# Exploring the home health care nursing work environment and the relation to nurse-reported patient outcomes: a cross-sectional study

**Master Thesis**

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## Abstract

**Title:** Exploring the home health care nursing work environment and the relation to nurse-reported patient outcomes.

**Background:** A healthy work environment for home health care (HHC) nurses is important to maintain quality of care and attract and retain nurses, in a situation of growing need for HHC and nurse shortage. Most research is performed in hospital setting, therefore further research is needed to explore the nursing work environment in HHC setting.

**Aims**: Determine the importance and presence of elements of work environment in current practice as indicated by HHC nurses. Secondary aim was to explore the association between healthy work environment and different job- and nurse-reported patient outcomes.

**Method:** A cross-sectional online survey study was conducted among Dutch HHC nurses. The survey was developed, using fifteen elements of work environment as described in literature. Descriptive statistics determined rankings of (1) important elements and (2) present elements. Associations between healthy work environment and the job outcomes and nurse reported patient outcomes were analysed using univariate regression.

**Results:** Fifty-nine nurses participated. 'Safe and healthy work environment' and 'working with clinically competent peers' were most important elements. 'Patient-centered culture' and 'clinical autonomy' were most present. A healthy work environment was positively associated with 'patient safety' (Regression coefficient B=0.138 (Confidence interval CI 0.05:0.22)), 'time available to coordinate care' (B=0.198 (CI 0.07:0.33)), 'overall quality of care' (B=0.147 (CI 0.04:0.25)), 'work satisfaction' (B=0.175 CI (0.08:0.28)) and 'satisfaction on work environment' (B=0.187 (CI 0.07:0.30)). 'Time available for the patient' (B=0.04 (CI 0.07:0.14)) was not significantly associated.

**Conclusion:** HHC nurses considered all elements important, however not all elements were present in practice. A healthy work environment positively influences the job- and patient outcomes.

**Recommendations:** implementing all elements of work environment in HHC and development of a validated instrument.

*Keyword*s: Home health care, Work environment, Patient outcomes, Job satisfaction

Samenvatting

**Titel:** Exploreren van de werkomgeving en de relatie met verpleegkundig gerapporteerde patiënt uitkomsten in de wijkverpleging.

**Achtergrond:** Een gezonde werkomgeving voor verpleegkundigen in de wijkverpleging is belangrijk om de kwaliteit van zorg te waarborgen en verpleegkundigen te boeien en te binden. Zeker in de situatie van groeiende vraag naar wijkverpleging en het tekort aan verpleegkundigen. Onderzoek hiernaar is veelal gedaan in ziekenhuissetting, daardoor is verder onderzoek naar de werkomgeving en associatie met werk- en patiënt uitkomsten in de wijkverpleging nodig.

**Doel**: Bepalen welke elementen verpleegkundigen aangeven als belangrijk en als aanwezig. Tweede doel is exploreren van de associatie tussen de gezonde werkomgeving en verschillende werkuitkomsten en verpleegkundig gerapporteerde patiënt uitkomsten.

**Methode:** Een cross sectionele, online vragenlijst studie is uitgevoerd, onder Nederlandse verpleegkundigen in de wijkverpleging. De vragenlijst is samengesteld met behulp van vijftien elementen van werkomgeving uit de literatuur. Beschrijvende statistiek resulteert in rangordes van (1) belangrijke elementen en (2) aanwezigheid van elementen. De associatie tussen gezonde werkomgeving en de werk uitkomsten en verpleegkundig gerapporteerde patiënt uitkomsten is geanalyseerd met behulp van enkelvoudige regressie.

**Resultaten:** Negenenvijftig verpleegkundigen participeerden. De belangrijkste elementen waren 'Veilig en gezonde werkomgeving' en 'werken met vakbekwame collega's'. 'Patiënt staat centraal', en 'Autonomie' waren het meest aanwezig. Gezonde werkomgeving was positief geassocieerd met 'patiënt veiligheid' (Regressie coëfficiënt B=0.138 (Betrouwbaarheid Interval BI 0.05:0.22)), 'Tijd voor coördineren van zorg' (B=0.198 (BI 0.07:0.33)), 'kwaliteit van zorg' (B=0.147 (BI 0.04:0.25)), 'werkplezier' (B=0.175 BI (0.08:0.28)) en 'werktevredenheid' (B=0.187 (BI 0.07:0.30)). 'Tijd gedurende zorgmoment' (B=0.04 (BI -0.07:0.14)) was niet significant geassocieerd.

**Conclusie:** Alle elementen zijn belangrijk bevonden door de verpleegkundigen in de wijkverpleging, maar niet alle elementen waren aanwezig. Een gezonde werkomgeving beïnvloed de werk- en patiënt uitkomsten positief.

**Aanbeveling:** Implementeren van alle elementen van de werkomgeving in de wijkverpleging en een gevalideerd meetinstrument hiervoor ontwikkelen.

*Sleutelwoorden:* Wijkverpleging, Werkomgeving, Patiënt uitkomsten, werkplezier.

# INTRODUCTION

Worldwide there is a growing need for home health care as a result of the aging population and the attempt to keep healthcare sustainable and affordable.[1,2] In many European countries, long-term care is shifting from institutional care to home health care due to technological advances, decreased duration of hospital stay and the desire of adults to stay self-supporting at home as long as possible.[2,3] At the same time, there is a worldwide growing shortage of healthcare workers, including nurses in home health care.[1,2,4,5] This imbalance is also occurring in the Netherlands, where the shortage of nurses is mostly due to leaving or retiring nurses.[4,6] The growing demand on home health care and the shortage of nurses working in home health care puts immense pressure on the quality of care.[6]

In order to maintain high quality of care in home health care, a healthy work environment is important.[7-8] A healthy work environment is defined by Kieft et al. (2014) as "a work setting in which nurses are able to both achieve the goals of the organisation and derive personal satisfaction from their work".[9] A healthy work environment is proven to contribute to attracting and retaining nurses in home health care.[10,11]

However, most research is performed in hospital setting. In these studies, positive associations between a healthy work environment for nurses and better job outcomes, such as lower burnout and job dissatisfaction, were shown.[12] Additionally, a healthy work environment was also positively related to patient outcomes, such as quality of care and readmission rates.[7,11] The association between a healthy work environment and patient outcomes can be measured using nurse-reported patient outcomes. Nurse-reported patient outcomes are based on the perspective of the nurse and are valuable since nurse perception is based on patient experiences, interactions and observations of all aspects of care.[8] In literature, the following nurse-reported patient outcomes are found to be important in home health care; (1) time available for the patient[13], (2) time to coordinate patient care[13], (3) patient safety[8], and (4) overall quality of nursing care.[8]

In order to achieve a healthy work environment, research shows that different elements must be present in the work field.[13,14] For example, Kramer and Schmalenberg (2004) described eight elements contributing to a healthy nursing work environment in hospitals; the so called Essentials of Magnetism. Wherein elements such as 'clinical autonomy', 'working with clinically competent peers' and 'nursing leadership' are described.[14,15] The Dutch Nurses' Association (V&VN) translated these Essentials into 'Excellent Care'.[8] In addition, Jarrín et al.[13] studied the 'American Nursing Credentialing Center (ANCC) Pathway to Excellence Program' which is based on research in hospital setting, and concluded that this pathway can benefit the quality of care and job outcomes in home health care.[13] Another study compared scores of hospital versus home health care

nurses, using the Essentials of Magnetism instrument. They showed that home health care nurses ranked the importance of the essentials different than clinical nurses.[16]

Comparable studies on a healthy work environment primarily focused on home health care are lacking. Furthermore, evidence regarding the association between a healthy work environment and job outcomes and patient outcomes is lacking. Therefore, the primary aim of this study was to determine what home health care nurses perceive to be important elements of a healthy work environment and if these elements were present in current practice. The secondary aim was to explore the association between a healthy work environment and different job outcomes and nurse-reported patient outcomes.

# METHOD

## Design

A cross-sectional study was performed using an online survey. The study was conducted in several home health care organisations in the Netherlands, between March and May 2020.

## Population & Domain

In the current study, home health care in the Netherlands was defined as 'assistance in personal care and nursing services at patients' own home' and is delivered by registered nurses with an associate or bachelor degree and certified nursing assistants,[10] hereinafter referred to as nurses. The study population consisted of a convenience sample of nurses working at Dutch home health care organisations with various patient and employee capacity. Self-employed nurses were excluded since these nurses have a different work environment.

## Data collection

Since no validated instrument on the work environment of home health care nurses was available, data was collected using an online survey which was composed and developed by the researcher using the survey tool Qualtrics.[17] The main study parameter was a combined list of fifteen elements of work environment. This list was combined using (1) the twelve standards from the Pathway to Excellence Program[13], (2) the characteristics of Excellent Care[15] (3) the eight essentials of magnetism described by Kramer et al.[14], and (4) the fourteen forces of magnetism described by the ANCC.[18] The two elements 'nurses are recognized for achievements' and 'safe and healthy work environment' were only described in the Pathway to Excellence Program and were added since they were proven to be relevant.[13] These two elements were originally in English and were translated into Dutch by the researcher. The other thirteen elements were available in Dutch (Figure 1).

[ Figure 1 – Elements of a healthy nursing work environment ]

The secondary study parameters were the following job outcomes; (1) 'job satisfaction' and (2) 'satisfaction on work environment' and the following nurse reported patient outcomes; (1) 'time available for the patient'[13], (2) 'time to coordinate patient care', (3) 'patient safety', and (4) 'overall quality of nursing care'. These outcomes were used to explore their association with a healthy work environment.

The online survey consisted of eight questions (Figure 2). First, self-reported baseline characteristics such as name of organisation, gender, age, profession and years of working experience were collected. Second, nurses were asked to rate the importance of each of the fifteen elements of work environment using a 4-point Likert scale from 1 (not important) to 4 (very important). Third, nurses were asked to rate to what extent these elements were present in their current practice, using a 4-point Likert scale from 1 (not present) to 4 (strongly present). Fourth, nurses received two questions about their opinion on the job outcomes, 'job satisfaction' and 'satisfaction on work environment' using a Numeric Rating Scale score (NRS-score) ranging from zero to ten. Higher score indicated better job outcomes. NRS scores were used, since most nurses are familiar with this rating scale and was therefore easy to understand.[19] Last, nurses received four questions to determine the nurse-reported patient outcomes. Each question was rated on a NRS-score ranging from zero to ten, where a higher score indicated a better nurse reported patient outcome.

*[ Figure 2 – Content of the online survey ]*

**Procedures**

Home health care nurses were approached by e-mail. Some of the nurses were approached using the network of researchers, others were approached through a platform for home health care research in the Netherlands. The e-mail included the participant information letter, provided information on the aim of the study and described the time it would take to participate. The link to the online survey was directly attached to this e-mail to reduce the amount of e-mails sent. In order to increase the response rate, reminders were sent on day 7 and 14 of the study. In addition, the researcher directly approached potential participants and used social media to further increase the response rate. Participation was voluntary and the participants could withdraw at any moment.

**Data analysis**

Analysis was performed using IBM SPSS Statistics version 24.[20] Baseline characteristics were described using descriptive statistics; type of the home health care organisation, gender and profession were displayed in numbers and percentage (%), age

and years of working experience were displayed as mean with standard deviation(SD) or as median with interquartile range (IQR).

In order to determine a ranking from most to least important elements and a ranking from most to least present elements, answers were scored and summed (Figure 3). For example, the answer option 'not important' result in a score 1, and 'very important' was scored as 4. This resulted in a total score, on each element, between 59 and 236. This scoring and summing was also applied in order to determine the ranking of the presence of the elements of work environment, resulting in a total score between 57 and 228 (Appendix 2).

[ Figure 3 - Scoring of the answer options in order to determine the ranking ]

A new continuous variable was composed to detect possible associations between a healthy work environment, defined as the number of present elements of work environment, and the different job outcomes and nurse reported patient outcomes. This new variable consisted of the number of present elements for each participant. An element was counted as present when the score was 3 'partly present' or 4 'strongly present', resulting in a number of elements between 0 (no elements present) and 15 (all elements present). An univariate linear regression analysis was performed to determine the association between a healthy work environment, as the independent variable, and each job outcome and each nurse-reported patient outcome separately as the dependent variable. Results were displayed using the variance ($R^2$) and regression coefficient (B) with confidence interval (CI). Significance level was set at $p < 0.05$. Conditions of regression were checked using normal QQ-plots, histograms and descriptives.[21]

**Ethical Issues**

This study was conducted according to the principles of the Declaration of Helsinki (version 64, October 2013) and the Dutch General Data Protection Regulation (AVG). The online survey did not contain personal, intimate or burdensome questions and participation was anonymous. Therefore, this study did not fall under the scope of the Medical Research Involving Subjects Act (WMO) by the Dutch law[22] and was approved by The Medical Research Ethics Committee (MREC) of the University Medical Center Utrecht (UMC Utrecht) on 11 February 2020. The first question of the online survey concerned the issue of informed consent, all participants consented. The raw data and the SPSS file are stored and saved for 15 years[23] at the network drive of the University of applied Science Utrecht (HU).

## RESULTS

A total of 59 nurses, working at eleven different home health care organisations completed the online survey. The response rate could not be calculated, since it was unclear

how many nurses received the online survey. Two nurses only completed the questions on baseline characteristics and the first question on importance of the elements. Data of these two cases were used in the analysis on these respective questions and both cases were excluded from further analysis. In the study population, 57.6% (n=34) of the participants were nurses with a bachelor degree and 5.1% (n=3) were certified nursing assistants. The majority (n=50) was female (84.7%) with a mean age of 39 years (SD±12). The median of work experiences was 4 years (IQR 2-8) (Table 1).

[ Table 1 – Nurse Characteristics ]

**Important elements**

The most important elements of work environment were 'safe and healthy work environment' (28.8% and 69.5%), 'working with clinically competent peers' (35.6% and 64.4%) and 'clinical autonomy' (40.7% and 57.6%). The percentages are based on the % nurses who rated the element as 'important' (first %) and 'very important' (second %). The elements 'structures for control for nurses' (44.1% and 32.2%) , 'focused on results' (57.6% and 15.3%) and 'research and quality improvement' (49.2% and 23.7%) were rated as less important. Each of the 15 elements was scored as 'important' or 'very important' by more than 60% of the nurses (Table 2, Figure 4).

[ Table 2 – Ranking from most to least important element of a healthy work environment (n=59) ]

[ Figure 4 – Ranking from most to least important element of a healthy work environment (n=59) ]

**Presence of elements in home health care**

The most present elements of work environment were 'patient-centered culture' (47.4% and 47.4%), 'clinical autonomy' (54.4% and 43.9%) and 'working with clinically competent peers' (50.9% and 38.6%), based on the % nurses who rated the element as 'partly present' respectively 'strongly present'. Nurses scored the elements 'nurses are recognized for achievements'(73.7% and 14.0%), 'research and quality improvement' (35.1% and 7.0%) and 'structures for control for nurses' (36.8% and 15.8%) as less present (Table 3).

[Table 3 – Ranking from most to less present element of a healthy work environment (n=57) ]

The median of present elements was 12 (IQR 9-14).Seven participants (15.3%) scored all fifteen elements as present. See Appendix 1 for the exact distribution of the number of elements.

**Job outcomes and nurse reported patient outcomes**

Job satisfaction was scored with a mean NRS score of 7.7 (SD 1.1). The mean NRS score on satisfaction of the work environment was 7.4 (SD 1.2). The following mean NRS

scores on the nurse reported patient outcomes were found; 'the amount of time available for the patient' 8.1 (SD 1.0), 'overall quality of nursing care' 7.7 (SD 1.1), 'patient safety' 7.4 (SD 1.0) and 'the amount of time to coordinate patient care' 7.3 (SD 1.4).

**Associations between healthy work environment and outcomes**

A healthy work environment was statistically significant and associated with 'work satisfaction' ($R^2$=18.2%, B=0.175 (CI 0.08:0.28)), 'satisfaction on work environment' ($R^2$=16.6%, B=0.187 (CI 0.07:0.30)), 'patient safety' ($R^2$=16.3%, B=0.138, (CI 0.05:0.22)), 'amount of time available to coordinate care' ($R^2$=14.4%, B=0.198 (CI 0.07:0.33)) and 'overall quality of care' ($R^2$=12.8%, B=0.147 (CI 0.04:0.25). This association was not significant between a healthy work environment and 'amount of time available for the patient' ($R^2$=0.8%, B=0.04 (CI -0.07:0.14)) (Table 4).

[Table 4 - Univariate regression model for healthy work environment and each dependent variable]

## DISCUSSION

This study aimed to determine what home health care nurses perceive to be important and present elements of a healthy work environment. The secondary objective was to explore the association between a healthy work environment and different job outcomes and nurse-reported patient outcomes. Results showed that all elements of work environment were perceived as important. In this study, every element was scored as 'important' or 'very important' by over 60% of the nurses. Therefore, we would conclude that all elements of work environment were perceived as important. The most important elements were 'safe and healthy work environment' and 'working with clinically competent peers'. The elements 'structures for control for nurses' and 'focused on results' were rated as less important. However, not all elements were present in current practice. The elements 'patient-centred culture' and 'clinical autonomy' were evaluated as most present in current practice. The elements 'nurses are recognized for achievements' and 'research and quality improvement' were least present. Furthermore, results confirmed that job satisfaction, satisfaction on work environment, amount of time available for coordinating care, patient safety and overall quality of care were positively associated with a healthy work environment. The more healthy the work environment, the higher these job outcomes and nurse-reported patient outcomes were scored. 'Amount of time available during care' showed no significant association with a healthy work environment.

The element 'working with clinical competent peers' was considered very important by the nurses. This is consistent with findings from a qualitative study on the nursing work environment and quality of care in hospital setting, using the essentials of magnetism. They showed that nurses appraised teamwork and collegial support, supportive for a healthy work

environment.[24] It is noteworthy that, despite the proven relevance of evidence based health care[25], the participants scored the element 'research and quality improvement' as less important. Likewise, Verest et al. (2019) who studied the needs and experiences of nurses on the quality and safety of care, found that nurses consider the use of evidence based knowledge and research less relevant.[26] An explanation for this finding can be the fact that the translation from research to practice, i.e. the implementation of evidence based interventions, is a complex process.[27,28]

A relatively large part (>50%) of our participants were working at a specialized home healthcare organisation. These type of organisations provide technical nursing care which is also delivered as day treatment in hospitals, such as intravenous therapy or chemotherapy. When comparing the most important elements as found in this study with another study, the findings are partly consistent. Mensik et al. (2007) performed a cross-sectional study on the Essentials of magnetism for home health nurses versus acute clinical care nurses. They found a similar top three of important elements for nurses working in acute clinical care setting to those found in our study on the home health care nurses, namely 'working with clinical competent peers', 'good nurse-doctor relationships and communication' and 'nurse autonomy and accountability'.[16] However, Mensik's top three for the home health care nurses, namely 'concern for patient is paramount', 'supportive nurse manager and supervisor' and 'adequate nursing staff', differed from our top three. Therefore, more research is needed to determine if nurses working at regular home health care organisations have different perspectives on the importance of the elements of work environment.

The data of this study provided additional insight in the job outcomes and nurse reported patient outcomes. The nurses scored the overall quality of care and patient safety relatively high and these scores were similar with findings from earlier research from Verest et al. (2019) on the need and experiences of nurses on the quality and safety of care in different healthcare settings.[26] Additionally, nurses where generally satisfied with their job and their work environment. The relatively high mean scores on these two job outcomes also corresponded with the survey study of Brinkman et al. (2017), requested by NIVEL, on the attractiveness of working in Dutch healthcare.[29]

Furthermore, the positive association between a healthy work environment and quality of care and patient safety in home health care, is supported by findings of several other studies.[9,30,31] Jarrín et al. (2017) studied the relation between a healthy work environment and different patient outcomes in home health care using Pathway to Excellence standards. They also found a positive association between the work environment and the amount of time to coordinate care[13]. In addition, our findings on the positive association between a healthy work and job satisfaction is consistent with the findings of Nantsupawat et al. (2016) in their study on the effect of work environment on job dissatisfaction, burnout and intention to leave among

hospital nurses. They concluded that a healthy work environment in hospitals, results in job satisfaction.[32]

To the best of our knowledge this study is the first to provide insight into the fifteen elements of working environment of Dutch home health care nurses and contributes to the (little) level of evidence on this specific topic. Another strength of this study is the multicentre data collection. Nurses from eleven different home health care organisations participated. The multicentre data collection improved the validity and generalisability[33] of our findings. The anonymous participation was another strength of this study. Nurses were hereby able to give honest opinions and answers on the online survey questions, which could have positively influenced the representativeness of the findings.

However, a few limitations need to be considered. The online survey was not a validated questionnaire. Since no validated instrument for home health care setting was available, the online survey was composed using literature and previous research. It is recommended to further develop and validate this instrument in order to monitor the current situation and measure future improvements in the home health care work environment. Another limitation could be the selection bias that may have occurred, since data was collected using an online survey. The sample mainly consisted of female nurses, although this percentage is in line with the 84% of female nurses in the Dutch home healthcare workforce.[34] In addition, more than half of the nurses had a bachelor degree or other specialization. Since 59% of the Dutch home health care workforce consists of nursing assistances[35], future research should include studying the opinions of this nursing population. Furthermore, the data analysis on the association in our study was conducted using univariate regression analysis. Confounders were not addressed since it was not expected that they would influence the association. However, it is recommended to further explorer the association in detail using multivariate analysis with correcting for confounders.

Since all fifteen elements of a healthy work environment were considered important, future research should focus on further implementing these elements. Prior to implementation, it is recommended to perform qualitative research using focus groups. Focus groups provide rich understanding of participants beliefs and experiences related to the different elements of a healthy work environment and provide insight in collective views and meaning behind these views.[36] Knowledge of the beliefs and experiences of the home health care nurses and involving the nurses could benefit implementation of all elements of work environment.[28]

## CONCLUSION

This study showed that all fifteen elements of work environment were found important by the home health care nurses. However not all fifteen elements were yet present in current practice. This study demonstrated that a healthy work environment could have a positive

influence on job satisfaction, satisfaction on work environment, amount of time to coordinate care, overall quality of care and patient safety. Therefore, it is of importance to make sure that the work environment of home health care nurses is as healthy as possible. A healthy work environment for nurses will contribute to improving and maintaining high quality of care for the growing number of patients and to attract and maintain nurses in home health care.

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# TABLES AND FIGURES

| Elements of a healthy nursing work environment |
| --- |
| 1. Working with clinically competent peers[15,16] |
| 2. Collaborative nurse-physician relationships[13–15,18] |
| 3. Clinical autonomy[14,15,18] |
| 4. Nurse manager support[13–15,18] |
| 5. Control over nursing practice[13–15] |
| 6. Sufficiënt nursing staff[14,15,18] |
| 7. Support for education[13–15,18] |
| 8. Patiënt-centered culture[13–15] |
| 9. Nursing strategy[15,18] |
| 10. Nursing leadership[15,18] |
| 11. Structures for control for nurses[15] |
| 12. Research and quality improvement[13,15,18] |
| 13. Focused on results[15] |
| 14. Nurses are recognized for achievements[13] |
| 15. Safe and healthy work environment [13] |

Figure 1

*Elements of a healthy nursing work environment as used in this study*

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┌──────────────────────┐  ┌──────────────────────┐  ┌──────────────────────────────────────┐
│                      │  │                      │  │                                        │
│ 15 elements of       │  │    Job outcomes      │  │  Nurse reported patient outcomes       │
│ nursing              │  │                      │  │                                        │
│ workenvironment      │  │                      │  │                                        │
└──────────────────────┘  └──────────────────────┘  └──────────────────────────────────────┘
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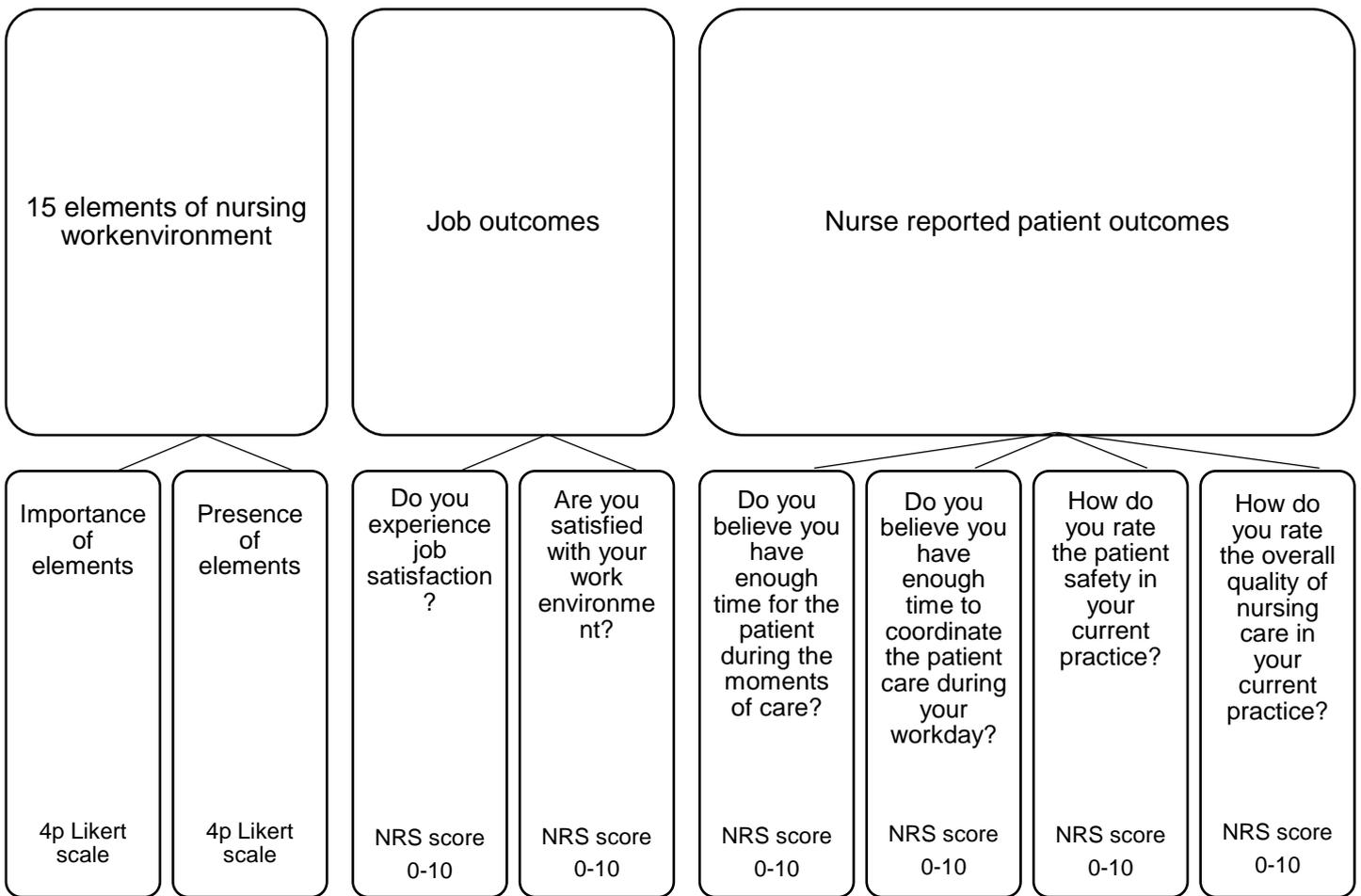| Importance of elements | Presence of elements | Do you experience job satisfaction? | Are you satisfied with your work environment? | Do you believe you have enough time for the patient during the moments of care? | Do you believe you have enough time to coordinate the patient care during your workday? | How do you rate the patient safety in your current practice? | How do you rate the overall quality of nursing care in your current practice? |
|---|---|---|---|---|---|---|---|
| 4p Likert scale | 4p Likert scale | NRS score 0-10 | NRS score 0-10 | NRS score 0-10 | NRS score 0-10 | NRS score 0-10 | NRS score 0-10 |

Figure 2

*Content of the online survey. NRS score = Numeric Rating Scale score*

| Answer on importance of the element | Score | Answer on presence of the element |
|---|---|---|
| 'Not important' | 1 | 'Not present' |
| 'Little important' | 2 | 'Hardly present' |
| 'Important' | 3 | 'Partly present' |
| 'Very important' | 4 | 'Strongly present' |

Figure 3

*Scoring of the answer options in order to determine the ranking*

Table 1

*Nurse Characteristics*

| Characteristics (n=59) | n total |
|---|---|
| Age, in years, mean (SD) | 39 (12) |
| *Range* | 23-59 |
| Gender, n (%) | |
| *Female* | 50 (84.7) |
| Male | 9 (15.8) |
| Education Level, n (%) | |
| *Registered nurse bachelor's degree* | 34 (57.6) |
| *Registered nurse associate degree* | 15 (25.4) |
| *Certified Nursing assistant* | 3 (5.1) |
| *Different (Specialist nurse[1])* | 7 (11.9) |
| Work experience, in years, median (IQR) | 4 (2 - 8) |
| *Range* | 0-37 |
| Type of organisations, n (%) | |
| Specialized home health care organisation[2] | 32 (54.2) |
| Regular nursing care organisation | 27 (45.8) |

N = number of participants, SD = standard deviation, IQR = interquartile range, range between Q1 and Q3

[1] Specialist nurse = specially trained nurses, for example intensive care nurses or oncology nurses

[2] Specialized home health care organisation= these type of organisations provide high technical care which is also delivered at day treatment in hospital, such as intravenous therapy, blood transfusions, tracheostomy care or complex wound dressing.
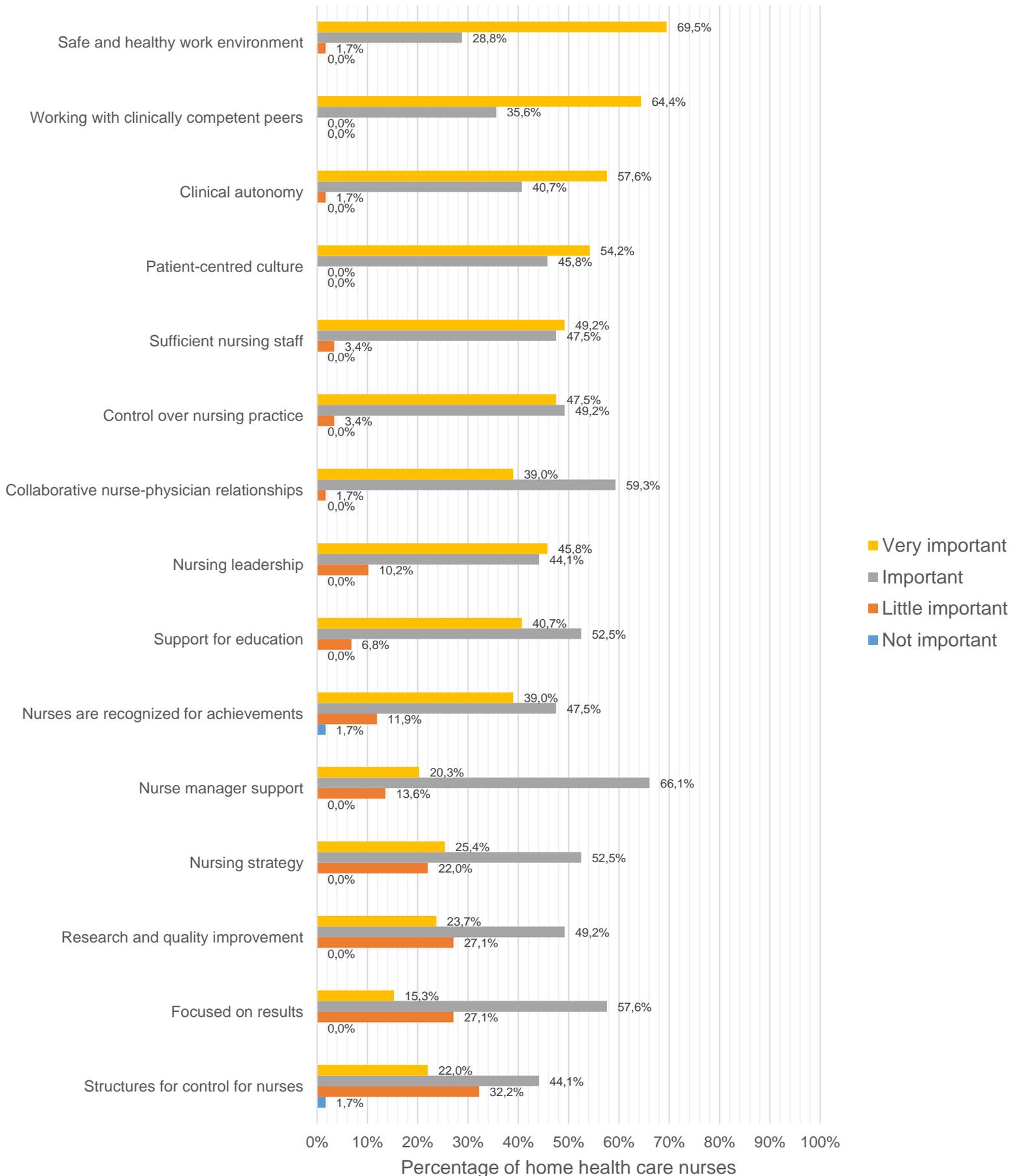
Table 2

*Ranking* from most to least important element of a healthy work environment *(n = 59)*

| Element of work environment | 'Not important' n (%) | 'Little important' n (%) | 'Important' n (%) | 'Very important' n (%) |
|---|---|---|---|---|
| Safe and healthy work environment | 0 (0) | 1 (1.7) | 17 (28.8) | 41 (69.5) |
| Working with clinically competent peers | 0 (0) | 0 (0) | 21 (35.6) | 38 (64.4) |
| Clinical autonomy | 0 (0) | 1 (1.7) | 24 (40.7) | 34 (57.6) |
| Patient-centred culture | 0 (0) | 0 (0) | 27 (45.8) | 32 (54.3) |
| Sufficient nursing staff | 0 (0) | 2 (3.4) | 28 (47.5) | 29 (49.2) |
| Control over nursing practice | 0 (0) | 2 (3.4) | 29 (49.2) | 28 (47.5) |
| Collaborative nurse-physician relationships | 0 (0) | 1 (1.7) | 35 (59.3) | 23 (39.0) |
| Nursing leadership | 0 (0) | 6 (10.2) | 26 (44.1) | 27 (45.8) |
| Support for education | 0 (0) | 4 (6.8) | 31 (52.5) | 24 (40.7) |
| Nurses are recognized for achievements | 1 (1.7) | 7 (11.9) | 28 (47.5) | 23 (39.0) |
| Nurse manager support | 0 (0) | 8 (13.6) | 39 (66.1) | 12 (20.3) |
| Nursing strategy | 0 (0) | 13 (22.0) | 31 (52.5) | 15 (25.4) |
| Research and quality improvement | 0 (0) | 16 (27.1) | 29 (49.2) | 14 (23.7) |
| Focused on results | 0 (0) | 16 (27.1) | 34 (57.6) | 9 (15.3) |
| Structures for control for nurses | 1 (1.7) | 19 (32.2) | 26 (44.1) | 13 (22.0) |

n = number of participants, SD = standard deviation

Figure 4
*Ranking from most to least important elements of work environment perceived by home health care nurses (n=59)*

Table 3

*Ranking from most to least present element of a healthy work environment (n = 57)*

| Element of work environment | 'not present' n (%) | 'hardly present' n (%) | 'Partly present' n (%) | 'Strongly present' n (%) |
|---|---|---|---|---|
| Patient-centred culture | 0 (0) | 3 (5.3) | 27 (47.4) | 27 (47.4) |
| Clinical autonomy | 0 (0) | 1 (1.8) | 31 (54.4) | 25 (43.9) |
| Working with clinically competent peers | 1 (1.8) | 5 (8.8) | 29 (50.9) | 22 (38.6) |
| Support for education | 0 (0) | 8 (14.0) | 31 (54.4) | 18 (31.6) |
| Nursing strategy | 0 (0) | 10 (17.5) | 30 (52.6) | 17 (29.8) |
| Focus on results | 0 (0) | 11 (19.3) | 31 (54.4) | 15 (26.3) |
| Collaborative nurse-physician relationships | 0 (0) | 7 (12.3) | 41 (71.9) | 9 (15.8) |
| Safe and healthy work environment | 1 (1.8) | 6 (10.5) | 42 (73.7) | 8 (14.0) |
| Nursing leadership | 0 (0) | 12 (21.1) | 34 (59.6) | 11 (19.3) |
| Sufficient nursing staff | 0 (0) | 12 (21.1) | 35 (61.4) | 10(17.5) |
| Control over nursing practice | 0 (0) | 14 (24.6) | 35 (61.4) | 2 (14.0) |
| Nurse manager support | 2 (3.5) | 18 (31.6) | 24 (42.1) | 13 (22.8) |
| Structures for control for nurses | 8 (14.0) | 19 (33.3) | 21 (36.8) | 9 (15.8) |
| Research and quality improvement | 5 (8.8) | 28 (49.1) | 20 (35.1) | 4 (7.0) |
| Nurses are recognized for achievements | 1 (1.8) | 6 (10.5) | 42 (73.7) | 8 (14.0) |

n = number of participants, SD =

standard deviation

Table 4

*Univariate regression model for healthy work environment and each dependent variable*

| Job outcome or nurse reported patient outcome | R Square (%) | B (95%CI) | p-value |
|---|---|---|---|
| Work satisfaction | 18.2 | 0.175 (0.08:0.28) | 0.00* |
| Satisfaction on work environment | 16.6 | 0.187 (0.07:0.30) | 0.00* |
| Amount of time available for the patient | 0.8 | 0.04 (-0.07:0.14) | 0.50 |
| Amount of time to coordinate patient care | 14.4 | 0.198 (0.07:0.33) | 0.00* |
| Patient safety | 16.3 | 0.138 (0.05:0.22) | 0.00* |
| Overall quality of nursing care in their team | 12.8 | 0.147 (0.04:0.25) | 0.01* |

R Square = percentage of the variance for job- or nurse reported patient outcome(dependent variable) explained by the healthy work environment (independent variable) B = Regression coefficient (slobe of linear regression), CI = confidence interval 95%,

* = significant p-value (<0.05)

Healthy work environment; defined as the number of present elements of work environment. The more elements present, the heathier the work environment.

**APPENDIX 1**

Table 5

*Number of elements home health care nurses perceived to be present in the current practice.*

| Number of elements | n[1] (%) |
|---|---|
| 0 – 4 | 0 (0) |
| 5 | 1 (1.8) |
| 6 | 2 (3.5) |
| 7 | 3 (5.3) |
| 8 | 3 (5.3) |
| 9 | 6 (10.5) |
| 10 | 4 (7.0) |
| 11 | 7 (12.3) |
| 12 | 5 (8.8) |
| 13 | 11 (12.3) |
| 14 | 8 (14.0) |
| 15 | 7 (12.3) |
| Median (IQR) | 12 (9 – 14) |
| Mode | 13 |
| Range | 5 - 15 |

[1] n = number of participants who scored this number of elements as present in their current practice. For example, 6 participants perceived 9 elements as present.

Table 6

*Total scores on the importance (n = 59) and presence (n = 57) of the elements of work environment used to determine the rankings*

| Element of work environment | Total Score[1] on importance | Total score[2] on presence |
|---|---|---|
| Safe and healthy work environment | 217 | 171 |
| Working with clinically competent peers | 215 | 186 |
| Clinical autonomy | 210 | 195 |
| Patient-centred culture | 209 | 195 |
| Sufficient nursing staff | 204 | 169 |
| Control over nursing practice | 203 | 165 |
| Collaborative nurse-physician relationships | 199 | 173 |
| Nursing leadership | 198 | 170 |
| Support for education | 197 | 181 |
| Nurses are recognized for achievements | 191 | 132 |
| Nurse manager support | 181 | 162 |
| Nursing strategy | 179 | 178 |
| Research and quality improvement | 175 | 137 |
| Focused on results | 170 | 175 |
| Structures for control for nurses | 169 | 145 |

[1] Total Score = total score on the importance of element which could have ranged between a score of 59 (all nurses scored the element as not important) to 236 (all nurses scored the element as very important)

[2] Total Score = total score on the presence of element which could have ranged between a score of 57 (all nurses scored the element as 'not present') to 228 (all nurses scored the element as 'strongly present').