8	11.9	
Initial motivation to attend the placement (N - %)					
Motivated	102	85.7	17	14.3	1.000
Not motivated	5	100.0	0	0.0	
Final level of satisfaction for the placement (N - %)					
Satisfied	82	84.5	15	15.5	
Neutral	1	100.0	0	0.0	--
Not satisfied	24	92.3	2	7.7	
CLES+T score					
Pedagogical atmosphere (Mean - SD)	3.9	0.7	4.2	0.7	0.060
Leadership style of the ward manager (Mean - SD)	4.1	0.7	4.1	1.1	0.443
Premises of nursing in the ward (Mean - SD)	4.1	0.7	4.3	0.8	0.299

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Supervisory relationship (Mean - SD)	3.9	0.9	4.4	0.6	**0.034**
Role of the nurse teacher (Mean - SD)	4.1	0.7	4.3	0.8	0.231
Total (Mean - SD)	4.0	0.7	4.3	0.7	0.143

Table 34. Association between academic success and information on clinical placement performed during the second academic year (n = 124).

Age (Mean - SD)	20.8	0.8
Gender (N - %)		
Female	65	86.7
Male	10	13.3
Number of family members (Mean - SD)	5.0	1.0
Number of children (Mean - SD)	0.0	0.0
Father's highest educational level (N - %)		
Up to the middle school	20	26.7
Secondary professional or high school	51	68.0
Academic	4	5.3
Mother's highest educational level (N - %)		
Up to the middle school	28	37.3
Secondary professional or high school	40	53.3
Academic	7	9.3
Father's job (N - %)		
Legislator, businessman, manager	6	17.1
Intellectual, scientific, and high specialized professions	0	0.0
Technical profession	2	5.7
Executive profession in the office work	8	22.9
Qualified profession in commercial activities and services	0	0.0
Artisan, specialized worker or farmer	0	0.0
System conductor, fixed and mobile machinery worker or vehicle drivers	1	2.9
Not qualified profession	0	0.0
Army	3	8.6
Unemployed/Invalid	15	42.9
Mother's job (N - %)		
Legislator, businessman, manager	0	0.0
Intellectual, scientific, and high specialized professions	0	0.0
Technical profession	4	5.8
Executive profession in the office work	6	8.7
Qualified profession in commercial activities and services	1	1.4
Artisan, specialized worker or farmer	2	2.9

System conductor, fixed and mobile machinery worker or vehicle drivers	0	0.0
Not qualified profession	0	0.0
Army	1	1.4
Unemployed/Housewife	55	79.7
Have had a family member employed as nurse (N - %)		
Yes	11	14.7
No	64	85.3
Type of secondary school attended (N - %)		
High school	73	97.3
Technical and professional school	2	2.7
Other	0	0.0
Secondary school grade (Mean - SD)	86.6	12.0
JSE-HPS score (Mean - SD)	110.0	14.2

Table 35. Sociodemographic characteristics, education, and cognitive empathy assessed at T_2 (n = 75).

Had ever worked (N - %)		
No	66	88.0
Yes	9	12.0
Field of the previous work activity (N - %)		
Healthcare	8	100.0
Not healthcare	0	0.0
Both	0	0.0
Had attended any other educational program without graduating (N - %)		
Yes	1	1.3
No	74	98.7

Table 36. Activities performed before applying for the NBP assessed at T_2 (n = 75).

Had participated in the 'open days' at the university (N - %)		
Yes	25	33.8
No	49	66.2
Life period in which students decided to apply for the NBP (N - %)		
After completing the secondary school, as a first educational choice	73	97.3
After attending other educational programs (academic or not)	1	1.3
After working for a period	1	1.3
Nursing indicated as first preference when applied (N - %)		
Yes	47	62.7
No	28	37.3
Main reason for choosing Nursing (N - %)		

'Internal' motivation (i.e. aptitude for aiding people, personal experiences or interest in healthcare subjects)	58	77.3
'External' motivation (i.e. employment opportunity, family advice/influence)	12	16.0
Both	5	6.7
Family approval of the career choice (N - %)		
Yes	75	100.0
No	0	0.0
Would advise a relative to become a nurse (N - %)		
Yes	65	86.7
No	10	13.3
Conformity between nurses' image perceived before enrolling and when filling the questionnaire (N - %)		
Yes	26	35.1
No	7	9.5
Partially	41	55.4
Conformity between nurses' image perceived through the media and when filling the questionnaire (N - %)		
Yes	37	49.3
No, the image provided by the media is worse	26	34.7
No, the image provided by the media is better	12	16.0

Table 37. Motivation to choose to be a nurse and perceived image of nurses assessed at T$_2$ (n = 75).

Lived in the city where the university is (N - %)		
Yes, with the family	26	34.7
Yes, with cohabitants	29	38.7
Yes, alone	1	1.3
No	19	25.3
How the university was usually reached (N - %)		
On feet	52	69.3
With public transport	22	29.3
With own or friends' vehicle	1	1.3
Distance university-home (km, Mean - SD)	7.0	13.6
Time daily spent to reach the university (minutes, Mean - SD)	31.3	33.7
Received a scholarship (N - %)		
Yes	22	29.3
No	53	70.7
Main source of economic support for the academic career (N - %)		
Student's family	72	96.0
Relatives/friends	0	0.0

Scholarship		2	2.7
Student, working while studying		1	1.3

Table 38. Life and study conditions while attending the third academic year of the NBP (n = 75).

Worked (N - %)			
No		69	92.0
Yes		6	8.0
	Weekly hours of work (Mean - SD)	22.2	12.3
	Continuous work during the year (N - %)		
	No	2	33.3
	Yes	4	66.7
	Number of months of continuous work (Mean - SD)	4.0	0.8
	Continuous work field (N - %)		
	Healthcare	6	100.0
	Not healthcare	0	0.0
	Both	0	0.0
Volunteered (N - %)			
No		69	92.0
Yes		6	8.0
	Weekly hours of volunteering (Mean - SD)	7.2	5.3
	Continuous volunteering during the year (N - %)		
	No	0	0.0
	Yes	5	100.0
	Number of months of continuous volunteering (Mean - SD)	4.5	4.8
	Continuous volunteering field (N - %)		
	Healthcare	0	0.0
	Not healthcare	3	60.0
	Both	2	40.0
Attended the 'Erasmus Project' (N - %)			
Yes		1	1.3
No		74	98.7
Faced familial burden (N - %)			
No		53	70.7
Yes		22	29.3
	Familial burden lasting (N - %)		
	Whole year	4	18.2
	Limited period	18	81.8
	Number of months (Mean - SD)	2.2	0.9
Faced personal health issues that did not allow to undertake one or more exams (N - %)			

Yes	9	12.0
No	66	88.0
Experienced financial difficulties (N - %)		
Yes	42	56.0
No	33	44.0
Experienced life events (N - %)		
Yes	36	48.0
No	39	52.0

Table 39. Other activities performed and trouble faced while attending the third academic year of the NBP (n = 75).

Main study sources (N - %)		
Official (e.g. textbooks)	48	64.0
Unofficial (e.g. web)	27	36.0
Both	0	0.0
Study method (N - %)		
Individual	75	100.0
In group	0	0.0
Study organization (N - %)		
Just before the exams	7	9.3
Periodically during the semester	24	32.0
Every day after lessons	44	58.7

Table 40. Study sources and methods while attending the third academic year of the NBP (n = 75).

Experienced learning difficulties (N - %)		
No	2	2.7
Yes	73	97.3
Main reason for difficulties (N - %)		
Poor teaching effectiveness of teachers	0	0.0
Ineffective study method	3	4.1
Inappropriate organization of exam sessions	2	2.7
Inadequacy of previous education	1	1.4
Excessive material to study	51	69.9
Excessive complexity of the disciplines	6	8.2
Language difficulties	3	4.1
Lack of time to study	7	9.6
Other	0	0.0
Intention to leave the NBP (N - %)		
No	67	89.3
Yes	8	10.7

Main reason (N - %)			
Fear of not being able to successfully complete the program		2	33.3
Difficult impact in the first clinical placement		0	0.0
Failure in one or more exams		1	16.7
Doubt having made a wrong choice		1	16.7
Personal organizational difficulties		0	0.0
Difficulties in studying		2	33.3
Difficulties in the clinical placement		0	0.0
Difficult relationship with clinical tutors		0	0.0
Difficult relationship with the reference guide		0	0.0
Other		0	0.0

Table 41. Learning difficulties and intention to leave the program during the third academic year of the NBP (n = 75).

Educational pathway met students' expectations regarding the study load (N - %)			
Yes		30	40.0
No, study load was less than expected		3	4.0
No, study load was more than expected		42	56.0
Agreed if the NBP lasting would have been lengthened up to four years (N - %)			
Yes		23	30.7
No		52	69.3
Perceived level of importance towards students' education about organizational features and services offered by the attended institutions			
Relationship with persons (Mean - SD)		7.5	1.8
Teaching (Mean - SD)		8.8	1.6
Physical environments (Mean - SD)		7.9	2.3
Clinical placement (Mean - SD)		8.4	2.3
Others (Mean - SD)		8.3	2.0
Level of satisfaction about organizational features and services offered by the attended institutions (Mean - SD)			
Relationship with persons (Mean - SD)		7.4	1.8
Teaching (Mean - SD)		8.3	1.8
Physical environments (Mean - SD)		6.2	2.6
Clinical placement (Mean - SD)		6.9	2.5
Others (Mean - SD)		6.4	2.5
Global level of satisfaction about the program (Mean - SD)		7.4	2.4
Level of satisfaction – Perceived level of importance about organizational features and services offered by the attended institutions (Mean - SD)			

Relationship with persons (Mean - SD)	-0.1	1.4
Teaching (Mean - SD)	-0.5	1.6
Physical environments (Mean - SD)	-1.7	2.4
Clinical placement (Mean - SD)	-1.4	2.6
Others (Mean - SD)	-1.9	2.5

Table 42. Program evaluation assessed at T₂ (n = 75).

Clinical area attended (N - %)		
Medical	63	84.0
Surgical	12	16.0
Outpatient	0	0.0
Biological contamination (N - %)		
No	62	82.7
Yes	13	17.3
Number of biological contaminations (Mean - SD)	4.1	3.2

Table 43. Information about the very first clinical placement assessed at the end of the third academic year (n = 75).

Number of attended floors (Mean - SD)	4.2	1.3
Witnessed to organizational changings in the attended floors (N - %)		
Yes	5	6.7
No	19	25.3
I do not know	51	68.0
Met the 'reference guide' (N - %)		
Yes	61	81.3
No	14	18.7
Electronically communicated with the 'reference guide' (N - %)		
No	74	98.7
Yes	1	1.3
Number of electronical communications with the 'reference guide' (Mean - SD)	5.0	--
Interrupted the placement for a period (N - %)		
Yes	3	4.0
No	72	96.0
Person perceived as the main contributor to students' learning process (N - %)		
Reference guide	10	13.3
Clinical tutors (i.e. nurses in floors)	20	26.7
Both	45	60.0
Initial motivation to attend the placement (N - %)		

Motivated		71	94.7
Not motivated		4	5.3
Final level of satisfaction for the placement (N - %)			
Satisfied		57	76.0
Neutral		1	1.3
Not satisfied		17	22.7
CLES+T score			
Pedagogical atmosphere (Mean - SD)		3.9	0.7
Leadership style of the ward manager (Mean - SD)		4.0	0.8
Premises of nursing in the ward (Mean - SD)		3.9	0.7
Supervisory relationship (Mean - SD)		3.7	0.9
Role of the nurse teacher (Mean - SD)		3.9	0.8
Total (Mean - SD)		3.9	0.7

Table 44. Information about the clinical placement performed during the third academic year of the NBP (n = 75).

	Success students (N = 69)		Not success students (N = 6)		p-value
Age (Mean - SD)	20.8	0.8	21.3	1.4	0.437
Gender (N - %)					
Female	61	93.8	4	6.2	0.180
Male	8	80.0	2	20.0	
Number of family members (Mean - SD)	5.0	1.0	5.3	0.5	0.210
Number of children (Mean - SD)	0.0	0.0	0.0	0.0	1.000
Father's highest educational level (N - %)					
Up to the middle school	16	80.0	4	20.0	
Secondary professional or high school	49	96.1	2	3.9	--
Academic	4	100.0	0	0.0	
Mother's highest educational level (N - %)					
Up to the middle school	24	85.7	4	14.3	
Secondary professional or high school	38	95.0	2	5.0	--
Academic	7	100.0	0	0.0	
Father's job (N - %)					
Legislator, businessman, manager	5	83.3	1	16.7	
Intellectual, scientific, and high specialized professions	0	0.0	0	0.0	
Technical profession	2	100.0	0	0.0	
Executive profession in the office work	8	100.0	0	0.0	--
Qualified profession in commercial activities and services	0	0.0	0	0.0	
Artisan, specialized worker or farmer	0	0.0	0	0.0	

	N	%	N	%	p-value
System conductor, fixed and mobile machinery worker or vehicle drivers	1	100.0	0	0.0	
Not qualified profession	0	0.0	0	0.0	
Army	3	100.0	0	0.0	
Unemployed/Invalid	13	86.7	2	13.3	
Mother's job (N - %)					
Legislator, businessman, manager	0	0.0	0	0.0	
Intellectual, scientific, and high specialized professions	0	0.0	0	0.0	
Technical profession	3	75.0	1	25.0	
Executive profession in the office work	6	100.0	0	0.0	
Qualified profession in commercial activities and services	1	100.0	0	0.0	--
Artisan, specialized worker or farmer	2	100.0	0	0.0	
System conductor, fixed and mobile machinery worker or vehicle drivers	0	0.0	0	0.0	
Not qualified profession	0	0.0	0	0.0	
Army	1	100.0	0	0.0	
Unemployed/Housewife	50	90.9	5	9.1	
Have had a family member employed as nurse (N - %)					
Yes	11	100.0	0	0.0	0.583
No	58	90.6	6	9.4	
Type of secondary school attended (N - %)					
High school	68	93.2	5	6.8	
Technical and professional school	1	50.0	1	50.0	0.155
Other	0	0.0	0	0.0	
Secondary school grade (Mean - SD)	87.0	12.3	82.4	7.5	0.066
JSE-HPS score (Mean - SD)	112.0	13.0	90.0	10.2	**0.002**

Table 45. Association between academic success and sociodemographic characteristics, education, and cognitive empathy measured at T$_2$ (n = 75).

	Success students (N = 69)		Not success students (N = 6)		p-value
Had ever worked (N - %)					
No	61	92.4	5	7.6	0.549
Yes	8	88.9	1	11.1	
Field of the previous work activity (N - %)					
Healthcare	8	100.0	0	0.0	
Not healthcare	0	0.0	0	0.0	--
Both	0	0.0	0	0.0	

	Yes				

Had attended any other educational program
without graduating (N - %)

Yes	1	100.0	0	0.0	1.000
No	68	91.9	6	8.1	

Table 46. Association between academic success and activities performed before enrolling in the NBP measured at T_2 (n = 75).

	Success students (N = 69)		Not success students (N = 6)		p-value
Had participated in the 'open days' at the university (N - %)					
Yes	24	96.0	1	4.0	0.657
No	44	89.8	5	10.2	
Life period in which students decided to apply for the NBP (N - %)					
After completing the secondary school, as a first educational choice	68	93.2	5	6.8	
After attending other educational programs (academic or not)	0	0.0	1	100.0	--
After working for a period	1	100.0	0	0.0	
Nursing indicated as first preference when applied (N - %)					
Yes	42	89.4	5	10.6	0.401
No	27	96.4	1	3.6	
Main reason for choosing Nursing (N - %)					
'Internal' motivation (i.e. aptitude for aiding people, personal experiences or interest in healthcare subjects)	53	91.4	5	8.6	
'External' motivation (i.e. employment opportunity, family advice/influence)	11	91.7	1	8.3	--
Both	5	100.0	0	0.0	
Family approval of the career choice (N - %)					
Yes	69	92.0	6	8.0	
No	0	0.0	0	0.0	--
Would advise a relative to become a nurse (N - %)					
Yes	60	92.3	5	7.7	1.000
No	9	90.0	1	10.0	
Conformity between nurses' image perceived before enrolling and when filling the questionnaire (N - %)					
Yes	23	88.5	3	11.5	--

No	7	100.0	0	0.0
Partially	39	95.1	2	4.9

Conformity between nurses' image perceived through the media and when filling the questionnaire (N - %)

Yes	34	91.9	3	8.1	
No, the image provided by the media is worse	24	92.3	2	7.7	--
No, the image provided by the media is better	11	91.7	1	8.3	

Table 47. Association between academic success and motivation to choose to be a nurse and perceived image of nurses assessed at T$_2$ (n = 75).

	Success students (N = 69)		Not success students (N = 6)		p-value
Lived in the city where the university is (N - %)					
Yes, with the family	25	96.2	1	3.8	
Yes, with cohabitants	27	93.1	2	6.9	
Yes, alone	1	100.0	0	0.0	--
No	16	84.2	3	15.8	
How the university was usually reached (N - %)					
On feet	49	94.2	3	5.8	
With public transport	19	86.4	3	13.6	--
With own or friends' vehicle	1	100.0	0	0.0	
Distance university-home (km, Mean - SD)	5.5	11.2	23.6	25.5	0.461
Time daily spent to reach the university (minutes, Mean - SD)	27.5	25.4	75.0	74.6	0.382
Received a scholarship (N - %)					
Yes	22	100.0	0	0.0	0.171
No	47	88.7	6	11.3	
Main source of economic support for the academic career (N - %)					
Student's family	67	93.1	5	6.9	
Relatives/friends	0	0.0	0	0.0	
Scholarship	2	100.0	0	0.0	--
Student, working while studying	0	0.0	1	100.0	

Table 48. Association between academic success and life and study conditions while attending the third academic year of the NBP (n = 75).

	Success students (N = 69)		Not success students (N = 6)		p-value
Worked (N - %)					
No	64	92.8	5	7.2	0.405
Yes	5	83.3	1	16.7	
Weekly hours of work (Mean - SD)	18.2	8.4	42.0	--	--
Continuous work during the year (N - %)					
No	2	100.0	0	0.0	1.000
Yes	3	75.0	1	25.0	
Number of months of continuous work (Mean - SD)	4.0	1.0	4.0	--	--
Continuous work field (N - %)					
Healthcare	0	0.0	0	0.0	
Not healthcare	5	83.3	1	16.7	--
Both	0	0.0	0	0.0	
Volunteered (N - %)					
No	63	91.3	6	8.7	1.000
Yes	6	100.0	0	0.0	
Weekly hours of volunteering (Mean - SD)	7.2	5.3	--	--	--
Continuous volunteering during the year (N - %)					
No	0	0.0	0	0.0	--
Yes	5	100.0	0	0.0	
Number of months of continuous volunteering (Mean - SD)	4.5	4.8	--	--	--
Continuous volunteering field (N - %)					
Healthcare	0	0.0	0	0.0	
Not healthcare	3	100.0	0	0.0	--
Both	2	100.0	0	0.0	
Attended the 'Erasmus Project' (N - %)					
Yes	1	100.0	0	0.0	1.000
No	68	91.9	6	8.1	
Faced familial burden (N - %)					
No	48	90.6	5	9.4	0.664
Yes	21	95.5	1	4.5	
Familial burden lasting (N - %)					
Whole year	4	100.0	0	0.0	1.000
Limited period	17	94.4	1	5.6	

					p-value
Number of months (Mean - SD)	2.2	0.9	3.0	--	--
Faced personal health issues that did not allow to undertake one or more exams (N - %)					
Yes	8	88.9	1	11.1	0.549
No	61	92.4	5	7.6	
Experienced financial difficulties (N - %)					
Yes	37	88.1	5	11.9	0.220
No	32	97.0	1	3.0	
Experienced life events (N - %)					
Yes	34	94.4	2	5.6	0.676
No	35	89.7	4	10.3	

Table 49. Association between academic success and other activities performed and trouble faced while attending the third academic year of the NBP (n = 75).

	Success students (N = 69)		Not success students (N = 6)		p-value
Main study sources (N - %)					
Official (e.g. textbooks)	44	91.7	4	8.3	
Unofficial (e.g. web)	25	92.6	2	7.4	1.000
Both	0	0.0	0	0.0	
Study method (N - %)					
Individual	69	92.0	6	8.0	--
In group	0	0.0	0	0.0	
Study organization (N - %)					
Just before the exams	6	85.7	1	14.3	
Periodically during the semester	22	91.7	2	8.3	--
Every day after lessons	41	93.2	3	6.8	

Table 50. Association between academic success and study sources and methods while attending the third academic year of the NBP (n = 75).

	Success students (N = 69)		Not success students (N = 6)		p-value
Experienced learning difficulties (N - %)					
No	2	100.0	0	0.0	1.000
Yes	67	91.8	6	8.2	
Main reason for difficulties (N - %)					
Poor teaching effectiveness of teachers	0	0.0	0	0.0	--
Ineffective study method	3	100.0	0	0.0	

Inappropriate organization of exam sessions	1	50.0	1	50.0
Inadequacy of previous education	1	100.0	0	.0
Excessive material to study	49	96.1	2	3.9
Excessive complexity of the disciplines	6	100.0	0	0.0
Language difficulties	3	100.0	0	0.0
Lack of time to study	4	57.1	3	42.9
Other	0	0.0	0	0.0
Intention to leave the NBP (N - %)				
No	62	92.5	5	7.5	0.504
Yes	7	87.5	1	12.5	
Main reason (N - %)				
Fear of not being able to successfully complete the program	2	100.0	0	0.0
Difficult impact in the first clinical placement	0	0.0	0	0.0
Failure in one or more exams	1	100.0	0	0.0
Doubt having made a wrong choice	1	100.0	0	0.0
Personal organizational difficulties	0	0.0	0	0.0
Difficulties in studying	1	50.0	1	50.0	--
Difficulties in the clinical placement	0	0.0	0	0.0
Difficult relationship with clinical tutors	0	0.0	0	0.0
Difficult relationship with the reference guide	0	0.0	0	0.0
Other	0	0.0	0	0.0

Table 51. Association between academic success and learning difficulties and intention to leave the program during the third academic year of the NBP (n = 75).

	Success students (N = 69)		Not success students (N = 6)		p-value
Educational pathway met students' expectations regarding the study load (N - %)					
Yes	27	90.0	3	10.0	
No, study load was less than expected	3	100.0	0	0.0	--
No, study load was more than expected	39	92.9	3	7.1	
Agreed if the NBP lasting would have been lengthened up to four years (N - %)					

Yes	23	100.0	0	0.0	0.169
No	46	88.5	6	11.5	
Perceived level of importance towards students' education about organizational features and services offered by the attended institutions					
Relationship with persons (Mean - SD)	7.5	1.8	7.0	1.9	0.469
Teaching (Mean - SD)	8.9	1.6	7.8	1.9	**0.036**
Physical environments (Mean - SD)	8.0	2.3	6.9	3.0	0.243
Clinical placement (Mean - SD)	8.4	2.3	7.8	1.8	0.061
Others (Mean - SD)	8.4	1.9	7.2	2.0	**0.033**
Level of satisfaction about organizational features and services offered by the attended institutions					
Relationship with persons (Mean - SD)	7.3	1.9	7.7	0.7	0.883
Teaching (Mean - SD)	8.2	1.9	8.5	1.1	0.639
Physical environments (Mean - SD)	6.3	2.6	5.1	2.7	0.300
Clinical placement (Mean - SD)	6.9	2.6	6.9	1.4	0.688
Others (Mean - SD)	6.3	2.6	7.3	1.3	0.488
Global level of satisfaction about the program (Mean - SD)	7.4	2.5	7.2	1.2	0.351
Level of satisfaction – Perceived level of importance about organizational features and services offered by the attended institutions					
Relationship with persons (Mean - SD)	-0.2	1.3	0.7	2.5	0.638
Teaching (Mean - SD)	-0.7	1.4	0.7	2.5	0.355
Physical environments (Mean - SD)	-1.7	2.4	-1.8	2.9	0.953
Clinical placement (Mean - SD)	-1.5	2.7	-0.9	1.5	0.498
Others (Mean - SD)	-2.1	2.5	0.0	2.2	0.171

Table 52. Association between academic success and program evaluation provided at T_2 (n = 75).

	Success students (N = 69)		Not success students (N = 6)		p-value
Clinical area attended (N - %)					
Medical	58	92.1	5	7.9	1.000
Surgical	11	91.7	1	8.3	

Outpatient	0	0.0	0	0.0	
Biological contamination (N - %)					
No	56	90.3	6	9.7	0.582
Yes	13	100.0	0	0.0	
Number of biological contaminations (Mean - SD)	4.1	3.2	--	--	--

Table 53. Association between academic success and information on the very first clinical placement provided at T$_2$ (n =75).

	Success students (N = 69)		Not success students (N = 6)		p-value
Number of attended floors (Mean - SD)	4.2	1.3	4.8	1.0	0.222
Witnessed to organizational changings in the attended floors (N - %)					
Yes	5	100.0	0	0.0	
No	17	89.5	2	10.5	--
I do not know	47	92.2	4	7.8	
Met the 'reference guide' (N - %)					
Yes	55	90.2	6	9.8	0.586
No	14	100.0	0	0.0	
Electronically communicated with the 'reference guide' (N - %)					
No	68	91.9	6	8.1	1.000
Yes	1	100.0	0	0.0	
Number of electronical communications with the 'reference guide' (Mean - SD)	5.0	--	--	--	--
Interrupted the placement for a period (N - %)					
Yes	3	100.0	0	0.0	1.000
No	66	91.7	6	8.3	
Person perceived as the main contributor to students' learning process (N - %)					
Reference guide	9	90.0	1	10.0	
Clinical tutors (i.e. nurses in floors)	18	90.0	2	10.0	--
Both	42	93.3	3	6.7	
Initial motivation to attend the placement (N - %)					
Motivated	65	91.5	6	8.5	1.000
Not motivated	4	100.0	0	0.0	
Final level of satisfaction for the placement (N - %)					

Satisfied	51	89.5	6	10.5	
Neutral	1	100.0	0	0.0	--
Not satisfied	17	100.0	0	0.0	
CLES+T score					
Pedagogical atmosphere (Mean - SD)	3.9	0.8	3.9	0.4	0.652
Leadership style of the ward manager (Mean - SD)	4.0	0.8	3.8	0.5	0.270
Premises of nursing in the ward (Mean - SD)	3.9	0.7	3.6	0.9	0.320
Supervisory relationship (Mean - SD)	3.8	0.9	3.5	0.8	0.277
Role of the nurse teacher (Mean - SD)	4.0	0.8	3.6	0.8	0.205
Total (Mean - SD)	3.9	0.7	3.7	0.3	0.245

Table 54. Association between academic success and information on clinical placement performed during the third academic year (n = 75).