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## Research article

## Attitudes and factors that affect Croatian nursing students' choice of thesis type: A cross-sectional study

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## ABSTRACT

**Background:** Research in nursing, as in other biomedical professions, is of paramount importance. Nursing students are required to attend research methodology courses during their studies. However, nursing research is lagging behind other biomedical fields.

**Objectives:** This study aimed to examine attitudes and factors that influence the choice of thesis type (original research versus essay-type literature review) among Croatian nursing students.

**Methods:** This cross-sectional study included nursing students from 8 health sciences studies in Croatia in the 2020/2021 academic year. Data were collected using the Students' Attitudes Toward Research (SAR) questionnaire and questions assessing potential barriers toward research.

**Results:** There were 912 students (25 % response rate) included in the study. In the regression analysis of the total sample, mentor encouragement ( $\beta$  0.200;  $P < 0.001$ ), knowledge ( $\beta$  0.137;  $P = 0.011$ ), and sense of ability to conduct research ( $\beta$  0.191;  $P < 0.001$ ) were positively associated with the SAR score, while the expectation that a research-based thesis will extend the study duration was negatively associated with the SAR score ( $\beta$  -0.124;  $P = 0.036$ ). Among bachelor's students, the sense of ability to conduct research ( $\beta$  0.255;  $P < 0.001$ ) was positively associated, while the expectation that a research-based thesis will extend the study duration was negatively associated with the SAR score ( $\beta$  -0.157;  $P = 0.053$ ). Among master's students, mentor encouragement ( $\beta$  0.415;  $P < 0.001$ ), knowledge ( $\beta$  0.261;  $P < 0.001$ ), and sense of ability to conduct research ( $\beta$  0.151;  $P = 0.045$ ) were positively associated with the SAR score. A higher SAR score was associated with a higher likelihood of selecting a research thesis (OR [95 % CI];  $P$ : 1.026 [1.014–1.038];  $P < 0.001$ ).

**Conclusions:** Our study revealed modifiable factors associated with positive attitudes toward scientific research and preference for a research-based thesis among nursing students. Policy-makers should consider our results and change nursing studies' curricula and mentors should encourage students to engage in research and conduct research-based thesis even if there are other thesis options available.

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## 1. Introduction

Nursing education in Croatia has undergone significant changes in recent times, including the adoption of the Bologna Declaration, and the need to adapt nursing education to the prevailing European trends (Janković et al., 2018; Janković et al., 2010). Namely, during the harmonization of nursing education in the EU, nursing was moved from the professional to the higher education (university) level, whereas higher education of nurses encompasses 3-year bachelor degree studies, 2-year master's degree studies and 3-year PhD studies (Janković et al., 2010). According to the nursing education system in Croatia the 3-year bachelor's degree (undergraduate) program ends with a Bachelor's thesis, which can be based on theoretical final paper (where the student chooses a specific topic and writes an essay about it based on literature review) or a final paper based on the original scientific research (where a student conducts research on a specific topic) (Catholic University of Croatia, 2016a; Faculty of Dental Medicine and Health Osijek, 2021; Faculty of Health Studies, 2021b; University Department of Health Studies, 2021a; University North, 2020a; University of Applied Health Sciences, 2015; University of Dubrovnik, 2021).

According to Gallart et al. [quote] *“the bachelor's thesis is an independent, original, and specific work that each student prepares under the supervision of a mentor. Bachelor's thesis should encourage critical and reflective thinking and provide a platform for integrating the knowledge acquired during the student's education”* (Gallart et al., 2015). While it is acknowledged that an essay/review could be considered by some also as a type of a research paper, a bachelor's thesis in Croatia based on an essay, i.e. simple narrative non-systematic literature review is not considered an original research thesis. Higher education institutions providing nursing studies in Croatia specifically consider an essay/review type of a bachelor thesis and thesis based on an original research as two different types of thesis. This is not exclusive for Croatia. According to a study conducted in Spain, 68 % of European undergraduate nursing programs include a bachelor's thesis, and the literature review is the most common format of Bachelor's thesis (Fernández-Cano et al., 2021). But 30 % of nursing undergraduate programs in Spain offer the research Bachelor's thesis (Fernández-Cano et al., 2021).

On the other hand, the master's degree (graduate) program in Croatia ends with a Master's thesis that must be based on scientific research conducted by a student (Catholic University of Croatia, 2016a; Faculty of Dental Medicine and Health Osijek, 2021; Faculty of Health Studies, 2021b; University Department of Health Studies, 2021a; University North, 2020a; University of Applied Health Sciences, 2015; University of Dubrovnik, 2021).

In nursing, as in other health professions, research must be the foundation for comprehensive, safe, and high-quality evidence-based clinical practice (Stevens, 2013). Nursing research is extremely important to the nursing profession and necessary for continued professional development. Research findings are used to develop guidelines, thereby reducing disparities in care and preventing unexpected and undesirable health outcomes (Stevens, 2013). The first and most important step in educating nurses to conduct research is education in research methodology, which nursing studies include already at the undergraduate level (Uysal Toraman et al., 2017). In Croatia, that is a course entitled “Basics of research in nursing” which is held at the undergraduate nursing studies (Kurtović et al., 2021).

A systematic review found that European nursing research published in 20 leading nursing journals in 2010 was mostly descriptive and poorly described. The authors included 223 papers from 21 European countries in the analysis. The research methodology of the analysed articles was often poor, unclear, or not described at all, and only one-third of the research was related to nursing practice (Richards et al., 2014). The authors concluded that nursing researchers need to be better educated during their studies and learn the basics of analysing and evaluating results and publishing research findings (Richards et al., 2014).

Unver et al., found positive attitudes toward research among nursing

students in Turkey, although only a small number of them participated in scientific research. Age, years of study, and scientific experience were factors related to attitudes toward scientific research in nursing (Unver et al., 2018). The study conducted in Osijek, Croatia, among nurses employed in a clinical hospital, showed a slightly positive attitude toward scientific research. Younger participants and those with a higher level of education showed more positive attitudes toward scientific research (Kovačević et al., 2017).

A review published in 2019 showed that participation in a research course, interest in a particular area of nursing research, application of research knowledge, student age, years of study, and previous research experience were found to significantly improve attitudes (Ross and Burrell, 2019). However, it is important to involve nursing students in research during their studies because only when they participate in research they can fully understand the concept and importance of scientific research in nursing (Brooke et al., 2015; Fernández-Cano et al., 2021).

According to the available literature, factors such as knowledge, attitude, experience, and barriers play an important role in conducting research among medical and health sciences students (Brooke et al., 2015; Mokhtari et al., 2019; Pallamparthi and Basavareddy, 2019; Ross and Burrell, 2019). Furthermore, one of the most important factors for student engagement in research is mentor encouragement (Memarpour et al., 2015). On the other hand, possible barriers to conducting research include: lack of time, limited knowledge of statistical methods, financial costs of research, uncertainty, low mentor support, lack of interest for science, limited access to data sources, materials, or equipment (Memarpour et al., 2015; Mokhtari et al., 2019; Nelly et al., 2019). Moreover, the most significant barrier to conducting scientific research for undergraduate students was the lack of supervision and guidance from mentors (El Achi et al., 2020).

Considering that the existing literature has not sufficiently examined the barriers that affect the conduct of research among nursing students, the aim of this study was to examine the contribution of attitudes and factors that influence the choice of the thesis type, in terms of choosing between the original research and essay-type literature review, among Croatian nursing students.

## 2. Methods

### 2.1. Study design

This cross-sectional study was conducted at eight health sciences studies in Croatia, in Croatia, located in Split, Dubrovnik, Zadar, Rijeka, Zagreb, Varaždin, and Osijek. The students were bachelor's and master's nursing students who voluntarily chose to participate in the study, without any exclusion criteria. The study was conducted during the academic year 2020/2021 between April and June 2021 using an anonymous (online) survey via a Google form. Study authors at participating institutions contacted their students via e-mail, inviting them to participate in the study. After the initial e-mail, three additional reminders were sent to students at 5-day intervals to ensure the highest possible response rate.

### 2.2. Population and sample

In this study, we included Croatian nursing students studying at undergraduate (bachelor) and graduate (master) level. Furthermore, the study was conducted at the time of the academic year when all bachelor students have already attended the course “Basics of research in nursing”. There were no exclusion criteria.

We invited 3642 eligible nursing students to participate in the study: Split (N = 230), Zadar (N = 185), Dubrovnik (N = 63), Catholic University of Croatia, Zagreb (N = 422), Varaždin (N = 585), Osijek (N = 627), Rijeka (N = 265) and University of Applied Health Sciences, Zagreb (N = 1265).

### 2.3. Questionnaire

The data were collected with a questionnaire which consisted of three parts. The first part of the questionnaire contained 14 questions about the students' general data, including gender, age, education level, employment data, experience in conducting scientific research, choice of type of Bachelor's or Master's thesis (original research or essay-based thesis), and the length of time since attending the last university course about research methodology (course Basics of research in nursing).

The second part of the questionnaire consisted of 15 statements related to the Students' Attitudes toward Research (SAR) (Al-Kuwaiti, 2014). Students rated their level of personal agreement using a 5-point Likert scale. Possible responses were 1 - I do not agree at all, 2 - I partially disagree, 3 - Neither agree nor disagree, 4 - I partially agree, 5 - I fully agree. The original questionnaire of Al-Kuwaiti was partially modified to adapt the questions for Masters' degree students (Appendix 1). The score for SAR was calculated as the sum of responses to 15 SAR-related questions. SAR questions were rated on a 5-point Likert scale, and therefore the SAR score range was from 15 to 75. The higher the SAR score, the more positive the students' attitudes toward scientific research. According to the original study, the internal consistency and reliability of the questionnaire tested on a sample of undergraduate students was evaluated (Cronbach's  $\alpha = 0.77$ ) (Al-Kuwaiti, 2014).

For our study, the questionnaire was translated into the Croatian language. We applied the forward-backwards translation method (Van de Vijver and Hambleton, 1996). In brief, an independent translator translated the questionnaire from the original English to Croatian. Then another independent translator translated the translated questionnaire from Croatian to English. Finally, the second version was translated from English into Croatian (Van de Vijver and Hambleton, 1996). A comparison of the two translated versions of the English language questionnaire was conducted by an English teacher. Harmonization of all significant differences between the two translations of the questionnaire into Croatian was performed in collaboration with associates in the field of nursing. The internal consistency between all 15 statements was  $\alpha = 0.884$ , indicating high reliability (Taber, 2018).

The third part of the questionnaire was based on a review of the available literature (Memarpour et al., 2015; Mokhtari et al., 2019; Nelly et al., 2019) and contained 9 items related to the students' assessment of possible barriers toward research. We used a 10-point Likert scale ranging from 0 to 10 (Appendix 1). The internal consistency between all 9 items was  $\alpha = 0.637$ , indicating acceptable reliability (Taber, 2018).

Given that some bachelor students (first- and second-year students) did not choose a mentor for their thesis, the question "Did you choose a mentor for your thesis?" was asked before the question about mentor encouragement to participate in research (Appendix 1). Master degree students were excluded from the question about concern for being assigned an original research topic for their thesis, because they are required to conduct original research for the Master's thesis according to the regulations of their institutions.

### 2.4. Data analysis

The Kolmogorov-Smirnov test was used for checking normality distribution. Due to the non-normal distribution of the data, continuous variables were presented as the median (interquartile range, IQR). Categorical variables were presented with frequencies and percentages. Differences in categorical variables were analysed by using a Chi-square test, while the Mann-Whitney test and Kruskal-Wallis test were used for continuous variables that were not normally distributed.

Multivariate logistic regression analysis was performed to assess the association of possible barriers toward research and students' preferences of the thesis type. The question "What type of the thesis do you prefer, if you could choose?" was a dependent variable, while the questions related to possible barriers toward research were independent

variables. The logistic regression model was adjusted for age, level of study, listening or attending a research methodology course, time elapsed since attending the last research methodology course, and experience in conducting scientific research.

Multivariate linear regression analysis was conducted to assess the association between SAR score and possible barriers toward research in the total sample, as well as for bachelor students and master's students separately. SAR score was a dependent variable (the mean of the SAR score scale was 45 points, and the observed values were  $<45$ , as well as  $>45$  points), and possible barriers toward research were independent variables. Models were adjusted for level of study, attending a research methodology course, time since attending the last research methodology course, and having the opportunity to participate in scientific research so far. Finally, we performed a logistic regression analysis to assess the association between the SAR score and the preferred thesis type.

Data were analysed in SPSS (IBM Corp., Armonk, NY, USA) version 28.0 for statistical data processing, and results were interpreted at a significance level of  $P < 0.05$ .

### 2.5. Ethical considerations

The study was carried out following the Declaration of Helsinki. The study protocol was approved by the Ethics Committee of the University of Split Department of Health Studies (2181-228-07-21-0009). We have also received equivalent approval from all the institutions that participated in the study. The study participants provided informed consent for participating in the study in the online interface.

## 3. Results

We received 912 (25 %) completed surveys. In order to calculate the minimum sample size, the Raosoft sample size calculator (Raosoft Sample Size Calculator) was used. With the nursing student population size of 3642, confidence level of 99 %, margin of error of 5 %, and response distribution of 50 %, this study's minimum effective sample size was 562. Appendix 2 shows the response rates in each participating institution.

### 3.1. General characteristic of the participants

Most participants were women ( $N = 819$ ; 89.8 %), and attending bachelor studies (680; 74.6 %). Age was significantly related to preference for thesis type ( $P = 0.024$ ). Compared to the other age groups, students aged 26–30 years were most likely to choose the research-based thesis, followed by the age group  $>35$  years and the age group 21–25 years. The results also showed that master's students, as well as students who attended a research methodology course, and those who had the opportunity to participate in scientific research, were more likely to choose the research-based thesis than the essay-type thesis (Table 1).

In addition, the time elapsed since attending the last research methodology course was also significantly associated with the preferences of type of thesis ( $P < 0.001$ ). Students who attended the last research methodology course 1 to 2 years ago (56.4 %), followed by ones who attended the last research methodology course 6 to 12 months ago (53.2 %), would choose most frequently the research-based thesis (Table 1).

### 3.2. Potential barriers toward research

Table 2 presents the logistic regression analysis that was conducted to determine the impact of potential barriers toward research. The logistic regression model was statistically significant ( $P < 0.001$ ). The model explained 31.1 % (Nagelkerke  $R^2$ ) of the variance in "What type of the thesis do you prefer, if you could choose?", and correctly classified 69.4 % of cases. A higher score on the questions related to the mentors' encouragement of students to participate in research and a sense of

**Table 1**  
General characteristic of the sample (N = 912) according to preferences for different thesis type.

	What type of the thesis do you prefer, if you could choose?		P <sup>a</sup>
	Essay	Scientific research	
Age			
18–20	85 (68.5 %)	39 (31.5 %)	<b>0.024</b>
21–25	247 (56 %)	194 (44 %)	
26–30	41 (48.8 %)	43 (51.2 %)	
31–35	49 (60.5 %)	32 (39.5 %)	
>35	95 (52.2 %)	87 (47.8 %)	
Gender			
Female	469 (57.3 %)	350 (42.7 %)	0.297
Male	48 (51.6 %)	45 (48.4 %)	
Level of study			
Bachelor students	435 (64 %)	245 (36 %)	<b>&lt;0.001</b>
Master students	82 (35.3 %)	150 (64.7 %)	
Do you study while working in the profession?			
No	219 (57.2 %)	164 (42.8 %)	0.799
Yes	298 (56.3 %)	231 (43.7 %)	
Have you ever listened or attended a research methodology?			
No	244 (69.5 %)	107 (30.5 %)	<b>&lt;0.001</b>
Yes	273 (48.7 %)	288 (51.3 %)	
Time elapsed since attending the last course with scientific research content			
<6 months	204 (50.7 %)	198 (49.3 %)	<b>&lt;0.001</b>
6 months to 1 year	52 (46.8 %)	59 (53.2 %)	
From 1 to 2 years	24 (43.6 %)	31 (56.4 %)	
>2 years	11 (73.3 %)	4 (26.7 %)	
I have never attended such a course	226 (68.7 %)	103 (31.3 %)	
Have you had the opportunity to participate in scientific research so far?			
Yes	155 (43.7 %)	200 (56.3 %)	<b>&lt;0.001</b>
No	362 (65 %)	195 (35 %)	

Bold values denote statistical significance at the P < 0.05 level.

<sup>a</sup> Chi-square test.

ability to conduct research were associated with a higher likelihood of choosing the research-based thesis. On the other side, a higher score on the question related to feeling of concern that the mentor could assign them a research topic for their thesis was associated with a decrease in the likelihood of choosing the research-based thesis (Table 2). Additionally, an increase in score on the question related to the expectation that a research-based thesis will extend the study duration showed a borderline significant association with a decreased likelihood of choosing the research-based thesis (P = 0.051) (Table 2).

**Table 2**  
The results of linear regression in predicting the effects of barriers on the thesis type selection.

Possible barriers toward research	OR (95 % CI)	P
Mentor encourages a student to participate in research	1.208 (1.10–1.32)	<b>&lt;0.001</b>
Additional financial burden of a research-based thesis for a student (Printing of surveys, costs of statistical processing, etc.)	1.020 (0.944–1.10)	0.619
Expectation that a research-based thesis will extend the study duration	0.911 (0.829–1.00)	0.051
Feeling discomfort about inviting potential participants to take part in a research	1.050 (0.960–1.148)	0.286
The need to invest a lot of time in data collection	0.910 (0.799–1.036)	0.153
The need to acquire knowledge of research methodology needed to conduct research during the studies	1.050 (0.916–1.204)	0.485
Feeling concerned that a mentor could assign a research topic for the thesis	0.865 (0.794–0.942)	<b>&lt;0.001</b>
Opinion that scientific research represents a challenge	1.064 (0.924–1.224)	0.389
Sense of ability to conduct research	1.174 (1.049–1.314)	<b>0.005</b>

Bold values denote statistical significance at the P < 0.05 level.

### 3.3. Associated factors on potential barriers toward research

Furthermore, the result of the overall total score of the SAR questionnaire was 54, indicating a slightly positive attitude toward scientific research. Several variables were significantly associated with SAR score, including the study level (master) (P < 0.001), attending a research methodology course (P < 0.001), the time elapsed since attending the last research methodology course (P < 0.001), and having the opportunity to participate in scientific research so far (P < 0.001).

Higher SAR score was found among master's students, students who attended a research methodology course and those who had the opportunity to participate in scientific research so far. Regarding time elapsed since attending the last research methodology course, the highest SAR score was observed among students who attended the course 6 to 12 months ago, then students who attended the course <6 months ago, followed by students who attended the course 1 to 2 years ago.

The lowest SAR score was found among the students who attended the research methodology course for >2 years ago and students who did not yet attend the research methodology course.

In the total sample, age, gender, and studying while working in the medical profession were not significantly associated with SAR scores (P = 0.201, P = 0.455, and P = 0.353, respectively). In the total sample, mentor's encouragement of students to participate in research, knowledge, and sense of ability to conduct research were positively associated with SAR score. On the contrary, an expectation that a research-based thesis will extend the study duration was negatively associated with SAR score (Table 3).

Among bachelor students, a sense of ability to conduct research was positively associated, and an expectation that a research-based thesis will extend the study duration was negatively associated with SAR score (Table 3). Among master's students, mentors' encouragement of students to participate in research, the need to acquire the knowledge needed to conduct research during the studies and sense of ability to conduct research were positively associated with SAR score (Table 3).

Finally, we performed a logistic regression analysis to assess the association between SAR score and the preferred form of thesis type. The model was statistically significant (P = 0.002). Results showed that a higher SAR score was associated with an increased likelihood of choosing the research-based thesis (OR [95 % CI]; P: 1.026 [1.014–1.038]; P < 0.001).

**Table 3**

The results of linear regression in prediction the effects of SAR score toward possible barriers (analysis was performed in the total sample, as well as for bachelor students and master students separately).

Barriers	Overall sample		Bachelor students		Master students	
	Total score for attitudes		Total score for attitudes		Total score for attitudes	
	$\beta$	<i>P</i>	$\beta$	<i>P</i>	$\beta$	<i>P</i>
Mentor encourages a student to participate in research	0.200	<0.001	0.097	0.177	0.415	<0.001
Additional financial burden of a research-based thesis for a student (Printing of surveys, costs of statistical processing, etc.)	0.037	0.484	0.119	0.096	-0.156	0.062
Expectation that a research-based thesis will extend the study duration	-0.124	<b>0.036</b>	-0.157	0.053	0.031	0.735
Feeling discomfort about inviting potential participants to take part in a research	0.002	0.967	0.070	0.418	-0.112	0.184
The need to invest a lot of time in data collection	-0.044	0.475	0.003	0.972	-0.154	0.080
The need to acquire knowledge of research methodology needed to conduct research during the studies	0.137	<b>0.011</b>	0.098	0.200	0.261	<0.001
Feeling concerned that a mentor could assign a research topic for the thesis	-0.026	0.681	-0.070	0.434	0.105	0.229
Opinion that scientific research represents a challenge	0.049	0.402	0.033	0.689	0.047	0.550
Sense of ability to conduct research	0.191	<0.001	0.255	<0.001	0.151	<b>0.045</b>
<i>P</i> value; <sup>a</sup> R <sup>2</sup>	<i>P</i> < 0.001; R <sup>2</sup> = 0.179		<i>P</i> < 0.001; R <sup>2</sup> = 0.108		<i>P</i> < 0.001; R <sup>2</sup> = 0.294	

Bold values denote statistical significance at the *P* < 0.05 level.

<sup>a</sup> Nagelkerke pseudo-R<sup>2</sup>.

#### 4. Discussion

Our results showed that nursing students in Croatia had slightly positive attitudes toward scientific research. Master's students had more positive attitudes toward scientific research compared to bachelor students, as well as students who had previously attended a research methodology course, and students who have previously had the opportunity to participate in scientific research.

Our results are similar to other reports indicating that students who attended a course with research methodology content had more positive attitudes toward science (Hren et al., 2004; Ross and Burrell, 2019). In addition, we found that master's students had a more positive attitude toward scientific research than bachelor's students, which could be explained by the fact that master's students had multiple research methodology courses. Furthermore, master's nursing students in Croatia are required to conduct a research-based thesis, unlike the bachelor students.

Although we found that there is borderline statistical significance for the expectation that a research-based thesis will extend the study duration, this could be one of the reasons why bachelor students are more likely to choose an essay-based thesis compared to a research-based thesis. This finding warrants further investigation and consideration for the included institutions. If students have an option to choose between the essay and research-based thesis, it is possible that they will be more motivated to choose an essay because of an expectation that such thesis can be completed faster. The predominance of the essay-based theses was the motivation for some of the included institutions to completely abolish the need for bachelor nursing students to conduct a thesis to complete their studies. For example, the Catholic University of Croatia does not require students to write a thesis at the end of their bachelor studies; instead – students have a final knowledge exam (Catholic University of Croatia, 2016b). It was deemed that such essay-based theses are burdening the faculty and students without having any lasting impact.

Vujaklija et al. found that attitudes toward science increased with years of study and that students who had attended a research methodology course had significantly more positive attitudes toward science compared to those who did not attend it (Vujaklija et al., 2010). Recently published study among nursing students from Croatia also confirmed that attitudes toward science increase with years of studying (Bokan et al., 2022; Puljak et al., 2020). This highlights the importance of including research methodology courses in university-level nursing studies.

In addition, mentors' encouragement of students to conduct scientific

research was found to be a significant variable influencing more positive attitudes toward science. This finding is very important because it emphasizes the role of the mentor in orienting the student toward science. Marušić in his report emphasized the important role of mentors and the importance of the mentor's productivity in scientific research as a characteristic of a "good" mentor (Marušić, 2015). It should also be emphasized here that mentors must be well trained in research methodology and productive in scientific research in order to motivate their students and engage them in scientific research.

Our results also showed that time elapsed since attending a research methodology course influences more positive attitudes toward science. Thus, students who had attended a research methodology course 6 to 12 months ago had more positive attitudes toward science. This finding is also important because it indicates the importance of research methodology courses in the nursing studies' curriculum. Policy-makers should take this finding into account and consider introducing additional research methodology courses into the undergraduate nursing curriculum. Another option is to organize the existing research methodology courses into multiple "vertical subjects" that are provided in each study year.

For example, it has been shown on the example of medical students that vertical subjects on research methodology can improve the students' knowledge regarding evidence-based medicine, compared to medical students whose curriculum does not have such vertical subjects (Balajić et al., 2012).

In addition, our results showed that encouraging students to conduct scientific research and a sense of being able to do research are associated with an increased likelihood of choosing a research form for a thesis, while being concerned about the possibility that a mentor will provide a research topic was associated with a decreased likelihood of choosing a scientific research thesis form. Also, the sense of ability to conduct research was also positively associated, while the expectation that a research-based thesis will extend the study duration was negatively associated to attitudes toward scientific research among bachelor and master students. Previous research pointed out that students gain a sense of ability to do scientific research when they are involved in scientific research (Brooke et al., 2015; Fernández-Cano et al., 2021). Thus, higher education institutions providing nursing studies should place a high emphasis on students performing research during their studies.

We were unable to find similar studies in the literature about the barriers influencing the choice of thesis type among nursing students in Croatia. To our knowledge, this is the first study in Croatia that examined nursing students' attitudes toward scientific research and the factors associated with these attitudes.

#### 4.1. Study limitations

This study had several limitations. Firstly, the study had a cross-sectional design, which precludes making causal conclusions. Secondly, the data were collected via online survey, as due to the COVID-19 pandemic, many students attend classes online (Bokan et al., 2022; Puljak et al., 2020). Thirdly, institutions included in the study have different timing when the research methodology courses are provided, and the content of those courses may differ; this may have influenced the results. For example, bachelor nursing students from Rijeka attend a research methodology course in the first year (Faculty of Health Studies, 2021a), and students from Split attend it in the second year (University Department of Health Studies, 2021b). In contrast, students from other participating institutions (Dubrovnik, Koprivnica, Osijek, Zadar and Zagreb) attend a research methodology course in the third year of the bachelor studies (Catholic University of Croatia, 2020; Department of health studies, 2018; Faculty of Dental Medicine and Health Osijek, 2020; University North, 2020b; University of Applied Health Sciences, 2020; University of Dubrovnik, 2020). Another limitation of our study is that we could not perform an analysis of students by year of study because the course Basics of Research Methodology in Croatia is held in different study years at different institutions. Moreover, in this study, we did not examine students' knowledge about scientific research, but this could be a topic for the follow-up study. The response rate (25 %) was in line with what could be expected from an unsolicited online survey (Saleh and Bista, 2017). It is possible that the targeted students were saturated with other online questionnaires and therefore did not respond to the survey in larger numbers (De Man et al., 2021).

#### 5. Conclusions

We found modifiable factors associated with positive attitudes toward scientific research and preference for a research-based thesis among nursing students. These findings can be used to change nursing studies' curricula and encourage students to engage in research as much as possible.

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#### CRedit authorship contribution statement

The idea for the study design came from MM, who further developed it with IBok, RO, and AŠ. LP contributed to the development and refinement of the study protocol. MM, LP, IG, SZ, MS, SČ, IBar, and DŠ collected data, and AM analysed the data. MM and IBok wrote the first draft of the manuscript, while all authors contributed to revisions and approved the final version of the manuscript. The authors take responsibility for all aspects of the study and the manuscript.

#### Declaration of competing interest

The authors declare no competing interests.

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#### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.nedt.2022.105664>.

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