

## ORIGINAL ARTICLE

# Attitudes of nursing staff towards pressure ulcer prevention in primary and specialised health care: A correlational cross-sectional study

Heidi Parisod<sup>1,2,3,4</sup>  | Arja Holopainen<sup>1,2,4</sup> | Emilia Kielo-Viljamaa<sup>3,5</sup>  | Pauli Puukka<sup>3</sup> | Dimitri Beeckman<sup>6,7,8</sup>  | Elina Haavisto<sup>3,5</sup>

<sup>1</sup>Nursing Research Foundation, Helsinki, Finland

<sup>2</sup>WHO Collaborating Center for Nursing, Helsinki, Finland

<sup>3</sup>Department of Nursing Science, University of Turku, Turku, Finland

<sup>4</sup>The Finnish Centre for Evidence-Based Health Care: A JBI Centre of Excellence, Helsinki, Finland

<sup>5</sup>Satakunta Hospital District, Pori, Finland

<sup>6</sup>Department of Public Health and Primary Care, Skin Integrity Research Group (SKINT), University Centre for Nursing and Midwifery, Ghent University, Ghent, Belgium

<sup>7</sup>Swedish Centre for Skin and Wound Research, School of Health Sciences, Örebro University, Örebro, Sweden

<sup>8</sup>Department of Clinical Research, Faculty of Health Sciences, Research Unit of Plastic Surgery, Odense, Denmark

## Correspondence

Heidi Parisod, PhD, Nursing Research Foundation, Asemamiehenkatu 2, 00520 Helsinki, Finland.

Email: heidi.parisod@hotus.fi

## Abstract

The aim of this correlational, cross-sectional study was to assess the pressure ulcer prevention attitudes of the nursing staff and to identify factors associated with it both in primary and special health care. The study was conducted with nursing staff (N = 554) working in primary and special health care units in two hospital districts in Finland in 2018 to 2019. Attitude towards Pressure Ulcer Prevention instrument was used for data collection. Demographic data, Pressure Ulcer Prevention Knowledge test, and Pressure Ulcer Prevention Practice instrument were used as background variables. Data were analysed with statistical tests. Nursing staff working in primary care (n = 327) had more positive attitudes towards pressure ulcer prevention than those in specialised care (n = 209;  $P = .047$ ). Working as a wound care nurse ( $P = .0005$ ), working experience after graduation ( $P = .0017$ ), self-reported pressure ulcer prevention and early detection skills ( $P < .0001$ ), pressure ulcer prevention knowledge ( $P = .0002$ ), and views about the realisation of their unit's pressure ulcer prevention practices ( $P < .0001$ ) independently explained variation in participants' attitudes. Attention should be placed on the pressure ulcer prevention attitudes of nurses who are less experienced or less skilled and who have lower pressure ulcer prevention knowledge. Positive organisational culture towards evidence-based pressure ulcer prevention practices should be promoted.

## KEYWORDS

attitude, nurses, pressure ulcer, prevention

## Key Messages

- further evidence, especially in a primary care setting, is needed about the factors that explain the variation in nurses' pressure ulcer prevention attitudes in order to develop and target interventions
- the aim of our study was to assess the pressure ulcer prevention attitudes of the nursing staff (N = 554) and to identify factors associated with it both in primary and special health care

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- our results confirm previous findings that special attention is needed on the attitudes of nurses with less experience and those with lower pressure ulcer prevention knowledge and skills
- attention is also needed to support the creation of positive organisational culture that encourages commitment to evidence-based pressure ulcer prevention practices

## 1 | INTRODUCTION

Pressure ulcer (PU) prevention is an essential task in clinical nursing,<sup>1</sup> as most PUs are preventable if evidence-based interventions such as PU risk assessment, repositioning, preventive skin care, nutrition, and supporting surfaces are used.<sup>2</sup> However, previous studies indicate that evidence-based prevention interventions are not always followed,<sup>3</sup> and the negative attitudes of nursing staff towards PU prevention or the use of prevention guidelines can explain the omission.<sup>4,5</sup> In addition, previous studies suggest that the knowledge of nurses on PU prevention is often insufficient.<sup>6,7</sup> Also, high workload, inadequate training, and shortage of pressure-relieving devices hinder nurses' prospects from carrying out evidence-based PU prevention practices.<sup>8</sup>

Nurses' attitudes towards PU prevention have been studied in various settings, especially within hospitals, for example, in intensive care units,<sup>9-11</sup> operation rooms,<sup>12</sup> and internal medicine units and surgical wards.<sup>13,14</sup> However, studies conducted in primary health care settings, such as nursing homes<sup>5</sup> and long-term facilities,<sup>15</sup> are scarce. According to a previous systematic review, nursing staff have shown overall positive attitudes towards PU prevention,<sup>16</sup> but the evidence might vary depending on the country and organisation. Even though some studies indicate that nurses' attitudes towards PU prevention are at a desirable level,<sup>10,13,15,17-20</sup> other studies show that nurses' attitudes are at a moderate level or even below it.<sup>8,9,11,12,14,21</sup> An attitude is an evaluation of an object of thought, and it can affect peoples' behaviour,<sup>22</sup> such as realisation of evidence-based PU prevention practices.<sup>9</sup> Studying nurses' attitudes towards PU prevention is essential because the quality of care can be improved when evidence-based practices are followed.<sup>23</sup>

Several factors can explain the variation in nurses' PU prevention attitudes. Positive attitudes are associated with the higher amount of PU prevention training<sup>13,14</sup> and longer working experience.<sup>12,14,17</sup> Better knowledge of PU prevention,<sup>9,11,14,17,18,21</sup> more work experience,<sup>9</sup> and a higher age of nurses<sup>18</sup> have been found to be associated with positive attitudes as well. Still, the factors related to positive attitudes might vary. In one study, for

example, it was found that when nurses' PU knowledge level increased, the level of negative attitude decreased.<sup>11</sup> Additionally, increased work experience was not found to be positively correlated with attitudes in two studies,<sup>11,20</sup> and in one study, no significant relationship between nurses' attitudes and their educational level was observed.<sup>14</sup> Findings considering the relationship between nurses' attitudes towards PU prevention and prevention practices also vary in different contexts. In one study,<sup>9</sup> attitudes and practices had a significant and positive correlation, whereas, in another study,<sup>14</sup> no significant difference between the attitudes and behaviour was found.

Nurses' attitudes towards PU prevention have been studied using various attitude assessment instruments, of which the most used validated instruments are the Attitude towards Pressure ulcer Prevention (APuP) instrument by Beeckman et al.<sup>4</sup> and the Attitude towards Pressure Ulcer questionnaire by Moore and Price.<sup>24,16</sup> Recently published studies assessing nurses' attitudes towards PU prevention have increasingly used the APuP instrument, which includes five subscales. In studies using the APuP instrument, the highest scores were received in the 'Impact of PUs',<sup>11,13,20,21</sup> subscale, and the lowest scores in the 'Personal competency to prevent PUs',<sup>12,13,15</sup> 'Confidence in the effectiveness of prevention',<sup>10,21</sup> and 'Priority of PU prevention'<sup>9</sup> subscales. Controversial results were found in the 'Responsibility for preventing PU' subscale as it received the highest scores in three studies<sup>9,12,15</sup> but the lowest scores in two studies.<sup>11,20</sup>

Focusing on nurses' attitudes towards PU prevention and factors related to the attitudes requires further attention because PUs are a significant source of concern in health care settings around the world, and they are one of the most common adverse events among hospitalised patients.<sup>25</sup> Increasing understanding of nurses' attitudes in different health care settings using accurate assessment is crucial to further develop PU prevention practices and training interventions.<sup>4,5</sup> In addition, understanding the factors related to the attitudes towards PU prevention interventions is essential to improve prevention practices. The aim of this study was to assess the PU prevention attitudes of the nursing staff and to identify factors associated

with these attitudes, both in primary and special health care.

## 2 | MATERIALS AND METHODS

### 2.1 | Study design

This correlation cross-sectional study was conducted in primary ( $n = 20$ ) and special health care ( $n = 27$ ) units in two hospital districts in Finland. Data were collected from May 2018 to January 2019.

### 2.2 | Participants and context

The participating hospital districts represented typical Finnish districts that have central hospitals and serve a population of approximately 420 000 people. Participants were registered nurses (licenced nurses with a bachelor's degree who perform nursing tasks independently), practical nurses (nurses with vocational qualification at diploma level who focus on basic care), and nurse managers (eg, registered nurses who often also have higher post-baccalaureate education) who work in these units and were willing to participate in the study. Eligibility criteria were: (a) Finnish-speaking; (b) practical nurses, registered nurses, and ward managers; and (c) in permanent or long-term positions. In Finland, primary care means public health services provided by municipalities.<sup>26</sup> Primary care includes, for example, health centres and home care and long-term care facilities, but it also includes in-patient care at hospitals for patients who require nursing services.<sup>27</sup> Specialised care means health care services provided by medical specialists at hospitals. These services are provided by the hospital districts.<sup>26</sup> Nurses' role in PU prevention in both primary and specialised care is similar.

### 2.3 | Data collection

This study is part of a larger study that concentrated on nursing staff's PU prevention attitudes, knowledge, and practices. The data were collected using an APuP. The instrument has been developed and validated by Beeckman et al. (2010). It examines nurses' attitudes towards PU prevention. Permission to use the APuP instrument was received from the copyright holders. The instrument consists of 13 items within five different domains: (a) personal competency to prevent PUs (three items; maximum score = 12), (b) priority of PU prevention (three items; maximum score = 12), (c) impact of PUs (three items; maximum score = 12), (d)

responsibility in PU prevention (two items; maximum score = 8), and (e) confidence in the effectiveness of prevention (two items; maximum score = 8). The items were positively and negatively worded and rated on a 4-Likert scale, from strongly agree (scored as 4) to strongly disagree (scored as 1). The maximum score is 52.

Characteristics of the participants (current nursing occupation, education, work experience, participation in PU training, self-evaluation of general PU prevention skills, and self-evaluation of additional training needs) were collected as background data. In addition, 35 items related to nurses' PU knowledge (Pressure Ulcer Prevention Knowledge test, PUPK),<sup>28</sup> and 42 items related to nurses' perceptions of their unit's PU prevention practices (the Pressure Ulcer Prevention Practice [PUPreP] instrument)<sup>29</sup> based on international PU prevention guidelines<sup>30</sup> were collected as the background variable. Prevention practices presented in the items were either recommended or not recommended according to the guidelines.

The PUPK test consists of 35 items on seven different domains: (a) PU development and risk factors, (b) PU classification, (c) PU risk assessment, and PU prevention with (d) repositioning, (e) pressure relief devices, (f) skin assessment and skin care, and (g) nutrition. Each domain includes five items with 'yes', 'no', or 'I don't know', answer options.<sup>28</sup> The PUPreP instrument includes a total of 42 questions about the following six sections on the unit's PU prevention practices based on international PU prevention guidelines: (a) PU risk assessment (nine items), (b) skin assessment and skin care (nine items), (c) nutrition (six items), (d) repositioning (nine items), (e) local pressure relief devices (four items), and (f) documentation (five items). The questions are Likert-scaled measuring nurses' perceptions on the PU prevention practices frequencies: 1 = never, 2 = sometimes, 3 = often, 4 = always, and 5 = cannot say. In addition, agreement on consistent PU prevention practices at units is measured in each item with dichotomous response options (yes/no).

The researcher (EH) verbally informed the ward managers of the participating units about the aim of the study and the data collection process. Both hospital districts had a contact person who received a link to the electronic questionnaire and the information letter. The contact person forwarded the materials to a total of 1975 practical nurses, registered nurses, and ward managers. The response rate was 28%.

### 2.4 | Ethical considerations

Ethical approval was sought from the Ethics Committee of Satakunta Higher Education Institution (December 20, 2018). Permission to collect the data was obtained

according to the policies of the participating organisations. The participants were informed that their participation was voluntary, and anonymity was guaranteed, and responding to the electronic questionnaire would be considered informed consent.

## 2.5 | Data analysis

The data were analysed using the SAS 9.4 statistical software package (SAS Institute Inc., Cary, NC). Frequencies, percentages, means, medians, and standard deviations were used to describe the variables.

The between-group comparisons of categorical variables were performed with  $\chi^2$  test. In the case of numerical variables, between-group comparisons were performed with *t*-test, otherwise with analysis of variance (ANOVA). If the distribution was not normal, Wilcoxon and Kruskal-Wallis tests were used, respectively. Significance levels in multiple comparisons were controlled by the Bonferroni correction. Associations between APuP scores, PUPK, and PUPreP scores were studied with Spearman correlation coefficients. The original items of the PUPK test were scored so that right answers were given one point while wrong answer, an 'I don't know' response, and missing answers were given zero points (maximum total PUPK score was 35 points).

The participants' average attitude scores on different APuP domains were compared pairwise with Wilcoxon signed-rank test using Bonferroni method to control for significance level. In the comparisons, two APuP domains that had a maximum score of 8 (*Responsibility in PU prevention* and *Confidence in the effectiveness of PU prevention*) were scaled between 4 and 12 to allow comparison with other domains that had the maximum score of 12. Finally, stepwise multivariate regression analysis was used to find out which background variables were independent determinants of the total APuP score. *P*-values <.05 were considered statistically significant.

## 2.6 | Validity and reliability of the instruments

APuP instrument used in the data collection has been validated in a previous study.<sup>4</sup> The PUPK test and the PUPreP instrument were also judged valid using total correlations and Cronbach's alpha coefficients. In this study, the alpha coefficient for the entire APuP-instrument was .72, and except for one item, the item-to-total correlations were over .31.

The PUPK<sup>28</sup> and PUPreP<sup>29</sup> instruments were both developed based on international PU prevention

guidelines.<sup>30</sup> Three rounds with expert panels and a pilot test with 96 nurses were conducted during the development of the PUPK test.<sup>28</sup> The internal consistency of the PUPK test was evaluated using item-to-total correlations and Cronbach's alpha coefficients. The item-to-total correlations<sup>31</sup> were over .20, with the exception of four statements. The alpha coefficient for the entire test was .77.

The content of the PUPreP instrument<sup>29</sup> was evaluated by a multidisciplinary expert panel. The alpha coefficients ranged from .75 to .90 except for one sum variable 'pressure relief devices' (.23), which also contained negatively expressed statements. The item-to-total correlations were over .38, except for two items.

## 3 | RESULTS

### 3.1 | Characteristics of the participating nursing staff

The characteristics of the participating registered nurses, practical nurses, and ward managers (N = 554) working in specialised (n = 213) and primary care (n = 329) are presented in Table 1.

### 3.2 | The nursing staff's attitudes towards PU prevention in primary and specialised care

Overall, the participants' (n = 548) attitude towards PU prevention (APuP total score) on average was 43.02 (SD 3.98, max. 52, representing the most positive attitudes). Their attitudes on different APuP domains varied (Table 2); the attitudes were the most positive towards priority of PU prevention and responsibility in PU prevention (*P* < .001) compared with other domains, and the most negative attitudes were related to personal competency to prevent PUs (*P* < .001).

Participants working in primary care (n = 327) had more positive attitudes towards PU prevention than those working in specialised care (n = 209) (APuP total score mean 43.28 [SD 3.83] and 42.60 [SD 4.19], respectively, *P* = .047). Variation was also observed between these two subgroups in priority of PU prevention, impact of PUs, and responsibility in PU prevention subdomains (Table 2).

### 3.3 | Factors associated with the nursing staff's attitudes

Considering nursing staff as a whole (n = 548), there was variation in their attitudes towards PU prevention (total

TABLE 1 Participant characteristics based on their working unit

Background factors		Participants working in specialised care n (%)	Participants working in primary care n (%)	P-value <sup>a</sup>
Nursing education (n = 540)	Registered nurse	162 (76.4)	104 (31.7)	< .0001
	Practical nurse	27 (12.7)	207 (63.1)	
	Other	23 (10.9)	17 (5.2)	
Current occupation (n = 517)	Ward manager	8 (4.1)	15 (4.7)	< .0001
	Registered nurse	162 (82.7)	92 (28.7)	
	Practical nurse	26 (13.3)	214 (66.7)	
Work experience in health care after graduation (n = 535)	6 years or less	70 (33.2)	67 (20.7)	.014
	6.1 to 14 years	50 (23.7)	86 (26.5)	
	14.1 to 25 years	46 (21.8)	89 (27.5)	
	25.1 years or more	45 (21.3)	82 (25.3)	
Working as unit's wound care nurse (n = 536)	Yes	14 (6.6)	14 (4.3)	.237
	No	197 (93.4)	311 (95.7)	
Working in PU prevention and early detection (n = 542)	Daily	101 (47.4)	208 (63.2)	.0003
	Weekly	57 (26.8)	63 (19.2)	
	Monthly	28 (13.2)	42 (12.8)	
	More rarely	27 (12.7)	16 (4.9)	
Taking care of patients with PUs (n = 542)	Daily	19 (8.9)	68 (20.7)	.001
	Weekly	69 (32.4)	111 (33.7)	
	Monthly	67 (31.5)	81 (24.6)	
	More rarely	58 (27.2)	69 (21.0)	
Participation in PU training in past 2 years within own organisation (n = 527)	Has not participated at all	131 (62.4)	174 (54.9)	.082
	One time	61 (29.1)	97 (30.6)	
	Two or more times	18 (8.6)	46 (14.5)	
Participation in PU training in past 2 years outside own organisation (n = 528)	Has not participated at all	186 (89.4)	236 (73.8)	< .0001
	One time	19 (9.1)	53 (16.6)	
	Two or more times	3 (1.4)	31 (9.7)	
Self-evaluated amount of needed additional training on PU prevention and early detection (n = 539)	Considerable	18 (8.6)	44 (13.4)	.002
	Moderate	102 (48.6)	196 (59.6)	
	A little	78 (37.1)	76 (23.1)	
	Not at all	12 (5.7)	13 (4.0)	
		<b>Mean (SD)</b>	<b>Mean (SD)</b>	<b>P-value<sup>b</sup></b>
PUPK (Pressure Ulcer Prevention Knowledge, min. 0-max. 35) (n = 542)		24.29 (4.07)	24.48 (4.00)	.969
PUPK scores based on current occupation	Ward manager	25.75 (1.39)	26.80 (2.60)	.266
	Registered nurse	24.16 (4.02)	25.71 (3.15)	.002
	Practical nurse	25.23 (2.52)	23.79 (4.26)	.029

(Continues)



TABLE 1 (Continued)

Background factors	Participants working in specialised care n (%)	Participants working in primary care n (%)	P-value <sup>a</sup>
PUPrEP (the Pressure Ulcer Prevention Practice, min. 1-max. 4) (n = 497)	3.16 (0.48)	3.25 (0.38)	.033
Self-reported PU prevention and early detection skills (min. 4: weak skills; max. 10: excellent skills) (n = 537)	7.56 (1.07)	7.78 (0.99)	.012

Abbreviation: PU, pressure ulcer.

<sup>a</sup>Between-group comparisons were performed with  $\chi^2$  test.

<sup>b</sup>Between-group comparisons were performed with *t*-test.

TABLE 2 Participants' (n = 548) attitudes on different Attitude towards Pressure ulcer Prevention (APuP) domains

Domain <sup>a</sup>	All participants (n = 548) Mean (SD)	Specialised care (n = 209) Mean (SD)	Primary care (n = 327) Mean (SD)	P-value <sup>b</sup>
Total APuP score	43.02 (3.98)	42.60 (4.19)	43.28 (3.83)	.047
Personal competency to prevent PUs	8.60 (1.45)	8.44 (1.54)	8.70 (1.39)	.090
Priority of PU prevention	10.61 (1.27)	10.32 (1.30)	10.81 (1.20)	< .0001
Impact of PUs	9.98 (1.38)	10.17 (1.33)	9.86 (1.41)	.008
Responsibility in PU prevention (scaled mean = 10.73) <sup>c</sup>	7.15 (0.94)	7.02 (0.94)	7.23 (0.94)	.006
Confidence in the effectiveness of PU prevention (scaled mean = 10.01) <sup>c</sup>	6.68 (1.04)	6.64 (1.03)	6.69 (1.06)	.608

<sup>a</sup>Domains were compared with Wilcoxon signed-rank test.

<sup>b</sup>Differences between the mean values of the participants working in specialised and primary care were compared with Wilcoxon test.

<sup>c</sup>These two domains with a maximum score of 8 were scaled between 4 and 12 when comparing them with the other domains.

APuP scores) based on all the background characteristics except participants' nursing education and current occupation. However, the attitude of participants on different APuP subdomains varied based on these two factors. Nursing education was the factor that explained the variation in different subdomains the most typically (Table 3).

The participants' attitudes towards PU prevention varied based on their working experience in health care after graduation ( $P < .0001$ ), how often they worked with PU prevention and early detection ( $P = .0002$ ) or took care of patients with PUs ( $P = .0129$ ) or whether they worked as a wound care nurse ( $P < .0001$ ) (Table 3). Based on pairwise comparisons, those who had worked in nursing less than 6 or 14 years after graduation had more negative attitudes than those who had over 14 or 25 years of working experience ( $P = .0127$  or less). Participants who worked daily with PU prevention and early detection had more positive attitudes towards PU prevention than those who rarely dealt with it on a monthly basis ( $P < .0006$ ).

The participants' attitudes (total APuP scores) also varied based on the amount of PU training within ( $P = .0001$ ) and outside their own organisation ( $P = .0032$ ). Those who participated in PU training within their own organisation two times or more had more positive attitudes than those who participated only once ( $P = .0405$ ) or did not participate at all ( $P < .003$ ). A similar difference in attitudes was observed with those participants who participated in PU training outside their own organisation two times or more compared with those who did not participate at all ( $P = .0066$ ).

Participant's attitudes (total APuP scores) correlated positively with their PU prevention knowledge (total PUPK scores,  $P < .0001$ ). Similar correlation was also observed for the subdomain scores (Table 4). Variation in attitudes also existed based on the participants' self-evaluated amount of needed additional training on PU prevention and early detection ( $P = .0011$ , Table 3). Those who evaluated being in need of considerable amount of additional training had more negative attitudes than those who evaluated being only in need of

TABLE 3 Attitude towards Pressure ulcer Prevention (APuP) total and subscores and differences based on participants' background characteristics

Background characteristics	Total APuP scores			Personal competency to prevent PUs			Priority of PU prevention			Impact of PUs			Responsibility in PU prevention			Confidence in the effectiveness of PU prevention		
	Mean (SD)	P-value		Mean (SD)	P-value		Mean (SD)	P-value		Mean (SD)	P-value		Mean (SD)	P-value		Mean (SD)	P-value	
Education <sup>a</sup>																		
Registered nurse (n = 269)	43.08 (4.17)	.0628	8.61 (1.47)	<b>.0066</b>	10.45 (1.31)	<b>.0025</b>	10.19 (1.30)	<b>.0039</b>	7.12 (.93)	<b>.0087</b>	6.72 (1.04)	.3588						
Practical nurse (n = 236)	43.15 (3.79)		8.70 (1.44)		10.83 (1.16)		9.74 (1.46)		7.24 (.94)		6.64 (1.06)							
Other (n = 39)	41.59 (3.68)		7.85 (1.25)		10.38 (1.37)		10.05 (1.26)		6.79 (.92)		6.51 (0.88)							
Current occupation <sup>a</sup>																		
Ward manager (n = 24)	44.31 (3.53)	.3079	8.58 (1.25)	.9536	11.00(1.29)	<b>.0002</b>	10.56 (1.50)	<b>.0002</b>	7.25 (.90)	.2091	6.92 (1.14)	.3418						
Registered nurse (n = 254)	43.04 (4.19)		8.61 (1.48)		10.42 (1.30)		10.20 (1.27)		7.11 (.93)		6.70 (1.02)							
Practical nurse (n = 242)	43.14 (3.78)		8.68 (1.44)		10.85 (1.16)		9.72 (1.45)		7.24 (.93)		6.64 (1.06)							
Work experience (after graduation; quartiles) <sup>a</sup>																		
6 years or less (n = 136)	42.17 (3.71)	< <b>.0001</b>	8.18 (1.28)	<b>.0001</b>	10.43 (1.23)	< <b>.0001</b>	9.86 (1.31)	.0969	7.07 (.92)	<b>.0025</b>	6.63 (0.98)	.2201						
6.1-14 years (n = 138)	42.08 (3.93)		8.46 (1.49)		10.28 (1.26)		9.83 (1.34)		6.93 (.99)		6.57 (1.03)							
14.1-25 years (n = 134)	43.62 (4.00)		8.76 (1.45)		10.79 (1.32)		9.99 (1.51)		7.31 (.87)		6.77 (1.04)							
25.1 years or more (n = 132)	44.14 (3.93)		8.95 (1.48)		10.92 (1.16)		10.25 (1.34)		7.27 (.94)		6.76 (1.03)							
Working as unit's wound nurse <sup>b</sup>																		
Yes (n = 27)	46.89 (4.38)	< <b>.0001</b>	10.07 (1.38)	< <b>.0001</b>	11.44 (.97)	<b>.0001</b>	10.96 (1.26)	<b>.0001</b>	7.37 (.97)	.1451	7.04 (1.09)	.0313						
No (n = 519)	42.81 (3.86)		8.52 (1.42)		10.57 (1.26)		9.92 (1.37)		7.14 (.94)		6.66 (1.04)							
Works in PU prevention and early detection <sup>a</sup>																		
Daily (n = 309)	43.60 (3.73)	<b>.0002</b>	8.89 (1.40)	< <b>.0001</b>	10.73 (1.22)	<b>.0191</b>	10.05 (1.34)	.4888	7.25 (.91)	<b>.0250</b>	6.69 (1.04)	.9899						
Weekly (n = 122)	42.69 (4.15)		8.53 (1.28)		10.48 (1.32)		10.00 (1.40)		7.05 (.99)		6.63 (1.17)							
Monthly (n = 71)	42.36 (4.17)		8.16 (1.50)		10.62 (1.27)		9.89 (1.44)		7.00 (.96)		6.69 (0.90)							
More rarely (n = 45)	40.93 (4.07)		7.49 (1.52)		10.12 (1.34)		9.68 (1.50)		6.96 (.93)		6.69 (0.90)							
Caring for patients with PUs <sup>a</sup>																		
Daily (n = 89)	43.84 (3.87)	<b>.0129</b>	9.07 (1.51)	< <b>.0001</b>	10.76 (1.23)	.1023	10.03 (1.34)	.8031	7.34 (.89)	<b>.0366</b>	6.64 (1.04)	.1002						
Weekly (n = 179)	43.44 (3.99)		8.78 (1.40)		10.74 (1.22)		10.03 (1.38)		7.20 (.98)		6.69 (1.09)							
Monthly (n = 150)	42.62 (3.84)		8.53 (1.37)		10.50 (1.27)		10.01 (1.33)		7.04 (.92)		6.53 (1.07)							

(Continues)

TABLE 3 (Continued)

Background characteristics	Personal competency to prevent PUs						Impact of PUs			Responsibility in PU prevention			Confidence in the effectiveness of PU prevention		
	Total APuP scores		Priority of PU prevention		Impact of PUs		Responsibility in PU prevention		Confidence in the effectiveness of PU prevention		Mean		P-value		
	Mean (SD)	P-value	Mean (SD)	P-value	Mean (SD)	P-value	Mean (SD)	P-value	Mean (SD)	P-value	Mean (SD)	P-value	Mean (SD)	P-value	
More rarely (n = 129)	42.34 (4.08)		8.09 (1.43)		10.45 (1.33)		9.86 (1.48)		7.09 (.93)		6.85 (.90)				
Participation in PU training within own organisation <sup>a</sup>	42.36 (3.98)	<b>.0001</b>	8.29 (1.39)	< <b>.0001</b>	10.46 (1.31)	<b>.0045</b>	9.86 (1.41)	.1311	7.11 (.98)	.0802	6.64 (1.05)	.1262			
One time (n = 159)	43.27 (3.61)		8.85 (1.33)		10.65 (1.21)		10.07 (1.25)		7.10 (.89)		6.61 (1.04)				
Two or more times (n = 63)	44.72 (3.99)		9.21 (1.61)		11.04 (1.06)		10.21(1.49)		7.37 (.90)		6.90 (1.01)				
Participation in PU training outside own organisation <sup>a</sup>	42.69 (3.94)	<b>.0032</b>	8.42 (1.41)	< <b>.0001</b>	10.55 (1.27)	.1110	9.90 (1.40)	.0814	7.15 (.93)	.8407	6.66 (1.03)	.1759			
One time (n = 72)	43.65 (3.80)		9.01 (1.42)		10.68 (1.31)		10.26 (1.21)		7.13 (.96)		6.57 (1.03)				
Two or more times (n = 34)	44.93 (4.15)		9.69 (1.35)		11.00 (1.10)		10.29 (1.47)		7.00 (1.13)		6.94 (1.15)				
Self-evaluated amount of needed additional training on PU prevention and early detection <sup>a</sup>	41.39 (4.58)	<b>.0011</b>	7.64 (1.64)	< <b>.0001</b>	10.61(1.32)	.3420	9.50 (1.45)	<b>.0070</b>	6.95 (1.12)	.3753	6.69 (1.04)	.0808			
Moderate (n = 300)	42.95 (3.63)		8.49 (1.28)		10.70 (1.20)		9.98 (1.37)		7.20 (.89)		6.59 (1.08)				
A little or not at all (n = 184)	43.69 (4.18)		9.11 (1.46)		10.49 (1.35)		10.15 (1.36)		7.14 (.96)		6.81 (0.96)				

<sup>a</sup>Comparisons made with Kruskal-Wallis test.<sup>b</sup>Comparisons made with Wilcoxon test.



**TABLE 4** Correlation coefficients of participants' Attitude towards Pressure ulcer Prevention (APuP) scores with the Pressure Ulcer Prevention Knowledge (PUPK) and Pressure Ulcer Prevention Practice (PUPreP) scores

	Total APuP scores	Personal competency to prevent PUs	Priority of PU prevention	Impact of PUs	Responsibility in PU prevention	Confidence in the effectiveness of PU prevention	
Total PUPK scores (n = 548)	Spearman correlation coefficients	.294	.278	.138	.264	.145	.116
	<i>P</i> -values	<.0001	<.00001	.0012	<.00001	.001	.006
Total PUPreP scores (n = 506)	Spearman correlation coefficients	.258	.224	.247	-.001	.245	.189
	<i>P</i> -values	<.0001	<.0001	<.0001	.977	<.0001	<.0001

**TABLE 5** Independent determinants of the total Attitude towards Pressure ulcer Prevention (APuP) score (n = 490)

Determinant	n	Beta	SE	95% CI	<i>P</i> <sup>a</sup>	<i>P</i> <sup>b</sup>
Intercept	490	24.02	1.68	20.73 to 27.32		<.0001
Working as a wound care nurse						
Yes	26	2.46	.70	1.09 to 3.83	.0005	.0005
No	464	0	-	-	-	
Working experience after graduation						
6 years or less	122	0	-	-	-	.0017
6.1 to 14 years	120	-.68	.44	-1.54 to .18	.12	
14.1 to 25 years	125	.71	.43	-.14 to 1.56	.10	
25.1 years or more	123	.81	.44	-.05 to 1.66	.065	
Self-reported PU prevention and early detection skills	490	1.16	.16	.84 to 1.48	<.0001	<.0001
Knowledge (PUPK test scores)	490	.18	.05	.09 to .27	.0002	.0002
PUPreP scores	490	1.65	.37	.93 to 2.38	<.0001	<.0001

Note: Significance of the model  $F(7,48) = 27.17$ ,  $P < .0001$ . Model  $100 \times R$ -square = 28.3%.

Abbreviations: CI, confidence interval; PUPK, Pressure Ulcer Prevention Practice, PUPreP, Pressure Ulcer Prevention Practice.

<sup>a</sup>Significance of beta coefficient.

<sup>b</sup>Significance of the determinant.

moderate ( $P = .0189$ ) or a little or no ( $P = .0015$ ) additional training. In addition, the participants' views of their unit's PU prevention practices correlated positively with their total APuP scores ( $P < .0001$ ) and all the sub-domain scores except for impact of PUs where correlation was not observed (Table 4).

In multivariate regression analysis of all the background factors, working as a wound care nurse ( $P = .0005$ ), working experience after graduation ( $P = .0017$ ), self-reported PU prevention and early detection skills ( $P < .0001$ ), PU prevention knowledge (PUPK scores,  $P = .0002$ ), and views about the realisation of their unit's PU prevention practices (PUPreP scores,  $P < .0001$ ) remained independent determinants of the APuP total scores (Table 5).

## 4 | DISCUSSION

The objective of this study was to assess nursing staff's PU prevention attitudes, both in primary and special

health care and to identify factors associated with it. Previous studies have shown partly discordant results regarding the nurses' attitude levels and associated factors, for example, regarding the role of PU knowledge.<sup>9,11,14,17,18,21</sup> Increased understanding of the different factors is needed to develop interventions targeted towards nurses to support positive attitudes about PU prevention and the use of advanced clinical practices.

The results of our study confirm previous findings that more attention needs to be paid to develop positive attitudes among nurses towards PU prevention as attitudes can affect peoples' behaviour<sup>9,22</sup> and the quality of care.<sup>23</sup> An interesting finding in our study was that the nurses working in primary health care had more positive attitudes compared with those in specialised care. This may be explained by the fact that the participants working in primary health care had longer working experience in health care compared with those working in specialised care. More positive attitudes have been demonstrated among those with longer working experience in

our study, and previous studies.<sup>12,14,17</sup> We also observed that those working in primary care also worked more often with PU prevention and early detection and took care of patients with PUs. Therefore, nurses in primary care may deal with more patients suffering from PUs and may have experienced different situations that demonstrate, in practice, the importance of PU prevention and the important role of nursing for the effective implementation of PU prevention practices. These findings highlight the important role of nursing for PU prevention and suggest how attitudes could be altered through the use of simulation training.

Besides working experience, our results show that PU prevention knowledge, self-reported PU prevention, and early detection skills and specialisation in wound care independently explain nurses' attitudes towards PU prevention. This confirms the previous understanding of the association of PU prevention knowledge and attitudes.<sup>9,11,14,17,18,21</sup> It also highlights the need for developing educational PU prevention interventions that concentrate both strengthening nurses PU prevention knowledge and attitudes simultaneously, for example, by using simulations.<sup>32</sup>

We also showed that nurses' perception of their unit's PU prevention practices based on international PU prevention guidelines practices was another factor that independently explained nurses' PU prevention attitudes. This result could be interpreted in a way that those nurses who recognised that their colleagues in the same unit and their nursing leaders were committed to developing and following evidence-based consistent PU prevention practices had more positive PU prevention attitudes. Organisational culture and nursing leaders have previously shown to have, in general, an important role in supporting the implementation of evidence-based nursing practices.<sup>33</sup> Colleagues who act as positive role models in wound care have a central role as well.<sup>2</sup> These important roles should be noted in practice when promoting positive PU prevention attitudes.

Previous evidence suggests that attitudes play a central role in influencing people's behaviour<sup>22</sup> and may influence the implementation of evidence-based PU prevention interventions.<sup>9</sup> This highlights the importance of paying attention to nurses' attitudes in nursing education. However, further studies to measure and better understand the influence of attitudes on actual nursing behaviour in the PU prevention context are still needed.

#### 4.1 | Limitations

The study has some limitations that must be considered when interpreting the results. The low response rate may

have affected selection bias, which should be considered. The study sample included 4% ward managers, 49% registered nurses, and 46% practical nurses. There is no precise information on the nurses who did not answer, as there is no information related to their background variables. It would have been relevant to conduct drop analysis, but it could not be done with the data. Thus, the respondents may only partially represent the professional profile of nurses in the region.

The low response rate is similar to other electronic surveys compared with paper surveys.<sup>34</sup> However, the number of respondents was high compared with previous studies when assessing nurses' attitudes towards PU prevention using APuP instruments. An average of 222 respondents (range of 56-553) have participated in studies examining attitudes in various countries in 2015 or later (eg,<sup>12,13,15</sup>).

We do not know the exact reason for the low response rate, and which nurses did not respond. However, we are aware that the data for this study were collected through the use of three instruments, which took about 20 min to complete. Also, the electronic form did not allow respondents to pause and continue from the same point at a later stage. Therefore, some respondents may have prioritised patient care instead of responding to the study. Other reasons could include lack of time, low motivation, and lack of support from the ward managers. The initial response time was set at 2 weeks, but nurses were given an additional 2 weeks to respond. The response rate could also have been improved by sending a link directly to all nurses. However, sending an email to 1975 nurses would have been expensive and time-consuming. A low response rate may mean that the results may not be generalisable to the entire population that represents typical specialised and primary health care. However, the results are indicative and consistent with the previous studies. Reporting was supported by the Strobe guideline to ensure that all relevant information was included.

## 5 | CONCLUSION

More attention needs to be paid on improving the attitudes of nurses towards PU prevention both in primary and specialised health care. Special focus should be placed on nurses in their early nursing career, and those without specialisation in wound care, less skilled in PU prevention, and lower PU prevention knowledge. Positive organisational culture towards commitment to evidence-based consistent PU prevention practices needs to be strengthened in order to promote positive PU prevention attitudes among nurses.

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## CONFLICT OF INTEREST

The authors declare no conflicts of interest.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

## ORCID

Heidi Parisod  <https://orcid.org/0000-0002-5865-2509>

Emilia Kielo-Viljamaa  <https://orcid.org/0000-0003-3931-1204>

Dimitri Beeckman  <https://orcid.org/0000-0003-3080-8716>

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