BMJ Open

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Journal:	*BMJ Open*
Manuscript ID	bmjopen-2020-037553
Article Type:	Original research
Date Submitted by the Author:	20-Mar-2020
Complete List of Authors:	Laporte, Pauline; Haute Ecole Arc Sante, Santé Juvet, Typhaine; Haute Ecole de Santé Arc Desbiens, Jean-François; Laval University, Faculty of Nursing Tapp, Diane; Laval University, Faculty of Nursing Pasquier, Jérôme; Center of Primary Care and Public Health (Unisanté), University of Lausanne Bornet, Marc-Antoine; Lausanne University Hospital, ;
Keywords:	PALLIATIVE CARE, MEDICAL EDUCATION & TRAINING, Adult palliative care < PALLIATIVE CARE

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Attitudes toward caring for terminally ill patients and associated factors among nursing students: a cross-sectional study in Switzerland

Pauline Laporte, PhD[1,§]; Typhaine Juvet, MSci[1]; Jean-François Desbiens, PhD[2]; Diane Tapp, PhD[2]; Jérôme Pasquier, PhD[3]; and Marc-Antoine Bornet, MD[4]

[1]Haute Ecole Arc Santé, University of Applied Sciences and Arts Western Switzerland (HES-SO), Neuchâtel, Switzerland

[2]Faculty of Nursing, Laval University (ULaval), Québec, Canada

[3]Center for Primary Care and Public Health (Unisanté), University of Lausanne, Lausanne, Switzerland

[4]Service of Internal Medicine, Lausanne University Hospital (CHUV), Lausanne, Switzerland

[§]Corresponding author:

Pauline Laporte, PhD Nursing
Haute Ecole Arc Santé
University of Applied Sciences and Arts Western Switzerland (HES-SO)
Route de Moutier 14
2800 Delémont
Switzerland
pauline.laporte@he-arc.ch
+41 32 930 12 43

This work was supported by the University of Applied Sciences and Arts Western Switzerland (HES-SO, www.hes-so.ch/).

The authors report no conflict of interest.

Word count: 3472 words without references and tables

Number of tables: 3 Figures: 1 References: 29

ABSTRACT

Objectives: Positive attitudes toward end-of-life care are essential among nursing students to adequately support terminally ill patients and enable students to feel confident about providing end-of-life care. This study aimed to explore nursing students' attitudes toward caring for terminally ill patients and associations between these attitudes and study year, exposure to terminally ill people, self-perceived nursing skills, and subjective impact of instruction.

Design: Cross-sectional study.

Setting: A health sciences school in Switzerland.

Participants: 178 participants (63 preparatory students; 67 first- and 48 third-year nursing students).

Primary and secondary outcome measures: Attitudes toward terminally ill patients were assessed using the Frommelt Attitude Toward Care of the Dying Scale, Form B (FATCOD, Form B). Predictive factors were gender, age, number of terminally ill persons encountered, self-perceived palliative care nursing skills, and subjective impact of instruction. Tolerance to participation was assessed as a secondary outcome.

Results: Mean FATCOD, Form B score was 117.7 (standard deviation: 9.8, median: 118.0). Better attitudes toward terminally ill patients were significantly associated with being aged 24–26 years (β = 6.97, 95% confidence interval [CI]: 2.00–11.95, p = .006), study year (β = 3.47, 95% CI: 1.69–5.25, p < .001), professional encounters with terminally ill patients (β = 3.59, 95% CI: 2.23–4.95, p < .001), and self-perceived palliative care nursing competence (β = 1.23, 95% CI: 0.41–2.04; p = .003). In multivariate analysis, professionally encountering terminally ill patients remained significant (β = 3.00; 95% CI: 1.43–4.57; p < .001).

Conclusions: Nursing students' attitudes toward caring for terminally ill patients were positive and improved during the curriculum. Professional exposure to terminally ill patients was the strongest factor, followed by private encounters, self-perceived palliative care nursing skills, study year, and age. Students did not consider addressing the theme of caring for terminally ill patients stressful.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This study used a widely recognized research tool to describe nursing students' attitudes toward caring for terminally ill patients.
- The response rate was high, making response bias unlikely.

- The study population (nursing students at one school across two sites in Switzerland) must be considered before attempting to generalize the results to other demographic and public health contexts.

INTRODUCTION

Nursing students entering the profession where contact with death often occurs on a daily basis. Many nursing students consider themselves insufficiently prepared for this situation because of a lack of training.[1] Notably, caring for end-of-life patients is not without consequences for these students. Some students may develop negative attitudes, such as patient avoidance, fear, self-doubt, and communication problems.[1-3] In addition to the potential impact on nursing students and patients, these kinds of negative attitudes have a broader effect on the health system, potentially impacting students' willingness to remain in the nursing profession and worsening the shortfall in nursing specialists.[4] Thus, a positive attitude toward end-of-life care, which is promoted in the nursing curriculum, is essential for students to feel confident and develop the skills necessary to offer quality, whole-person nursing care to end-of-life patients.[5] Unfortunately, this key theme has not yet been studied in Switzerland.

Being a woman[6 7] and being young[8] are associated with more negative attitudes toward caring for terminally ill patients, whereas senior staff have been found to have more positive attitudes.[2 9] Among students, master's students have more positives attitudes compared with bachelor's students,[10] and those who have already been exposed to death have more positive attitudes than others.[11 12] However, attitudes of preparatory students and the evolution of attitudes of bachelor's students over time have not yet been documented.

In addition to these factors, we believe it is particularly important to study modifiable factors in the curriculum. Previous work has demonstrated that positive attitudes toward end-of-life care are correlated with specific training.[6 9 13 14] Nevertheless, three-quarters of nurses have been shown to have insufficient knowledge of geriatric palliative care, in Vietnam, precisely.[15] Associations between self-assessed competence to provide end-of-life care and attitudes toward caring for terminally ill patients, to the best of our knowledge, have not yet been empirically examined. Nurses' perceived competence in this area is important for them to carry out their profession with confidence.

We developed the following hypothesis for this study: Nursing students' attitudes toward caring for terminally ill patients evolve over the course of the curriculum and are

influenced by the number of terminally ill persons encountered, self-perceived nursing skills in palliative care, and the subjective impact of instruction. To test this hypothesis, the study aimed to explore attitudes toward caring for terminally ill patients among nursing students, as well as the associations of these attitudes with the number of terminally ill persons encountered and the nursing students' age, study year, self-perceived nursing skills, and subjective impact of instruction. An additional objective of the study was to analyze the participants' tolerance toward this assessment.

METHODS

Setting

This cross-sectional study was conducted from March to May 2019 at the Haute Ecole Arc Santé of the University of Applied Sciences and Arts Western Switzerland. This health sciences school, which enrolls about 400 students spread over two locations Switzerland (Neuchâtel and Delémont), offers a three-year bachelor's degree in nursing science and a related preparatory program. The preparatory program is a one-year course to prepare students who want to enter the nursing curriculum or other health programs (i.e., to become technicians in medical radiology, physiotherapy, osteopathy, occupational therapy, dietetics and nutrition, or midwifery).

Study enrollment procedure

Preparatory students as well as first- and third-year nursing students listened to a brief oral presentation about the study. We conducted this information session in the classroom at the end of a class session. The students received a printed information sheet and had a 24-hour period to decide whether they wished to participate in the study. The following day, students interested in participating signed a written informed consent form and were enrolled in the study.

Data collection

Participants completed a self-report computerized questionnaire. The principal investigator was present to answer questions. This assessment lasted approximately 15 minutes and occurred on the health sciences school campus.

Attitudes toward terminally ill patients

Attitudes toward terminally ill patients were assessed using the Frommelt Attitude Toward Care of the Dying Scale, Form B (FATCOD, Form B),[16] which is an adapted version of the original FATCOD[17] specifically developed for use among students in a variety of programs of study. The original English questionnaire was translated into French by two native French speakers, and two native English speakers then performed a reverse translation, following standard procedures.[18] The FATCOD, Form B includes 30 items evaluated on a Likert-type scale scored from 1 to 5, with half of the items negatively worded (and requiring reverse scoring). The total score range from 30 to 150, with higher scores indicating more positive attitudes.

Other covariates

Year of study, gender, age, and number of terminally ill persons encountered in personal and professional contexts were assessed. To ensure confidentiality, data on age were collected by category (≤ *20 years*, *21–23 years*, *24–26 years*, and ≥ *27 years*). Exposure to terminally ill persons was assessed as a categorical variable (*never*, *one time*, *2 to 5 times*, *6 to 10 times*, and *10 and more times*) to reduce response burden.

Self-perceived nursing skills in palliative care were assessed using the Self-Perceived Palliative Care Nursing Competence scale,[19] which consists of 34 questions answered on an 11-point Likert-type scale. The original version of this scale is in French. The final score is the mean score on all items and ranges from 0 to 10, with higher scores indicating more confidence in one's own skills.

The subjective impact of the instruction the nursing students had received so far on their ability to care for terminally ill patients was assessed using two questions: one on skills and the other on personal lived experience. These questions were developed specifically for the present study. Content validity, more specifically the understanding of the items, was tested among five students. All study participants scored their previous instruction on each of the two questions from 0 (*does not prepare me at all*) to 10 (*prepares me completely*).

The expected impact of their instruction at the end of the study program was also assessed, again both for skills and for personal lived experience. For both questions, the participants provided a score from 0 (*will not be prepared at all*) to 10 (*will be prepared completely*).

Participation tolerance was evaluated by asking the study participants about the stress induced by the assessment with a single question. Participants' responses ranged from 0 (*no stress*) to 10 (*significant stress*).

Ethical aspects

In case of suffering caused by participating in the study, the principal investigator was available to listen and provide assistance. The school nurse was also informed and was available to provide any necessary follow-up care. The study was performed in agreement with the Helsinki Declaration and its former amendments, and in accordance with the applicable Swiss legislation. Because the project did not deal with diseases or the functioning of the human body, it did not fall within the scope of the Human Research Ordinance. This information was formally verified with the Ethics Commission of Canton Vaud (CER-VD, www.cer-vd.ch), which indicated that we did not have to submit our protocol for evaluation. We used the STROBE checklist for reporting in cross-sectional studies in writing this article.[20]

Patient and public involvement

There was no time allocated for patient and public involvement, so we were unable to involve patients in the research.

Statistical analyses

We conducted descriptive analyses, which are presented as means and standard deviations (SD) for continuous variables and as frequencies and proportions for categorical variables. Bivariate associations between the different descriptive factors measured and FATCOD, Form B score were assessed using univariate regression models. With the exception of age, ordered categorical variables were considered continuous in the regression models because only linear trends were observed. Age was included in the regression models as a categorical variable. A multivariate linear regression model was also estimated, with FATCOD, Form B score as the response variable and all variables considered in the univariate regression models included as explanatory variables. Missing values were handled by multiple imputation (15 imputations). Statistical analyses were performed using R, Version 3.6.1 (www.r-project.org), and the mice package, Version 3.5.0 was used for the imputation.

RESULTS

Population description

The participant enrollment process is described in **Figure 1**. A total of 178 participants were included in the study (83.7% women, median age category: 21–23 years). Of the participants, 63 were in the preparatory program, and there were 67 first-year and 48 third-year nursing students. The participant characteristics are summarized in **Table 1**.

Attitudes toward caring for terminally ill patients

The overall mean FATCOD, Form B score was 117.7 (SD: 9.8, median: 118). For preparatory students, first-year, and third-year students, the mean scores were 114.9 (SD: 10.1, median: 114), 117.4 (SD: 9.7, median: 116), and 121.9 (SD: 8.2, median: 123.5), respectively.

The most positive attitudes were found for the following items: Item 17, "caregiver withdraw from involvement nears death" (mean: 4.6, SD: 0.6, median: 5); Item 19, "not allowed to make decisions about his/her physical care" (mean: 4.6, SD: 0.7, median: 5); and Item 21, "beneficial to verbalize his/her feelings" (mean: 4.6, SD: 0.6, median: 5). The most negative attitudes were associated with Item 3, "uncomfortable talking about impending death" (mean: 3.1, SD: 1.2, median: 3); Item 7, "the length of time required frustrates me" (mean: 2.3, SD: 1.1, median: 2); and Item 26, "uncomfortable if I found him/her crying" (mean: 3.1, SD: 1.2, median: 3).

Associated factors

In the bivariate analysis, attitudes toward caring for terminally ill patients were associated with the nursing student's age, study year, professional encounters with terminally ill patients, and self-perceived nursing skills (Self-Perceived Palliative Care Nursing Competence scale) (**Table 2**).

The multivariate analysis showed that the association with professionally encountering terminally ill patients remained significant (**Table 3**).

Tolerance to participation

Participants had a mean stress score of 2.5 (SD: 2.4, median: 2). For preparatory students, first-year nursing students, and third-year nursing students, the mean stress scores were 2.2 (SD: 2.2, median: 2), 2.9 (SD: 2.5, median: 3), and 2.4 (SD: 2.4, median: 2), respectively. Participants with higher stress scores had significantly more negative attitudes toward caring for terminally ill patients (univariate regression—β = -0.86; 95% confidence

interval: -1.49 to -0.23, $p = .007$). No participants reported or showed signs of suffering during the assessment, and no participants expressed the need to speak with the investigator.

DISCUSSION

Attitudes toward caring for terminally ill patients are positive and improve during nursing students' curriculum. Professionally encountering terminally ill patients was the strongest factor associated with these attitudes, followed distantly by private experiences with a relative at the end of his or her life. Self-perceived nursing skills in palliative care, study year, and age were other significant factors. Finally, the students did not consider addressing the theme of caring for terminally ill patients to be stressful.

Attitudes

The overall attitudes score was three-quarters of the maximum possible score, which shows that nursing students have very positive attitudes toward caring for terminally ill patients. This positive view may be explained by the students' understanding of caring for vulnerable patients and offering whole-person compassionate care as a core value of the nursing profession. Nurses, especially those working in palliative care, consider it an ethical responsibility to support patients and make sure that they understand that they will not be abandoned: Ricot has called this the "duty of fraternity," which is the "obligation of a human presence, always attentive, often discreet, sometimes silent."[21] This vision is widely recognized, as both patients and professionals have a positive view of professionals taking care of end-of-life patients and attribute qualities such as kindness, warmth, compassion, and genuineness to those fulfilling this role.[22] Finally, students may recognize that the challenge of being professionally confronted with death can lead to personal growth.[23]

The attitudes toward death among participants in our study were more positive than those found among nursing students in Palestine[24] and Turkey, similar to those found among nursing students in the United States,[25] and poorer than those found among nursing students in Sweden.[26] Further, our sample of nursing students had more positive attitudes than those found among registered nurses in China,[5] India,[27] Ethiopia,[28] Saudi Arabia,[14] and Japan;[6] however, nurses in Israel[3] and the United States[29] have been found to have more positive attitudes than those seen in the present study.

Differences between our sample and the samples used in studies conducted in other countries may be explained by cultural variations across the studied countries.[26] Another contributing factor could be differences in the health system in place. Previous findings have shown that the integration of palliative care, with education for nurses regarding end-of-life situations, is the most important factor influencing attitudes toward palliative care.[14] National health systems are influenced by the socioeconomic level of the country, which may explain the higher scores found in European countries and the United States, compared with other countries.

Associated factors

Study year and age. Attitudes toward caring for terminally ill patients are positively associated with older age and more advanced study year. This result is consistent with previous studies demonstrating the effects of age[2 6 8 9] and training.[10] Lack of experience may also explain why, in our results, the most positively rated items are those that highlight the patient's well-being and the most negatively rated items are those concerning elements that nurses say they are afraid they will be unable to tolerate.

In addition, as noted above, previous studies conducted in United States have reported better attitudes among registered nurses than among nursing students.[25 29] This may explain why our sample of young students had poorer attitudes compared with those of registered nurses in some other countries.

Exposure. The number of end-of-life patients encountered professionally is the most important factor influencing attitudes in this study. Indeed, meeting and providing care to end-of-life patients is the key to developing positive attitudes. This finding is consistent with previous studies.[11 12] We think it can be assumed that exposure demystifies the end of life and thereby reduces anxiety. Furthermore, this kind of exposure provides opportunities for the development of knowledge and skills and for personal growth. These changes positively influence attitudes toward future end-of-life patients. Correspondently, it has been established that specific palliative care training is correlated with positive attitudes toward end-of-life care.[6 9 13 14] Conversely, a negative experience can be expected to have a detrimental influence on attitudes, and adequate supervision should therefore be available to help nursing students to overcome this kind of experience.

Skills. Attitudes toward caring for terminally ill patients are associated with self-perceived nursing skills. To our knowledge, this is the first published empirical examination of

this relationship. This finding suggests that caregivers who feel comfortable and competent with end-of-life care have a positive attitude toward providing such care. For nursing students, this means that such attitudes could be fostered through confidence building, targeted teaching, and individually rewarding exercises.

Expected impact. Third-year nursing students, who are just months from the end of their studies, do not expect further progress. Preparatory and first-year nursing students are confident that they will improve during the course of their studies, in terms of both skills and lived experience. This is an encouraging result for nursing teachers, as it reflects students' motivation to improve and trust in the school's resources.

Because of variability between participants, we could not demonstrate a link between the expected impact of instruction at the end of their curriculum and the examined attitudes. However, the above developments suggest that there may indeed be a positive link between the expected impact of instruction and these attitudes.

Tolerance

Participants with higher stress induced by participating in the study had slightly more negative attitudes than others. This finding is consistent with a previous report, which showed that anxiety about death is inversely related to attitudes toward caring for dying patients.[7] This can be related to the findings on self-perceived skills outlined above: Our hypothesis is that caregivers who feel that they are unable to provide adequate end-of-life care experience more stress because of this thought. Likewise, these caregivers' behaviors and attitudes regarding dying patients can be expected to be less appropriate.

Overall, the study participants showed a high level of tolerance for approaching this topic and a low level of stress, even though the participants completed a self-report form rather than meeting with an investigator for a face-to-face interview. Our study is the first examination of this subject to assess the stress level of participants caused by study participation. This point is of ethical importance and can contribute to the justification for conducting studies about end-of-life care among nursing students.

Strengths and limitations

The present study used a widely recognized research tool in a geographic setting where nursing students' attitudes toward the management of terminally ill patients has not yet been explored.

The study was conducted in one school, with students spread over two sites in Switzerland. This element of the study design must be considered before attempting to generalize the results to other demographic and public health contexts.

Implications for nursing schools

On the basis of our results, we believe that nursing students should not be removed or protected from situations concerning death during their internships. Early occupational exposure is essential for reducing students' anxiety. Thus, students must be confronted with these situations. To come through these experiences positively, students should be supported and provided with the necessary resources. Both in class and in practical settings, teachers must foster confidence through positive experiences and feedback to enhance students' self-perceived competence. We can also imagine the benefit of classes where students meet with families who have recently lost a loved one. Adopting these approaches should greatly improve the positive attitudes and skills of nursing students and nurses regarding end-of-life care and help them to provide high-quality, whole-person care to patients at the end of life.

Conclusion

Nursing students have positive attitudes toward caring for end-of-life patients, and these attitudes become more positive during the course of the nursing curriculum. Our study highlights the importance of students experiencing end-of-life care. Future research should develop and assess pedagogic interventions aiming to provide nursing students with appropriate experiences of this type. This is a key point in helping nurses to feel confident in their ability to support patients by being truly present at the time of death.

AUTHOR CONTRIBUTIONS

PL, TJ, JFD, DT, and MAB designed the research. JP and MAB conducted the statistical analysis. All authors interpreted the data. PL and MAB wrote the first draft of the manuscript. All authors participated in the writing of subsequent versions and approved the final article.

FUNDING

This work was supported by the University of Applied Sciences and Arts Western Switzerland (HES-SO, www.hes-so.ch/).

COMPETING INTERESTS

The authors report no conflict of interest.

ETHICS APPROVAL

No ethics approval was required.

DATA SHARING STATEMENT

The full dataset will be provided on reasonable request.

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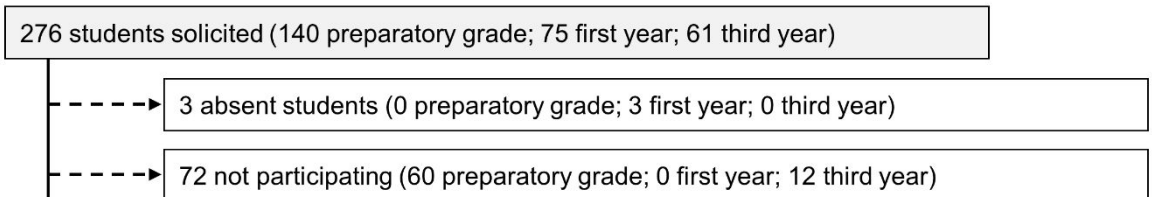
FIGURE LEGEND

Figure 1. Study flow chart



TABLES

Table 1. Characteristics of the participants, overall and according to the study year.

	Total sample (N = 178)	Preparatory grade (N= 63)	First year (N = 67)	Third year (N = 48)
Women (%)	83.7	74.6	86.6	91.7
Age (%):				
≤ 20 years	35.4	66.7	31.3	0
21-23 years	44.9	20.6	50.7	68.8
24-26 years	10.7	6.3	9.0	18.8
≥ 27 years	9.0	6.3	9.0	12.5
Private encountering (%):				
Never	10.1	15.9	7.5	6.3
1 time	23.6	19.0	32.8	16.7
2-5 times	57.3	54.0	52.2	68.8
6-10 times	7.3	7.9	7.5	6.3
> 10 times	1.7	3.2	0	2.1
Professional encountering (%):				
Never	14.0	25.4	13.4	0
1 time	28.7	38.1	34.3	8.3
2-5 times	43.8	30.2	43.3	62.5
6-10 times	8.4	4.8	6.0	16.7
> 10 times	5.1	1.6	3.0	12.5
SPCNC (33 missing)	4.8 (1.9)	4.1 (1.7)	4.4 (1.6)	6.3 (1.5)
SPCNC (imputed)	4.8 (1.8)	4.1 (1.7)	4.4 (1.5)	6.2 (1.5)
Instruction's impact – skills	4.3 (2.2)	4.0 (2.0)	3.4 (1.8)	5.8 (2.3)
Instruction's impact – lived experience	4.4 (2.5)	4.6 (2.4)	3.4 (2.2)	5.7 (2.3)
Expected impact – skills (7 missing)	6.3 (2.4)	6.6 (2.5)	6.3 (2.3)	5.9 (2.3)
Expected impact – skills (imputed)	6.2 (2.4)	6.4 (2.5)	6.3 (2.3)	5.9 (2.3)
Expected impact – lived experience (8 missing)	6.3 (2.4)	6.7 (2.3)	6.3 (2.4)	5.8 (2.4)
Expected impact – lived experience (imputed)	6.3 (2.4)	6.5 (2.4)	6.4 (2.5)	5.8 (2.4)

Results are expressed as mean (standard deviation) for quantitative variables and as proportions for categorical variables.
SPCNC, Self-perceived palliative care nursing competence.

Table 2. Analysis of bivariate associations between the different descriptive elements and the Frommelt attitude toward care of the dying scale (FATCOD, Form B).

Predictive factor		**β (95% CI)**	***p*-value**	**R^2**
Gender (ref: Male)	Intercept	116.45 (112.85 to 120.04)		<.01
	Female	1.52 (-2.40 to 5.45)	.445	
Age (ref: 20 years old or less)	Intercept	116.08 (113.68 to 118.48)		.05
	21-23 years	2.17 (-1.03 to 5.37)	.183	
	24-26 years	6.97 (2.00 to 11.95)	.006	
	≥ 27 years	-0.83 (-6.15 to 4.49)	.759	
Study year	Intercept	114.55 (112.40 to 116.69)		.08
	Slope	3.47 (1.69 to 5.25)	<.001	
Private encountering	Intercept	115.69 (112.41 to 118.97)	<.001	.01
	Slope	1.22 (-0.54 to 2.98)	.174	
Professional encountering	Intercept	111.91 (109.33 to 114.50)		.13
	Slope	3.59 (2.23 to 4.95)	<.001	
SPCNC (33 missing)	Intercept	112.03 (107.58 to 116.47)		.06
	Slope	1.32 (0.46 to 2.18)	.003	
SPCNC (imputed)	Intercept	111.87 (107.74 to 116.00)		.05
	Slope	1.23 (0.41 to 2.04)	.003	
Instruction's impact – skills	Intercept	116.30 (113.19 to 119.41)		<.01
	Slope	0.34 (-0.31 to 0.98)	.308	
Instruction's impact – lived experience	Intercept	116.36 (113.38 to 119.34)		<.01
	Slope	0.31 (-0.28 to 0.89)	.302	
Expected impact – skills (7 missing)	Intercept	115.84 (111.58 to 120.10)		<.01
	Slope	0.33 (-0.31 to 0.97)	.312	
Expected impact - skills (imputed)	Intercept	115.55 (111.44 to 119.66)		<.01
	Slope	0.35 (-0.27 to 0.97)	.266	
Expected impact – lived experience (8 missing)	Intercept	115.75 (111.53 to 119.98)		<.01
	Slope	0.34 (-0.29 to 0.96)	.293	
Expected impact – lived experience (imputed)	Intercept	115.40 (111.36 to 119.43)		<.01
	Slope	0.37 (-0.23 to 0.97)	.225	

β, regression coefficient; 95% CI, 95% confidence interval; R^2, coefficient of determination; Int, Intercept. SPCNC, Self-perceived palliative care nursing competence.
Factors coding: study year: 0 = preparatory year, 1 = first year, 2 = 2nd year, 3 = 3rd year; private and professional encountering: 0 = never, 1 = 1 time, 2 = 2 - 5 times, 3 = 6 - 10 times, 4 = 10 or more; SPCNC: 0-10 (higher score indicating higher perception); impact: 0 – 10 (higher score indicating positive impact).

Table 3. Multivariate linear regression to predict Frommelt attitude toward care of the dying scale (FATCOD, Form B).

Predictive factor	Without imputation			With imputation		
	β (95% CI)	*p*-value	R^2	β (95% CI)	*p*-value	R^2
Intercept	105.06 (95.35 to 114.77)			105.94 (97.90 to 113.98)		
Women	-1.06 (-5.85 to 3.74)	.664		-0.64 (-4.48 to 3.21)	.743	
21-23 years	1.07 (-3.35 to 5.49)	.632		-0.11 (-3.84 to 3.62)	.953	
24-26 years	4.53 (-1.51 to 10.57)	.140		3.99 (-1.17 to 9.14)	.129	
≥ 27 years	-1.43 (-7.83 to 4.97)	.660		-2.25 (-7.89 to 3.39)	.432	
Study year	1.45 (-1.55 to 4.45)	.340		1.97 (-0.48 to 4.42)	.115	
Private encountering	-0.36 (-2.43 to 1.71)	.733		0.51 (-1.17 to 2.20)	.549	
Professional encountering	2.81 (0.97 to 4.65)	.003	.20	3.00 (1.43 to 4.57)	<.001	.21
SPCNC	0.89 (-0.26 to 2.03)	.129		0.51 (-0.50 to 1.53)	.318	
Instruction's impact - skills	-0.95 (-2.18 to 0.29)	.133		-0.85 (-1.90 to 0.21)	.115	
Instruction's impact - lived experience	0.30 (-0.81 to 1.40)	.595		0.27 (-0.68 to 1.22)	.580	
Expected impact - skills	0.38 (-1.04 to 1.81)	.597		0.49 (-0.49 to 1.46)	.329	
Expected impact - lived experience	0.52 (-0.89 to 1.93)	.465		0.25 (-0.79 to 1.29)	.638	

β, regression coefficient; 95% CI, 95% confidence interval; R^2, coefficient of determination.
SPCNC, Self-perceived palliative care nursing competence.

Reporting checklist for cross sectional study.

Based on the STROBE cross sectional guidelines.

		Reporting Item	Page Number
Title and abstract			
Title	#1a	Indicate the study's design with a commonly used term in the title or the abstract	1
Abstract	#1b	Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background / rationale	#2	Explain the scientific background and rationale for the investigation being reported	3 - 4
Objectives	#3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	#4	Present key elements of study design early in the paper	4
Setting	#5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4

Eligibility criteria	#6a	Give the eligibility criteria, and the sources and methods of selection of participants.	4
	#7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	4
Data sources / measurement	#8	For each variable of interest give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group. Give information separately for for exposed and unexposed groups if applicable.	4 - 5
Bias	#9	Describe any efforts to address potential sources of bias	4
Study size	#10	Explain how the study size was arrived at	4
Quantitative variables	#11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen, and why	5 - 6
Statistical methods	#12a	Describe all statistical methods, including those used to control for confounding	6
Statistical methods	#12b	Describe any methods used to examine subgroups and interactions	6
Statistical methods	#12c	Explain how missing data were addressed	6

Statistical methods	#12d	If applicable, describe analytical methods taking account of sampling strategy	n/a
Statistical methods	#12e	Describe any sensitivity analyses	6
Results			
Participants	#13a	Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed. Give information separately for for exposed and unexposed groups if applicable.	6 - 7
Participants	#13b	Give reasons for non-participation at each stage	Figure 1
Participants	#13c	Consider use of a flow diagram	Figure 1
Descriptive data	#14a	Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders. Give information separately for exposed and unexposed groups if applicable.	6 - 7
Descriptive data	#14b	Indicate number of participants with missing data for each variable of interest	Table 1
Outcome data	#15	Report numbers of outcome events or summary measures. Give information separately for exposed and unexposed groups if applicable.	6 - 7

Main results	#16a	Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	6 - 7
Main results	#16b	Report category boundaries when continuous variables were categorized	6 - 7
Main results	#16c	If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	n/a
Other analyses	#17	Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses	7
Discussion			
Key results	#18	Summarise key results with reference to study objectives	7 - 8
Limitations	#19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	10
Interpretation	#20	Give a cautious overall interpretation considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	8 - 10
Generalisability	#21	Discuss the generalisability (external validity) of the study results	10
Other Information			

Funding	#22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	11

BMJ Open

Factors affecting attitudes toward caring for terminally ill patients among nursing students in Switzerland: a cross-sectional study

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2020-037553.R1
Article Type:	Original research
Date Submitted by the Author:	06-Jul-2020
Complete List of Authors:	Laporte, Pauline; Haute Ecole Arc Sante Juvet, Typhaine; Haute Ecole Arc Sante Desbiens, Jean-François; Laval University, Faculty of Nursing Tapp, Diane; Laval University, Faculty of Nursing Pasquier, Jérôme; Center of Primary Care and Public Health (Unisanté) Bornet, Marc-Antoine; Lausanne University Hospital
Primary Subject Heading:	Palliative care
Secondary Subject Heading:	Nursing
Keywords:	PALLIATIVE CARE, MEDICAL EDUCATION & TRAINING, Adult palliative care < PALLIATIVE CARE

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Factors affecting attitudes toward caring for terminally ill patients among nursing students in Switzerland: a cross-sectional study

Pauline Laporte, PhD[1,§]; Typhaine Juvet, MSci[1]; Jean-François Desbiens, PhD[2]; Diane Tapp, PhD[2]; Jérôme Pasquier, PhD[3]; and Marc-Antoine Bornet, MD[4]

[1]Haute Ecole Arc Santé, University of Applied Sciences and Arts Western Switzerland (HES-SO), Neuchâtel, Switzerland

[2]Faculty of Nursing, Laval University (ULaval), Québec, Canada

[3]Center for Primary Care and Public Health (Unisanté), University of Lausanne, Lausanne, Switzerland

[4]Service of Internal Medicine, Lausanne University Hospital (CHUV), Lausanne, Switzerland

[§]Corresponding author:

Pauline Laporte, PhD Nursing
Haute Ecole Arc Santé
University of Applied Sciences and Arts Western Switzerland (HES-SO)
Route de Moutier 14
2800 Delémont
Switzerland
pauline.laporte@he-arc.ch
+41 32 930 12 43

This work was supported by the University of Applied Sciences and Arts Western Switzerland (HES-SO, www.hes-so.ch/).

The authors report no conflict of interest.

Word count: 3852 words without references and tables

Number of tables: 3 Figures: 1 References: 45

ABSTRACT

Objectives: Positive attitudes toward end-of-life care are essential among nursing students to adequately support terminally ill patients and enable students to feel confident about providing end-of-life care. This study aimed to determine nursing students' attitudes toward caring for terminally ill patients, as well as the associations between these attitudes and year of study, exposure to terminally ill people, self-perceived nursing skills, and subjective impact of instruction.

Design: Cross-sectional study.

Setting: A health sciences school in Switzerland.

Participants: All preparatory students, first-year nursing students, and third-year nursing students were invited to participate; 178 agreed to participate.

Primary outcome measure: Attitudes toward terminally ill patients were assessed using the Frommelt Attitude Toward Care of the Dying Scale, Form B (FATCOD, Form B), as the primary outcome. Secondary measures were gender, age, year of study, number of terminally ill persons encountered, self-perceived palliative care nursing skills, and subjective impact of instruction.

Results: Mean FATCOD, Form B score was 117.7 (standard deviation: 9.8, median: 118.0). Better attitudes toward terminally ill patients were significantly associated with being aged 24–26 years (β = 6.97, 95% confidence interval [CI]: 2.00–11.95, $p = .006$), year of study (β = 3.47, 95% CI: 1.69–5.25, $p < .001$), professional encounters with terminally ill patients (β = 3.59, 95% CI: 2.23–4.95, $p < .001$), and self-perceived palliative care nursing competence (β = 1.23, 95% CI: 0.41–2.04; $p = .003$). In the multivariate analysis, professionally encountering terminally ill patients remained significant (β = 3.00; 95% CI: 1.43–4.57; $p < .001$).

Conclusions: Nursing students' attitudes toward caring for terminally ill patients were positive and improved as their year of study progressed. Professional exposure to terminally ill patients was the strongest factor, followed by private encounters, self-perceived palliative care nursing skills, year of study, and age.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This study's primary outcome measure, the Frommelt Attitude Toward Care of the Dying Scale, Form B, is a widely recognized research tool.
- The response rate was high, making response bias unlikely.
- The few instances of missing data were handled by multiple imputation.
- The secondary measures were not all fully psychometrically validated.
- The sample included nursing students at one school across two sites in Switzerland.

INTRODUCTION

Caring for an end-of-life patient is a challenge that requires both advanced skills and appropriate attitudes regarding the provision of this care. The nursing skills required to care for these patients are holistic; such care includes, for example, the treatment of pain, nausea, and constipation (the biological dimension); the management of anxiety, depression, and agitation (the psychological dimension); caring for the patient's loved ones (the social dimension); and identifying spiritual distress (the spiritual dimension).[1] In addition, end-of-life patients have been shown to have a particularly strong need for open and honest communication, involvement in decisions about their care, and close monitoring with regular reassessment to allow them to cope with the instability of their situation.[2]

Nursing students are entering a profession where contact with death often occurs on a daily basis. Many of these students consider themselves insufficiently prepared for this situation because of a lack of training.[3] Notably, caring for end-of-life patients is not without consequences for these students. Some students may develop negative attitudes, such as patient avoidance, fear, self-doubt, and communication problems.[3-5] Attitudes comprise ideas and beliefs that are attached to specific emotions.[5] More specifically, an attitude is the way a person expresses beliefs (internal feelings that something is true) and values (stable and enduring beliefs regarding the importance a person attaches to something) through words and behaviors.[6]

In addition to the potential impact on nursing students and patients, the kinds of negative attitudes described above have a broader effect on the health system, potentially impacting students' willingness to remain in the nursing profession and worsening the shortfall in nursing specialists.[7] Thus, a positive attitude toward end-of-life care, which is promoted in the nursing curriculum, is essential for students to feel confident and develop the skills necessary to offer

quality, holistic nursing care to end-of-life patients.[8] Unfortunately, this key theme has not yet been studied in Switzerland.

Being a woman[9 10] and being young[11] are associated with more negative attitudes toward caring for terminally ill patients, whereas senior staff have been found to have more positive attitudes.[4 12] Little information has been collected regarding these attitudes among students. A study described master's students as having more positive attitudes compared with bachelor's students,[13] and other evidence indicates that those who have already been exposed to death have more positive attitudes than those who have not had this exposure.[14 15] However, attitudes of preparatory students and the evolution of attitudes of bachelor's students over time have not yet been documented.

In addition to these factors, we believe it is particularly important to study modifiable factors in the curriculum, which was one of our motivations for conducting this study. Previous work has demonstrated that positive attitudes toward end-of-life care are correlated with specific training.[9 12 16 17] Nevertheless, three-quarters of nurses in a study in Vietnam had insufficient knowledge of geriatric palliative care.[18] Associations between self-assessed competence to provide end-of-life care and attitudes toward caring for terminally ill patients, to the best of our knowledge, have not yet been empirically examined. Nurses' perceived competence in this area is important for them to carry out their professional duties with confidence.

We developed the following hypothesis for this study: Nursing students' attitudes toward caring for terminally ill patients evolve over the course of the curriculum and are influenced by the number of terminally ill persons encountered, self-perceived nursing skills in palliative care, and the subjective impact of instruction. To test this hypothesis, the study aimed to determine attitudes toward caring for terminally ill patients among nursing students, as well as the associations of these attitudes with the number of terminally ill persons encountered and the nursing students' age, year of study, self-perceived nursing skills, and subjective impact of instruction.

METHODS

Study design and setting

We used the STROBE checklist for reporting in cross-sectional studies in writing this article.[19] This cross-sectional study was conducted from March to May 2019 at the Haute Ecole Arc Santé of the University of Applied Sciences and Arts Western Switzerland. This health sciences school, which enrolls about 400 students (140 preparatory students and 260 nursing students) spread over two locations in Switzerland (Neuchâtel and Delémont), offers a three-year bachelor's degree in nursing science and a related preparatory program. The preparatory program is a one-year course to prepare students who want to enter the nursing curriculum or other health programs (i.e., to become technicians in medical radiology, physiotherapy, osteopathy, occupational therapy, dietetics and nutrition, or midwifery).

Sampling method and sample size calculation

Preparatory students, first-year nursing students, and third-year nursing students were included as participants. There were no exclusion criteria. Potential participants attended a brief oral presentation about the project. We conducted this information session in the classroom at the end of a class session. The students received a printed information sheet and had a 24-hour period to decide whether they wished to participate in the study. The following day, students interested in participating signed a written informed consent form and were enrolled in the study.

Statistical power was calculated to allow analysis by student year of study subgroups and was therefore not based on the overall number of students. With an error level of less than 5% and a confidence interval of 95%, considering a population of around 100 students per year of study, 79 participants were necessary for each group (calculation performed with the CustomInsight algorithm at https://www.custominsight.com/articles/random-sample-calculator.asp). We therefore chose to include the total school population for the years of interest, without sampling.

Data collection

Participants completed a self-report computerized questionnaire. Approximately 15 minutes were specifically dedicated to completing the assessment before a normal class session. Participants completed the questionnaires using their personal laptops in a classroom on a health sciences school campus. The principal investigator was present to answer questions.

Participants did not talk to each other while filling out the questionnaires. Students who did not wish to participate were instructed not to announce this decision publicly and spent this time on their coursework. This procedure was repeated six times over a three-week period to reach students in the different years of study at the two school sites.

Instruments

Attitudes toward terminally ill patients. Attitudes toward terminally ill patients were assessed using a widely recognized research tool, the Frommelt Attitude Toward Care of the Dying Scale, Form B (FATCOD, Form B),[20] which is an adapted version of the original FATCOD[21] specifically developed for use among students in a variety of programs of study. The original English questionnaire was translated into French by two native French speakers, and two native English speakers then performed a reverse translation, following standard procedures.[22] The FATCOD, Form B includes 30 items evaluated on a Likert-type scale scored from 1 to 5, with half of the items negatively worded (and requiring reverse scoring). The total score ranges from 30 to 150, with higher scores indicating more positive attitudes. The Cronbach's alpha calculated for this scale in our study was 0.78.

Secondary measures. Year of study, gender, age, and number of terminally ill persons encountered in personal and professional contexts were assessed. To ensure confidentiality, data on age were collected by category (≤ *20 years*, *21–23 years*, *24–26 years*, and ≥ *27 years*). Exposure to terminally ill persons was assessed as a categorical variable (*never*, *one time*, *2 to 5 times*, *6 to 10 times*, and *10 and more times*) to reduce response burden.

Self-perceived nursing skills in palliative care were assessed using the Self-Perceived Palliative Care Nursing Competence scale,[23] which consists of 34 questions answered on an 11-point Likert-type scale. The original version of this scale is in French. The final score is the mean score on all items and ranges from 0 to 10, with higher scores indicating more confidence in one's own skills. The Cronbach's alpha calculated for this scale in our study was 0.97.

The subjective impact of the instruction the nursing students had received so far on their ability to care for terminally ill patients was assessed using two questions: one on skills and the other on personal lived experience. These questions were developed specifically for the present study. Before the main study began, the questions were tested with five students who found them comprehensible, relevant, and comprehensive to measure the subjective impact of the instruction received. All study participants scored their previous instruction on each of the two questions from 0 (*does not prepare me at all*) to 10 (*prepares me completely*).

The expected impact of their instruction at the end of the study program was also assessed, again both for skills and for personal lived experience. For both questions, the participants provided a score from 0 (*will not be prepared at all*) to 10 (*will be prepared completely*).

Ethical aspects

In case of suffering caused by participating in the study, the principal investigator was available to listen and provide assistance. The school nurse, who was also informed, was available to provide any necessary follow-up care. The study was performed in agreement with the Helsinki Declaration and its amendments, and in accordance with the applicable Swiss legislation. Since the project did not deal with diseases or the functioning of the human body, it did not fall within the scope of the Human Research Ordinance. This information was formally verified with the Ethics Commission of Canton Vaud (CER-VD, www.cer-vd.ch), which indicated that there was no need to submit our protocol for evaluation.

Patient and public involvement

There was no time allocated for patient and public involvement, so we were unable to involve patients in the research.

Statistical analyses

We conducted descriptive analyses, which are presented as means and standard deviations (SD) for continuous variables and as frequencies and proportions for categorical variables. Bivariate associations between the different descriptive factors measured and FATCOD, Form B score were assessed using univariate regression models. With the exception of age, ordered categorical variables were considered continuous in the regression models because only linear trends were observed. Age was included in the regression models as a categorical variable. Then, to control for confounding factors, a multivariate linear regression model was estimated, with FATCOD, Form B score as the response variable and all variables considered in the univariate regression models included as explanatory variables. Because this last analysis was intended as a descriptive model rather than a predictive model, variables weakly associated with the FATCOD, Form B were not removed.[24] Missing values were handled by multiple imputation: instead of being replaced by a single value, missing values are replaced by several values selected at random from a distribution determined using a model (15 imputations for this study). Statistical analyses were performed using R, Version 3.6.1 (www.r-project.org), and the mice package, Version 3.5.0 was used for the imputation.

RESULTS

Population description

The participant enrollment process is described in **Figure 1**. A total of 178 participants were included in the study (83.7% women, median age category: 21–23 years). The overall participation rate was 64%. Of the participants, 63 were in the preparatory program, and there were 67 first-year and 48 third-year nursing students. The participant characteristics are summarized in **Table 1**.

Attitudes toward caring for terminally ill patients

The overall mean FATCOD, Form B score was 117.7 (SD: 9.8, median: 118). This shows that nursing students' mean score was three-quarters of the maximum score for positive attitudes toward caring for terminally ill patients. For preparatory students, first-year students, and third-year students, the mean scores were 114.9 (SD: 10.1, median: 114), 117.4 (SD: 9.7, median: 116), and 121.9 (SD: 8.2, median: 123.5), respectively.

When we break up the total score to examine each item separately, the most positive attitudes were found for the following items: Item 17, "As a patient nears death, the nonfamily caregiver should withdraw from his/her involvement with the patient" (mean: 4.6, SD: 0.6, median: 5); Item 19, "The dying person should not allowed to make decisions about his/her physical care" (mean: 4.6, SD: 0.7, median: 5); and Item 21, "It is beneficial for the dying person to verbalize his/her feelings" (mean: 4.6, SD: 0.6, median: 5).

The most negative attitudes were associated with Item 3, "I would be uncomfortable talking about impending death with the dying person" (mean: 3.1, SD: 1.2, median: 3); Item 7, "The length of time required to give care to a dying person would frustrate me" (mean: 2.3, SD: 1.1, median: 2); and Item 26, "I would be uncomfortable if I entered the room of a terminally ill person and found him/her crying" (mean: 3.1, SD: 1.2, median: 3).

Associated factors

In the bivariate analysis, attitudes toward caring for terminally ill patients were positively associated with nursing student's older age, higher year of study, more frequent professional encounters with terminally ill patients, and better self-perceived nursing skills (Self-Perceived Palliative Care Nursing Competence scale) (**Table 2**).

The multivariate analysis demonstrated that, after controlling for confounding factors, only the positive association with more frequent professionally encountering terminally ill patients remained significant (**Table 3**).

DISCUSSION

Attitudes toward caring for terminally ill patients are positive and improve as the student's year of study progresses. Professionally encountering terminally ill patients was the strongest factor associated with these attitudes, followed distantly by private experiences with a relative at the end of his or her life. Self-perceived nursing skills in palliative care, year of study, and age were other significant factors.

Attitudes

The overall attitudes score was three-quarters of the maximum possible score, which shows that nursing students have very positive attitudes toward caring for terminally ill patients. This positive view may be explained by the students' understanding of caring for vulnerable patients and offering holistic compassionate care as a core value of the nursing profession. Nurses, especially those working in palliative care, consider it an ethical responsibility to support patients and make sure that they understand that they will not be abandoned: Ricot has called this the "duty of fraternity," which is the "obligation of a human presence, always attentive, often discreet, sometimes silent."[25] This vision is widely recognized, as both patients and professionals have a positive view of professionals taking care of end-of-life patients and attribute qualities such as kindness, warmth, compassion, and genuineness to those fulfilling this role.[26] Finally, students may recognize that the challenge of being professionally confronted with death can lead to personal growth.[27]

The attitudes toward death among participants in our study were more positive than those found among nursing students in Palestine and Turkey,[15 28] similar to those found among nursing students in the United States,[29] and poorer than those found among nursing students in Sweden.[30] Further, our sample of nursing students had more positive attitudes than those found among registered nurses in China,[8] India,[31 32] Ethiopia,[33] Saudi Arabia,[17] and Japan;[9] however, nurses in Israel[5] and the United States[34] have been found to have more positive attitudes than those seen in the present study.

Differences between our sample and the samples used in studies conducted in other countries may be explained by cultural variations across the studied countries.[30] This explanation is consistent with the results of research conducted in the United States that showed a significant relationship between students' ethnicity and their attitudes toward the end of life and death.[35] Religious beliefs inherent to a specific culture could also play a role, as suggested by a Turkish study finding that students who considered themselves non-believers had worse attitudes toward caring for terminally ill patients than did students with religious beliefs.[15]

Another contributing factor could be differences in the health system in place. Previous findings have shown that the integration of palliative care with education for nurses regarding end-of-life situations is the most important factor influencing attitudes toward palliative care.[17 35] National health systems are influenced by the socioeconomic level of the country, which may explain the higher scores found in European countries and the United States, compared with other countries.

Associated factors

Year of study and age. Attitudes toward caring for terminally ill patients are positively associated with older age and more advanced year of study. These results are consistent with previous studies demonstrating the effects of age[4 9 11 12 35 36] and training.[13 37] Lack of experience may also explain why, in our results, the most positively rated items are those that highlight the patient's well-being and the most negatively rated items are those concerning elements that nurses say they are afraid they will be unable to tolerate.

In addition, as noted above, previous studies conducted in the United States have reported better attitudes among registered nurses than among nursing students.[29 33] This may explain why our sample of young students had poorer attitudes compared with those of registered nurses in some other countries.

Exposure. The number of end-of-life patients encountered professionally is the most important factor influencing attitudes in this study. Indeed, meeting and providing care to end-of-life patients is the key to developing positive attitudes. This finding is consistent with previous studies.[7 14 35 36] It can be assumed that exposure demystifies the end of life and thereby reduces anxiety. Furthermore, this kind of exposure provides opportunities for the development of knowledge and skills and for personal growth. These changes positively influence attitudes toward future end-of-life patients. Correspondently, it has been established that specific palliative care training is correlated with positive attitudes toward end-of-life care.[9 12 16 17]

Conversely, a negative experience can be expected to have a detrimental influence on attitudes, and adequate supervision should therefore be available to help nursing students to overcome this kind of experience.

Skills. Attitudes toward caring for terminally ill patients are associated with self-perceived nursing skills. Our results are in line with findings previously published by Max et al. in a poster abstract, were self-perceived nursing skills were assessed with a knowledge assessment.[35] This finding suggests that caregivers who feel comfortable and competent with end-of-life care have a positive attitude toward providing such care. For nursing students, this means that positive attitudes could be fostered through confidence building, targeted teaching, and individually rewarding exercises. This idea is supported by previous studies showing that focused end-of-life care simulation exercises[32 38 39] and education[40 41] improved nursing students' attitudes toward caring for terminally ill patients.

Expected impact

Third-year nursing students, who are just months from the end of their studies, do not expect further progress. Preparatory students and first-year nursing students are confident that they will improve during the course of their studies, in terms of both skills and lived experience. This is an encouraging result for nursing teachers, as it reflects students' motivation to improve and trust in the school's resources. In addition to courses (including palliative care courses) and internships, the presence of a nursing simulation center could contribute to these improvements: Several studies have shown the strong role of simulation in teaching, which has been described as a highly effective strategy to improve the connection between theory and practice.[42-44]

We could not demonstrate a link between the expected impact of instruction at the end of the students' curriculum and the examined attitudes. This is likely explained by the variability between participants, including their self-confidence. Variability in the participants' exposure to death in their own lives may also have played a role here. Indeed, a previous study has shown that nurses have varied personal experiences with death.[45]

Strengths and limitations

The primary outcome in this study was assessed with a widely recognized research tool. We used this tool in a geographic setting where nursing students' attitudes toward the management of terminally ill patients had not previously been assessed. Our analyses confirmed that this tool had good internal consistency.

The present study was conducted in one school, with students spread over two sites in Switzerland. This element of the study design must be considered before attempting to generalize the results to other demographic and public health contexts.

Only 80% (preparatory students), 85% (first-year students) and 61% (third-year students) of the calculated sample size was reached, which may have slightly reduced the statistical power. However, we believe that the magnitude of this reduction was minimal. Furthermore, the overall participation rate was satisfactory (64%).

The secondary measures used in this study have not all been fully psychometrically validated. In particular, the questions we developed specifically for this study have not been subjected to a full psychometric validation process. Furthermore, data on age and exposure to terminally ill patients were collected as categorical variables, which may have decreased the accuracy of our analyses. Future studies should include age and exposure to terminally ill patients as continuous variables.

Implications for nursing schools

On the basis of our results, we believe that nursing students should not be removed or protected from situations concerning death during their internships. Early occupational exposure is essential for reducing students' anxiety. Thus, students must be confronted with these situations. To come through these experiences positively, students should be supported and provided with the necessary resources. Both in class and in practical settings, teachers must foster confidence through positive experiences and feedback to enhance students' self-perceived competence. We can also imagine the benefit of classes where students meet with families who have recently lost a loved one. Adopting these approaches should greatly improve the positive attitudes and skills of nursing students and nurses regarding end-of-life care and help them to provide high-quality, holistic care to patients at the end of life.

Conclusion

Nursing students have positive attitudes toward caring for end-of-life patients, and these attitudes improve as the students' year of study progresses. In addition, better attitudes toward terminally ill patients are significantly associated with older age, professional encounters with terminally ill patients, and self-perceived palliative care nursing competence. Our study highlights the importance of students experiencing end-of-life care by being in direct contact with end-of-life patients. Future research should develop and assess pedagogic interventions aiming to provide nursing students with appropriate experiences of this type. In addition to

contact with patients during internships, we encourage training with simulated patients. This kind of training program would allow students to gain an increased sense of perceived competence. This is a key point in helping nurses to feel confident in their ability to support patients by being truly present at the time of death.

ACKNOWLEDGMENT

We thank Edanz Group (www.edanzediting.com) editing of a draft of this manuscript.

AUTHORS' CONTRIBUTIONS

PL, TJ, JFD, DT, and MAB designed the research. JP and MAB conducted the statistical analysis. All authors interpreted the data. PL and MAB wrote the first draft of the manuscript. All authors participated in the writing of subsequent versions and approved the final article.

FUNDING

This work was supported by the University of Applied Sciences and Arts Western Switzerland (HES-SO, www.hes-so.ch/).

COMPETING INTERESTS

The authors report no conflicts of interest.

ETHICS APPROVAL

No ethics approval was required.

DATA SHARING STATEMENT

The full dataset will be provided on reasonable request.

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FIGURE LEGEND

Figure 1. Study flow chart.

TABLES

Table 1. Characteristics of the participants, overall and according to the year of study.

	Total sample (N = 178)	**Preparatory grade (N= 63)**	**First year (N = 67)**	**Third year (N = 48)**
Women (%)	83.7	74.6	86.6	91.7
Age (%):				
≤ 20 years	35.4	66.7	31.3	0
21-23 years	44.9	20.6	50.7	68.8
24-26 years	10.7	6.3	9.0	18.8
≥ 27 years	9.0	6.3	9.0	12.5
Private encountering (%):				
Never	10.1	15.9	7.5	6.3
1 time	23.6	19.0	32.8	16.7
2-5 times	57.3	54.0	52.2	68.8
6-10 times	7.3	7.9	7.5	6.3
> 10 times	1.7	3.2	0	2.1
Professional encountering (%):				
Never	14.0	25.4	13.4	0
1 time	28.7	38.1	34.3	8.3
2-5 times	43.8	30.2	43.3	62.5
6-10 times	8.4	4.8	6.0	16.7
> 10 times	5.1	1.6	3.0	12.5
SPCNC (33 missing)	4.8 (1.9)	4.1 (1.7)	4.4 (1.6)	6.3 (1.5)
SPCNC (imputed)	4.8 (1.8)	4.1 (1.7)	4.4 (1.5)	6.2 (1.5)
Instruction's impact – skills	4.3 (2.2)	4.0 (2.0)	3.4 (1.8)	5.8 (2.3)
Instruction's impact – lived experience	4.4 (2.5)	4.6 (2.4)	3.4 (2.2)	5.7 (2.3)
Expected impact – skills (7 missing)	6.3 (2.4)	6.6 (2.5)	6.3 (2.3)	5.9 (2.3)
Expected impact – skills (imputed)	6.2 (2.4)	6.4 (2.5)	6.3 (2.3)	5.9 (2.3)
Expected impact – lived experience (8 missing)	6.3 (2.4)	6.7 (2.3)	6.3 (2.4)	5.8 (2.4)
Expected impact – lived experience (imputed)	6.3 (2.4)	6.5 (2.4)	6.4 (2.5)	5.8 (2.4)

Results are expressed as mean (standard deviation) for quantitative variables and as proportions for categorical variables.
SPCNC, Self-perceived palliative care nursing competence.

Table 2. Analysis of bivariate associations between the different descriptive elements and the Frommelt attitude toward care of the dying scale (FATCOD, Form B).

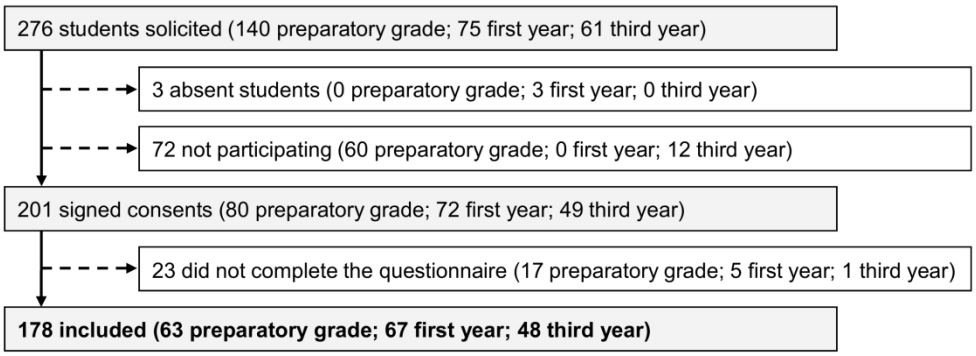
Associated factor		β (95% CI)	*p*-value	R^2
Gender (ref: Male)	Intercept	116.45 (112.85 to 120.04)		<.01
	Female	1.52 (-2.40 to 5.45)	.445	
Age (ref: 20 years old or less)	Intercept	116.08 (113.68 to 118.48)		.05
	21-23 years	2.17 (-1.03 to 5.37)	.183	
	24-26 years	6.97 (2.00 to 11.95)	.006	
	≥ 27 years	-0.83 (-6.15 to 4.49)	.759	
Year of study	Intercept	114.55 (112.40 to 116.69)		.08
	Slope	3.47 (1.69 to 5.25)	<.001	
Private encountering	Intercept	115.69 (112.41 to 118.97)	<.001	.01
	Slope	1.22 (-0.54 to 2.98)	.174	
Professional encountering	Intercept	111.91 (109.33 to 114.50)		.13
	Slope	3.59 (2.23 to 4.95)	<.001	
SPCNC (33 missing)	Intercept	112.03 (107.58 to 116.47)		.06
	Slope	1.32 (0.46 to 2.18)	.003	
SPCNC (imputed)	Intercept	111.87 (107.74 to 116.00)		.05
	Slope	1.23 (0.41 to 2.04)	.003	
Instruction's impact – skills	Intercept	116.30 (113.19 to 119.41)		<.01
	Slope	0.34 (-0.31 to 0.98)	.308	
Instruction's impact – lived experience	Intercept	116.36 (113.38 to 119.34)		<.01
	Slope	0.31 (-0.28 to 0.89)	.302	
Expected impact – skills (7 missing)	Intercept	115.84 (111.58 to 120.10)		<.01
	Slope	0.33 (-0.31 to 0.97)	.312	
Expected impact - skills (imputed)	Intercept	115.55 (111.44 to 119.66)		<.01
	Slope	0.35 (-0.27 to 0.97)	.266	
Expected impact – lived experience (8 missing)	Intercept	115.75 (111.53 to 119.98)		<.01
	Slope	0.34 (-0.29 to 0.96)	.293	
Expected impact – lived experience (imputed)	Intercept	115.40 (111.36 to 119.43)		<.01
	Slope	0.37 (-0.23 to 0.97)	.225	

β, regression coefficient; 95% CI, 95% confidence interval; R^2, coefficient of determination; Int, Intercept. SPCNC, Self-perceived palliative care nursing competence.
Factors coding: year of study: 0 = preparatory year, 1 = first year, 2 = 2nd year, 3 = 3rd year; private and professional encountering: 0 = never, 1 = 1 time, 2 = 2 - 5 times, 3 = 6 - 10 times, 4 = 10 or more; SPCNC: 0-10 (higher score indicating higher perception); impact: 0 – 10 (higher score indicating positive impact).

Table 3. Multivariate linear regression of factors associated with the Frommelt attitude toward care of the dying scale (FATCOD, Form B).

Associated factor	Without imputation			With imputation		
	β (95% CI)	*p*-value	R^2	β (95% CI)	*p*-value	R^2
Intercept	105.06 (95.35 to 114.77)			105.94 (97.90 to 113.98)		
Women	-1.06 (-5.85 to 3.74)	.664		-0.64 (-4.48 to 3.21)	.743	
21-23 years	1.07 (-3.35 to 5.49)	.632		-0.11 (-3.84 to 3.62)	.953	
24-26 years	4.53 (-1.51 to 10.57)	.140		3.99 (-1.17 to 9.14)	.129	
≥ 27 years	-1.43 (-7.83 to 4.97)	.660		-2.25 (-7.89 to 3.39)	.432	
Year of study	1.45 (-1.55 to 4.45)	.340		1.97 (-0.48 to 4.42)	.115	
Private encountering	-0.36 (-2.43 to 1.71)	.733		0.51 (-1.17 to 2.20)	.549	
Professional encountering	2.81 (0.97 to 4.65)	.003	.20	3.00 (1.43 to 4.57)	<.001	.21
SPCNC	0.89 (-0.26 to 2.03)	.129		0.51 (-0.50 to 1.53)	.318	
Instruction's impact - skills	-0.95 (-2.18 to 0.29)	.133		-0.85 (-1.90 to 0.21)	.115	
Instruction's impact - lived experience	0.30 (-0.81 to 1.40)	.595		0.27 (-0.68 to 1.22)	.580	
Expected impact - skills	0.38 (-1.04 to 1.81)	.597		0.49 (-0.49 to 1.46)	.329	
Expected impact - lived experience	0.52 (-0.89 to 1.93)	.465		0.25 (-0.79 to 1.29)	.638	

β, regression coefficient; 95% CI, 95% confidence interval; R^2, coefficient of determination.
SPCNC, Self-perceived palliative care nursing competence.



Reporting checklist for cross sectional study.

Based on the STROBE cross sectional guidelines.

		Reporting Item	Page Number
Title and abstract			
Title	#1a	Indicate the study's design with a commonly used term in the title or the abstract	1
Abstract	#1b	Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background / rationale	#2	Explain the scientific background and rationale for the investigation being reported	3 - 4
Objectives	#3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	#4	Present key elements of study design early in the paper	4
Setting	#5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4

Eligibility criteria	#6a	Give the eligibility criteria, and the sources and methods of selection of participants.	4
	#7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	4
Data sources / measurement	#8	For each variable of interest give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group. Give information separately for for exposed and unexposed groups if applicable.	4 - 5
Bias	#9	Describe any efforts to address potential sources of bias	4
Study size	#10	Explain how the study size was arrived at	4
Quantitative variables	#11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen, and why	5 - 6
Statistical methods	#12a	Describe all statistical methods, including those used to control for confounding	6
Statistical methods	#12b	Describe any methods used to examine subgroups and interactions	6
Statistical methods	#12c	Explain how missing data were addressed	6

Statistical methods	#12d	If applicable, describe analytical methods taking account of sampling strategy	n/a
Statistical methods	#12e	Describe any sensitivity analyses	6
Results			
Participants	#13a	Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed. Give information separately for for exposed and unexposed groups if applicable.	6 - 7
Participants	#13b	Give reasons for non-participation at each stage	Figure 1
Participants	#13c	Consider use of a flow diagram	Figure 1
Descriptive data	#14a	Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders. Give information separately for exposed and unexposed groups if applicable.	6 - 7
Descriptive data	#14b	Indicate number of participants with missing data for each variable of interest	Table 1
Outcome data	#15	Report numbers of outcome events or summary measures. Give information separately for exposed and unexposed groups if applicable.	6 - 7

Main results	#16a	Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	6 - 7
Main results	#16b	Report category boundaries when continuous variables were categorized	6 - 7
Main results	#16c	If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	n/a
Other analyses	#17	Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses	7
Discussion			
Key results	#18	Summarise key results with reference to study objectives	7 - 8
Limitations	#19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	10
Interpretation	#20	Give a cautious overall interpretation considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	8 - 10
Generalisability	#21	Discuss the generalisability (external validity) of the study results	10
Other Information			

Funding	#22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	11