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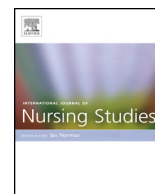
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Work environment characteristics associated with quality of care in Dutch nursing homes: A cross-sectional study



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ABSTRACT

Background: A lack of relationship between direct care staffing levels and quality of care, as found in prior studies, underscores the importance of considering the quality of the work environment instead of only considering staff ratios. Only a few studies, however, have combined direct care staffing with work environment characteristics when assessing the relationship with quality of care in nursing homes.

Objectives: To examine the relationship between direct care staffing levels, work environment characteristics and perceived quality of care in Dutch nursing homes.

Design: Cross-sectional, observational study in cooperation with the Dutch Prevalence Measurement of Care Problems.

Settings: Twenty-four somatic and 31 psychogeriatric wards from 21 nursing homes in the Netherlands. **Participants:** Forty-one ward managers and 274 staff members (registered nurses or certified nurse assistants) from the 55 participating wards.

Methods: Ward rosters were discussed with managers to obtain an insight into direct care staffing levels (i.e. total direct care staff hours per resident per day). Participating staff members completed a questionnaire on work environment characteristics (i.e., ward culture, team climate, communication and coordination, role model availability, and multidisciplinary collaboration) and they rated the quality of care in their ward.

Data were analyzed using multilevel linear regression analyses (random intercept). Separate analyses were conducted for somatic and psychogeriatric wards.

Results: In general, staff members were satisfied with the quality of care in their wards. Staff members from psychogeriatric wards scored higher on the statement 'In the event that a family member had to be admitted to a nursing home now, I would recommend this ward'. A better team climate was related to better perceived quality of care in both ward types ($p \leq 0.020$). In somatic wards, there was a positive association between multidisciplinary collaboration and agreement by staff of ward recommendation for a family member ($p = 0.028$). In psychogeriatric wards, a lower score on market culture ($p = 0.019$), better communication/coordination ($p = 0.018$) and a higher rating for multidisciplinary collaboration ($p = 0.003$) were significantly associated with a higher grade for overall quality of care. Total direct care staffing, adhocracy culture, hierarchy culture, as well as role model availability were not significantly related to quality of care.

Conclusions: Our findings suggest that team climate may be an important factor to consider when trying to improve quality of care. Generating more evidence on which work environment characteristics actually lead to better quality of care is needed.

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What is already known about the topic?

- Work environment characteristics have been identified as determinants of quality of care in nursing homes.
- A lack of relationship between direct care staffing levels and quality of care, as found in prior studies, underscores the

importance of considering the quality of the work environment instead of just the staff ratios.

- Using direct care staff members as informants of the overall quality of care in nursing homes is an underexplored opportunity, as they have insight into aspects of quality of care that are not necessarily documented in medical records or resident files.

What this paper adds

- Our findings suggest that team climate may be an important factor ward managers should consider when trying to improve quality of care in their wards.
- Consistent with findings from a recent other study, total direct care staffing levels were not associated with staff-reported quality of care. This may indicate that staff satisfaction may not be improved by simply adding extra manpower.

1. Introduction

Nursing staff, including certified nurse assistants, nurse aides and registered nurses, provide most of the round-the-clock direct care in nursing homes. Even though the relationship between direct care staffing levels and quality of care (QoC) in nursing homes has been assessed in many, mostly US based, studies, the relationship is unclear as studies provide inconsistent conclusions (Backhaus et al., 2014; Bostick et al., 2006; Spilsbury et al., 2011). Worldwide, little progress has been made on establishing minimum nursing home staffing standards, whereas these might positively affect the QoC and quality of life of nursing home residents (Mueller et al., 2006). However, improvements in the QoC in nursing homes in the future cannot simply focus on numbers and educational backgrounds of direct care staff. A lack of relationship between direct care staffing levels and QoC, as found in prior studies, underscores the importance of considering the quality of the work environment instead of just the staff ratios (Backhaus et al., 2014; Zúñiga et al., 2015). Only a few studies, however, have combined direct care staffing with work environment characteristics when assessing the relationship with QoC in nursing homes (Zúñiga et al., 2015; Flynn et al., 2010). Therefore, comprehensive theoretical models, integrating direct care staffing and other work environment characteristics are scarce

(Schwendimann et al., 2014), while at the same time, evidence on the relationship between work environment characteristics and QoC increases (Schwendimann et al., 2014).

Different work environment characteristics have been identified as determinants for QoC in prior studies. For example, ward environment characteristics such as positive work culture and a good team climate have been associated with better QoC in nursing homes (Schwendimann et al., 2014). Also, work processes like good communication and coordination among direct care staff have been associated with better QoC in nursing homes (Colon-Emeric et al., 2013; Temkin-Greener et al., 2009). Evidence from the hospital setting suggests that multidisciplinary collaboration, such as between nurses and physicians, might lead to better QoC as well, but evidence for the nursing home sector is still scarce (Van Bogaert et al., 2014). In the international literature, increasing attention is paid to the presence of role models as a determinant for QoC. A role model is a staff member whose work is emulated by other team members (Johnson, 2015). In countries like the US and Canada, role modeling is considered part of advanced roles such as nurse practitioner, nurse consultant or nurse specialist (Elliott et al., 2016). To our knowledge, the relationship between the presence of role models within a team and QoC in nursing homes has not been reported in the research literature. Nevertheless, we hypothesize that the presence of a role model in a ward might be associated with better QoC, as role models assist other direct care staff to deal more effectively with challenging or complex situations (Backhaus et al., 2015). Based on a literature review, we developed the model presented in Fig. 1, suggesting that work environment characteristics might mediate the relationship between staffing levels and QoC.

In this study, all these factors that possibly determine QoC in nursing homes, i.e., direct care staffing levels, ward environment characteristics (work culture, team climate), as well as work processes (communication and coordination, multidisciplinary collaboration, presence of role models) will be considered jointly when examining the relationship with QoC (Fig. 1). In addition, specific attention will be paid to the selection of QoC outcomes. Nursing home QoC is predominantly operationalized as clinical outcomes for residents such as the prevalence of falls or medication incidents. Others have utilized staff perception of QoC (Zúñiga et al., 2015), since this has been found suitable in other

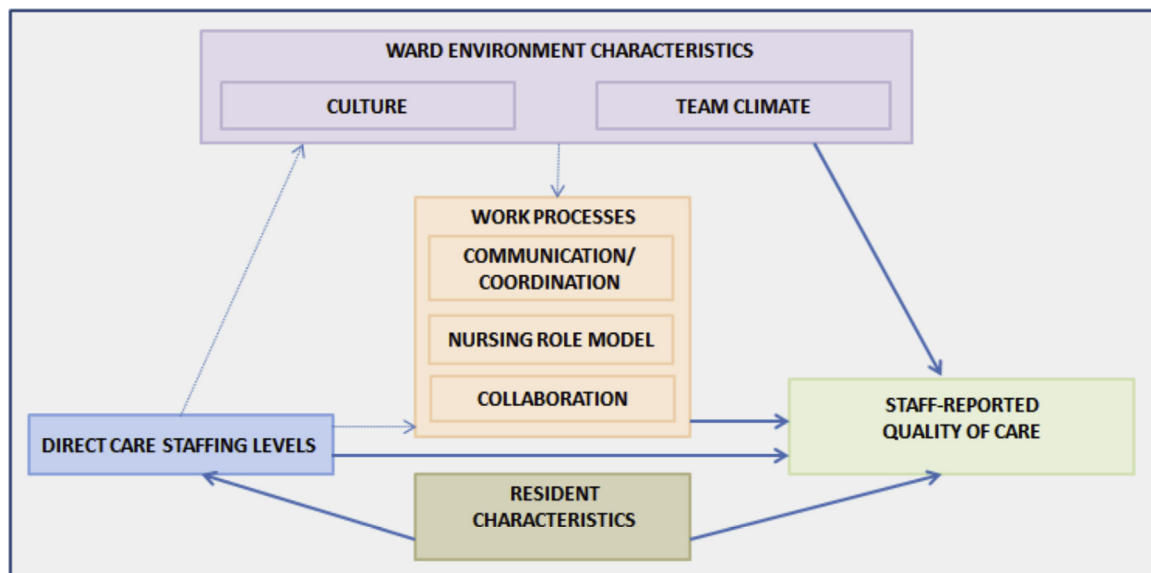


Fig. 1. Theoretical model of the relationship between direct care staffing levels, ward environment characteristics, work processes and staff-reported quality of care. **Note:** Bold arrows are tested in this study.

settings (Aiken et al., 2012). Using direct care staff members as informants of the overall QoC in nursing homes might be an underexplored opportunity, as they have insights into aspects of QoC that are not necessarily documented in medical records or resident files (McHugh and Stimpfel, 2012). Staff perception of QoC is not based on isolated components of QoC, e.g. a resident falls or there is a medication incident, but develops over time, and thus provides a more comprehensive view of the residents' care (Zúñiga et al., 2015).

The aim of our study is to examine the relationship between direct care staffing levels, work environment characteristics and perceived QoC in Dutch nursing homes. In our study, parts of the theoretical model presented in Fig. 1 will be tested to infer this relationship.

2. Methods

2.1. Study design

We conducted this study in cooperation with the Dutch Prevalence Measurement of Care Problems (LPZ: Landelijke Prevalentiemeting Zorgproblemen). The LPZ database includes a cross-sectional point prevalence measurement of several care problems (such as pressure ulcers and medication incidents) and takes place annually on the same day in different healthcare settings (van Nie-Visser et al., 2013). Health care organizations participate voluntarily. All nursing homes participating in the LPZ measurement in April 2014 were invited to participate in our study. Among nursing homes that agreed to participate, a cross-sectional, observational study was conducted between April and June 2014. The study was conducted in Dutch.

2.2. Setting and participants

Fifteen organizations with 44 nursing homes were invited to participate in our study additional study. Within Dutch nursing homes, three different wards can be distinguished: somatic wards for residents with physical disabilities, psychogeriatric wards for residents with dementia, and rehabilitation wards that provide sub-acute rehabilitation. Somatic and psychogeriatric wards provide long-term, residential care, whereas rehabilitation wards provide short-term, skilled nursing care. In our study, we focused on somatic and psychogeriatric wards. Wards for residents with specific diseases such as Huntington's disease, were excluded. If the director of an invited organization gave consent to participate in the study, ward managers from this organization were invited to participate in a brief, voluntary interview concerning nurse staffing. Ward managers that gave informed consent were interviewed (via telephone). In addition, the ward managers were asked to distribute a digital questionnaire to at least five staff members working in their ward. The questionnaire was implemented using the online survey tool SurveyMonkey (www.surveymonkey.com) and included questions on ward environment characteristics, work processes, and staff-reported QoC. The choice to ask for at least five staff members and not for all staff members from a ward was made to keep participation in this study feasible. Staff members that were registered nurses or certified nurse assistants and worked at least 12 h per week in one of the somatic or psychogeriatric wards were considered eligible for participation. The ward managers were asked to invite, to the extent possible, staff members with different educational background and years of work experience. All resident data were extracted from the LPZ database. Data about the residents were collected by two health care professionals, one who works on the resident's ward and one on another ward. These health care professionals received standardized training on how to collect resident level data (van

Nie-Visser et al., 2013). Good inter-rater reliability testing between the two observers has been previously reported (Cohen's kappa 0.87) (Meijers et al., 2009).

2.3. Data sources, variables and operationalization

In Table 1, the main variables, their operationalization and the data sources are presented. All measurement instruments were selected based on their psychometric properties (validity, reliability), clinical utility and appropriateness for the Dutch nursing home setting and population. To the extent that it is possible, previously tested scales were used for measurement. The ward manager interview, the questionnaire completed by staff members and the information extracted from the LPZ database were in Dutch. Interview questions were pretested for comprehensibility with ward managers, and questions included in the questionnaire were pretested with direct care staff (registered nurses, certified nurse assistants) from two nursing home organizations that did not participate in our study.

2.3.1. Resident characteristics

Residents' age, gender, nursing home length of stay, number of comorbidities and care dependency status were extracted from the LPZ database (Table 1). Care dependency was assessed with the Care Dependency Scale (CDS). The CDS covers 15 activities for which the degree to which the resident is dependent upon care provided by others is indicated on a 5-point scale (completely dependent (1) – completely independent (5)): eating and drinking, incontinence, body posture, mobility, day/night pattern, getting dressed and undressed, body temperature, hygiene, avoiding danger, communication, contact with others, awareness of rules and values, daily activities, recreational activities, and learning ability (van Nie-Visser et al., 2013). For each resident, the total score (sum of 15 items) was divided by 15 to obtain a mean score.

2.3.2. Direct care staffing levels and ward size

Data on direct care staffing levels and the ward size (number of residents living in ward) were collected via ward managers. Ward managers provided data both on how many residents were living in the ward and on the nurse staffing for an average day within the last 7 days. Based on the actual ward roster, this included the number of direct care staff members that worked on that day (morning (7:00 am–12:00 noon), day (12:00 noon–5:00 pm), evening (5:00 pm–11:00 pm), and night (11:00 pm–7:00 am) shifts), each staff member's educational background and the exact start and finish time of their shift. The educational background of direct care staff working in Dutch nursing homes varies and is explained in Table 1. Data were obtained via (telephone) interviews and based on actual schedules. Total staff hours per resident day (HPRD) were calculated by dividing the total direct care staff hours for that specific day by the number of residents living in the ward.

2.3.3. Ward environment characteristics

Ward environment characteristics (organizational culture, team climate) were assessed by a questionnaire completed by staff members (registered nurses or certified nurse assistants). Organizational culture was measured with the Dutch version (van Beek and Gerritsen, 2010) of the competing values framework (CVF) for long-term care (Scott-Cawiezell et al., 2005). The six CVF items cover six domains: dominant organizational characteristic, administration, management style, organizational 'glue' (i.e., relational characteristics that connect the ward members together, for example, 'loyalty, trust and commitment' or 'formal procedures, rules and policies'), strategic emphasis and criteria for success. For each domain, staff members had to rank order four statements from 1 to 4, with 4 best describing the culture on their ward. Each

Table 1
Study variables and their measurement.

Variable	Measurement
<i>Ward characteristics</i>	
Total direct care staffing levels	Total direct care staff hours per resident per day (HPRD): Direct care staff consist of nurse aides, nurse assistants, certified nurse assistants (comparable to licensed practical/vocational nurses in the US (Verkaik et al., 2011)), vocationally trained registered nurses, baccalaureate-educated registered nurses, specially trained feeding assistants, trainees, and untrained staff.
Ward size	Number of residents living on ward
Ward type	Psychogeriatric/somatic nursing care ward
<i>Resident characteristics</i>	
Gender	Man/woman
Age	Age in years
Length of stay	Number of days
Comorbidities	Number of comorbidities (0–24*): Infectious illness; cancer; endocrine, nutritional or metabolic illness/disease; diabetes mellitus; disease of blood or blood related organs; psychological disorders; dementia; nervous system disorder (excluding cerebrovascular accident (CVA)); spinal cord lesion/paraplegia; cardio vascular disease; CVA/hemiparesis; respiratory disorder/diseases, including nose and tonsils; disorder/disease of the digestive tract, including intestinal obstruction, peritonitis, hernia, liver, gallbladder, pancreas; disorder/disease of kidney/urinary tract, sexual organs; skin disorder/disease; motor disorder/disease; congenital disorders; injury resulting from accident(s), undesirable consequences of accident(s); symptoms and abnormal clinical or lab findings, not elsewhere classified; overdose/substance abuse/addiction; disease of the eye; disease of the ear; pregnancy, child birth; external factors for disease
Care dependency	Care Dependency Scale (Dijkstra et al., 2012)
<i>Ward environment characteristics</i>	
Organizational culture	Four different culture types from the competing values framework (CVF) for long-term care (van Beek and Gerritsen, 2010)
Team climate	Dutch 14-item version of the team climate inventory (TCI) (Strating and Nieboer, 2009)
<i>Work process characteristics</i>	
Communication/coordination	Communication/coordination subscale from the Work Environment and Perceived Work Effectiveness in Nursing Homes questionnaire (Temkin-Greener et al., 2009)
Role model availability	Employee has a role model working in the ward (yes/no)
Multidisciplinary collaboration	Grade ranging from 1–10*
<i>Staff-reported quality of care outcomes</i>	
Grade overall quality of care	Grade 1–10*
Recommending the ward	"In the event that a family member had to be admitted to a nursing home now, I would recommend this ward" (completely not agree (1) – completely agree (5))

* Underlined score is the most favorable score.

statement belongs to a specific culture type: clan, adhocracy, market or hierarchy (van Beek and Gerritsen, 2010). Clan culture is associated with shared goals and values, strong cohesion and a sense of collective identity. Adhocracy culture is characterized by the ability to adapt quickly to new opportunities and deal successfully with changes. In a market culture, there is a focus on profit, competitiveness and productivity. A hierarchy culture is characterized by centralized decisions, structures and rules (van Beek and Gerritsen, 2010). Usually, more than one type of culture characterizes an organization (Scott et al., 2003; van Beek and Gerritsen, 2010). Therefore, we calculated a total score for each culture type separately. Van Beek and Gerritsen (2010) translated the CVF into Dutch applying back-translation and validated the scale in the Dutch nursing home setting. As the CVF is an ipsative or 'forced choice' scale and the scores on one subscale are dependent on scores on the other subscales, the internal consistency reliability cannot be tested (Scott-Cawiezell et al., 2005). Team climate was measured with the Dutch 14-item version of the Team Climate Inventory (TCI) (Strating and Nieboer, 2009). The TCI measures four factors that contribute to the team climate: participative safety, support for innovation, vision, and task orientation. The underlying rationale is that effective team performance is often reached when team activities are characterized by these factors (Bosch et al., 2011). Staff members had to score for each item on a 5-point scale (strongly disagree – strongly agree), with higher scores indicating a better team climate. The score for each item was summed up to determine a total scale score. Strating and Nieboer (2009) translated the TCI into Dutch and tested the construct validity, reliability, predictive validity and

temporal stability of the scale, concluding that the psychometric properties were acceptable. For the four subscales of the TCI, they found Cronbach's alphas ranging from 0.73–0.80. In our sample, the Cronbach's alpha for the total scale was 0.90, indicating good internal consistency.

2.3.4. Work processes

In the questionnaire completed by staff members, work processes were assessed as well. Communication and coordination were measured with the communication/coordination subscale from the Work Environment and Perceived Work Effectiveness in Nursing Homes questionnaire that measures 'the degree to which communication between staff members is uninhibited, accurate, timely and effective, and focuses on effectiveness of procedures for coordinating tasks and job responsibilities' (Temkin-Greener et al., 2009). This subscale consists of 15 items, which are scored on a 5-point scale (strongly disagree – strongly agree). The score for each item was summed up to determine a total scale score, with higher scale scores indicating better communication/coordination. No Dutch version of the Work Environment and Perceived Work Effectiveness in Nursing Homes questionnaire existed. To assure cross-cultural validity, the communication and coordination subscale was translated according to the forward-backward translation guidelines from Beaton et al. (2000). The final Dutch version was tested for comprehensibility with direct care staff members (registered nurses, certified nurse assistants) to make sure that all items were appropriate for the Dutch nursing home setting. In our sample, the Cronbach's alpha of the scale was 0.80, indicating acceptable internal consistency. To obtain insight into

the existence of role models, staff members were asked whether or not they had a colleague (not necessarily a higher-educated colleague, but, for example, another certified nurse assistant) they viewed as a professional role model. In addition, the multidisciplinary collaboration between direct care staff, physicians and paramedics was graded by staff members (grade ranging from 1 to 10 with higher scores indicating better multidisciplinary collaboration).

2.3.5. Staff-reported quality of care outcomes

In the questionnaire completed by staff members, two questions on QoC were included. Participating staff members graded the overall QoC on their ward (grade 1–10, a higher score indicating better QoC) and indicated to what extent they agreed with the statement “In the event that a family member had to be admitted to a nursing home now, I would recommend this ward” (completely not agree (1) – completely agree (5)).

2.4. Statistical analyses

Data analyses were performed with SPSS for Windows (version 22). Missing items were replaced by ward averages ($n=2$) or respondents' mean score on the scales ($n=4$). In addition, 8.9% ($n=23$) of the respondents did not rank order all statements within organizational culture domains correctly. Statements that were not rank ordered correctly were considered as missing and were imputed using multiple imputation techniques.

Differences in staff-reported QoC between somatic and psychogeriatric wards were found using independent samples *t*-tests, thus all subsequent analyses were considered separately. Means and standard deviations of ward, resident, staff, ward environment, work process characteristics as well as QoC were computed. To examine the relationship between direct care staffing levels, ward environment characteristics, work processes (independent variables) and staff-reported QoC (dependent variable), multilevel linear regression analyses (random intercept) were conducted, in which staff (level 1) was nested in wards (level 2). Intraclass correlation coefficients (ICC) were calculated to test the correlation between staff members working in the same ward. To test for multicollinearity among the independent variables, variance inflation factors (VIFs) were calculated. As all VIFs were lower than 5, no multicollinearity problem existed (García et al., 2015). For each dependent variable (staff-reported QoC outcomes), two different analyses were conducted. First, we conducted fully-adjusted analyses in which we controlled for background characteristics (i.e. ward size and residents' mean age, gender (female/male), length of stay, and number of comorbidities). Due to the low spread of the care dependency status variable, care dependency status was not considered as a background characteristic in the analyses. Second, we conducted unadjusted analyses in which we did not control for background characteristics. Likelihood ratios (-2LL) were considered to assess whether the adjusted or the unadjusted models fitted better (lower likelihood ratio values indicating a better fit).

2.5. Ethical considerations

The Medical Ethics Review Committee (METC) of the University Hospital Maastricht and Maastricht University approved the study protocol (METC14-4-057). Participation was voluntary and anonymous, and participants were informed that their answers would be treated as strictly confidential. No identifying information on the participants was collected. Ward managers had no access to the questionnaires completed by staff members and did not know which staff members had or had not completed the questionnaire.

All data about the residents were extracted from an existing database (LPZ).

3. Results

3.1. Descriptive statistics

Eight out of fifteen invited nursing home organizations participated in our study. The study was conducted in 21 nursing homes and 55 wards (31 psychogeriatric and 24 somatic). In total, 1438 residents were living in the 55 included wards, 617 lived in a somatic and 821 in a psychogeriatric ward. Ward and resident characteristics are described in Table 2.

3.1.1. Staff characteristics

Staff members amounting to 274 from the 55 included wards completed the questionnaire of ward environment and work process characteristics; 17 respondents were excluded from the analyses, as they did not complete the digital questionnaire. In total, 257 respondents were included in the analyses, of whom 84.0% were certified nurse assistants, 13.6% vocationally trained registered nurses, and 2.3% baccalaureate-educated registered nurses (Table 2).

3.1.2. Ward environment and work process characteristics

Staff members from somatic as well as psychogeriatric wards gave high mean ratings for the team climate (Table 2). For both types of wards, staff members scored, on average, highest on clan culture, followed by hierarchy, adhocracy and market culture. Also, the communication and coordination in their wards were rated as good. 73% of somatic ward staff members and 71% of psychogeriatric ward staff members indicated that they had a colleague whom they saw as role model for themselves. In general, staff members were satisfied with the collaboration among the various disciplines.

3.1.3. Staff-reported quality of care

Overall, staff members from both somatic and psychogeriatric wards were satisfied with the overall QoC in their wards, while staff members working in psychogeriatric wards gave, on average, higher ratings (Table 2). More staff members from psychogeriatric wards agreed with the statement ‘In the event that a family member had to be admitted to a nursing home now, I would recommend this ward’, with a mean score of 3.9 from psychogeriatric staff compared to 3.5 from somatic staff (scale range: completely not agree (1) – completely agree (5)).

3.2. Factors influencing quality of care in nursing homes

The results of the multilevel regression analyses are reported in Table 3. As the -2LL was lower for the unadjusted models and the adjusted models were not significantly better (corresponding *p*-values > 0.05), unadjusted models should be preferred. The parameter estimates from the adjusted (controlling for ward size, residents' mean age, gender (female/male), length of stay, and number of comorbidities) and unadjusted models were comparable. In both ward types, somatic and psychogeriatric, team climate was associated with QoC. Better team climate was significantly related to better staff perceptions for overall QoC ($p=0.003$ and $p=0.020$) and agreement by staff of ward recommendation for a family member ($p=0.000$ and $p=0.009$). In somatic wards, there was a positive association between multidisciplinary collaboration and agreement by staff of ward recommendation for a family member ($p=0.028$). In psychogeriatric wards, a lower score on market culture ($p=0.019$), better communication/coordination ($p=0.018$) and a higher rating for multidisciplinary collaboration

Table 2
Differences in study variable characteristics among somatic and psychogeriatric wards.

	Somatic wards (n=24)	Psychogeriatric wards (n=31)
<i>Ward characteristics (n=55)</i>		
Total direct care staffing (HPRD; mean, SD)	3.06 ± 0.58	3.15 ± 0.40
Ward size (mean, SD)	27 ± 8	27 ± 10
<i>Resident characteristics</i>		
Age in years (mean, SD)	617 residents	821 residents
Female (%)	79 ± 11	83 ± 9
Length of stay in years and days (mean, SD)	65	72
Number of comorbidities (mean, SD)	2.7 (1002 ± 1225)	2.6 (959 ± 873)
Care dependency (scale range: 1–5; mean, SD) ^a	3 ± 1	3 ± 1
	2.7 ± 1.1	2.1 ± 1.1
<i>Staff characteristics</i>		
Number of work hours per week (mean, SD)	104 staff members	153 staff members
Educational background	29.45 ± 5.17	29.18 ± 5.48
- Baccalaureate-educated RN (%)	2.9 (n=3)	2.0 (n=3)
- Vocationally trained RN (%)	18.3 (n=19)	10.5 (n=16)
- Certified nurse assistant (%)	78.8 (n=82)	87.6 (n=134)
<i>Ward environment characteristics</i>		
Team climate (scale range: 14–70; mean, SD)	53 ± 7	55 ± 6
Clan culture (scale range: 6–24; mean, SD)	18 ± 3 (n=100)	19 ± 3 (n=134)
Adhocracy culture (scale range: 6–24; mean, SD)	14 ± 3 (n=100)	15 ± 3 (n=134)
Market culture (scale range: 6–24; mean, SD)	11 ± 4 (n=100)	10 ± 3 (n=134)
Hierarchy culture (scale range: 6–24; mean, SD)	17 ± 3 (n=100)	16 ± 3 (n=134)
<i>Work process characteristics</i>		
Communication/coordination (scale range: 15–75; mean, SD)	54 ± 7	56 ± 6
Role model (% staff having a role model)	73	71
Multidisciplinary collaboration (scale range: 1–10; mean, SD)	7.3 ± 0.8	7.2 ± 0.9
<i>Staff-reported quality of care outcomes</i>		
Grade overall quality of care (scale range: 1–10; mean, SD) [*]	104 staff members	153 staff members
Recommending the ward (scale range: 1–5; mean, SD) [*]	7.4 ± 0.9	7.7 ± 0.7
	3.5 ± 1.0	3.9 ± 0.9

Note: SD = standard deviation.

^a degree to which the resident is dependent upon care provided by others is indicated on a 5-point scale (completely dependent (1) – completely independent (5)).

^{*} significantly different among somatic and psychogeriatric wards ($p < 0.01$; independent samples t -test).

($p = 0.003$) were significantly associated with a higher grade for overall QoC. Total direct care staffing, adhocracy culture, hierarchy culture, as well as role model availability were not significantly related to QoC.

4. Discussion and conclusion

Overall, the findings of this study only partly confirm our theoretical model (Fig. 1). In our study, team climate was the only factor consistently associated with staff-reported QoC. Significant

associations were also found for market culture, communication/coordination, and multidisciplinary collaboration, although these were not consistent across ward types. Contrary to our expectations, no significant associations were found for total direct care staffing, adhocracy culture, hierarchy culture and role model availability.

On average, staff members from both somatic and psychogeriatric wards were satisfied with the overall QoC in their wards. This is in agreement with the findings from van Beek and Gerritsen (2010), who found that 72% of staff members rated the QoC in their

Table 3
Factors Influencing Staff-Reported Quality of Care (QoC).

	Grade overall QoC Somatic wards			Grade overall QoC Psychogeriatric wards			Recommending the ward Somatic wards			Recommending the ward Psychogeriatric wards		
	b	SE	p-value	b	SE	p-value	b	SE	p-value	b	SE	p-value
<i>Ward characteristics</i>												
Total direct care staffing	-0.160	0.185	0.388	0.101	0.172	0.557	-0.182	0.162	0.261	0.036	0.241	0.880
<i>Ward environment</i>												
Team climate	0.048	0.016	0.003	0.025	0.011	0.020	0.073	0.019	0.000	0.036	0.014	0.009
Adhocracy culture	-0.003	0.032	0.922	-0.046	0.025	0.067	-0.022	0.037	0.558	0.008	0.032	0.811
Market culture	-0.021	0.023	0.370	-0.044	0.019	0.019	-0.026	0.027	0.336	-0.023	0.024	0.328
Hierarchy culture	-0.034	0.029	0.246	-0.038	0.024	0.114	-0.049	0.035	0.165	-0.035	0.031	0.252
<i>Work processes</i>												
Communication/coordination	0.019	0.015	0.206	0.025	0.010	0.018	-0.009	0.018	0.600	0.015	0.013	0.252
Role model	-0.059	0.149	0.694	0.057	0.108	0.601	0.105	0.176	0.549	0.021	0.139	0.879
Multidisciplinary collaboration	0.076	0.104	0.464	0.177	0.059	0.003	0.262	0.119	0.028	0.112	0.076	0.140
	ICC: 0.30			ICC: 0.18			ICC: 0.07			ICC: 0.24		

Note: p-values < 0.05 were considered statistically significant.

ward as good to very good. Also, in a recent Swiss study (Zúñiga et al., 2015), 93% of staff members perceived the QoC in their ward as good. Our finding that team climate was consistently associated with staff-reported QoC is similar to those of Zúñiga et al. (2015), who found that ‘teamwork and safety climate’ was the most important factor associated with staff-reported QoC. Bosch et al. (2011) assessed the team climate in 67 Dutch nursing home wards in 2005. Even though they did not find a relationship between team climate and QoC, respondents’ scores on team climate were comparable with the high mean ratings for team climate found in our study. Prior evidence suggests that a better team climate is not only associated with better QoC, but also with higher job satisfaction of direct care staff working in nursing homes (Schwendimann et al., 2016).

In psychogeriatric wards, a lower score on market culture was associated with a higher grade for overall QoC. In a study from van Beek and Gerritsen (2010), conducted among Dutch psychogeriatric nursing home wards, market culture was also negatively associated with staff perceived QoC. As was the case with our study, staff members scored, on average, highest on clan culture, followed by hierarchy, adhocracy and market culture. In addition, better communication and coordination were significantly related to a higher rating for overall QoC in psychogeriatric wards. Compared with the findings from Temkin-Greener et al. (2009), staff members in our study perceived the communication and coordination in their wards as somewhat better. Good communication and coordination may improve QoC as it allows for timely responses to changes in residents’ health, functional or mental status, as well as timely revisions in residents’ care plans (Zheng and Temkin-Greener, 2010).

In both ward types, a higher grade for multidisciplinary collaboration was associated with better perceived QoC. In somatic wards, better multidisciplinary collaboration was associated with higher scores on ward recommendation and in somatic wards with a higher grade for overall QoC. The fact that staff members in general were satisfied with the multidisciplinary collaboration might be partly explained by the employment pattern of physicians and other health professionals in Dutch nursing homes. In the Netherlands, medical nursing home care is provided by specifically trained nursing home medical specialists, who are, like all other health professionals (e.g., psychologists, physical therapists, speech therapists), employed by the nursing home (Huls et al., 2015). This might lead to a more coherent collaboration between professionals from different disciplines.

We were unable to demonstrate any relationship between total direct care staffing, adhocracy culture, hierarchy culture, or role model availability and staff-reported QoC. Also, in the study from Zúñiga et al. (2015), total direct care staffing levels were not associated with staff-reported QoC. This may indicate that staff satisfaction may not be improved by adding extra manpower. In a recent study conducted among Dutch hospital nurses (van Oostveen et al., 2015), nurses reported that they were more dissatisfied with their role than with the actual staffing levels, as they felt a lack of authority and autonomy in decision-making. Prior studies indicated that having autonomy within the workplace enhanced the care provided by nurses (McCabe et al., 2015; Suhonen et al., 2013). For example, in the study from McCabe et al. (2015), staff’s autonomy was associated with self-efficacy and confidence in working with aged care residents. The fact that we were unable to demonstrate a relationship between adhocracy as well as hierarchy culture and staff-reported QoC confirms the findings from van Beek and Gerritsen (2010). Also, role model availability was not significantly related to staff-reported QoC. One explanation for the lack of effect might be that we only distinguished between staff members that did or did not have a colleague they saw as role model for themselves, not considering,

for example, the extent to which staff members are actually motivated and inspired by their role model. In addition, in many cases, no registered nurses were working in the wards. Registered nurses may be more suitable as role models compared to certified nurse assistants.

The findings of this study should be interpreted carefully. Due to the cross-sectional design we could only assess associations and not imply any cause and effect relationships. Moreover, as the largest proportion of staff members consisted of certified nurse assistants and only a few registered nurses were working in the participating wards, we were unable to assess the relationship between the staff mix (i.e., percentage of registered nurses working in a ward) and staff-reported QoC. In some wards, no registered nurses completed the questionnaire, meaning that only the perspective of certified nurse assistants could be considered. Even though we provided ward managers with criteria for the selection of participating staff members (i.e., different educational background and years of experience), we cannot ensure that the staff members chosen by the ward managers were representative of all staff members that worked in a ward. Regarding staff-reported QoC as outcome variables of our study, a potential weakness may be that staff members interpret the concept of QoC differently based on their individual perceptions. In addition, especially the certified nurse assistants may be unable to recognize all QoC deficits in their wards. Due to the fact that only a few registered nurses participated, we were unable to test for differences in QoC reported by registered nurses and certified nurse assistants. However, Zúñiga et al. (2015) did not find differences in the ratings of registered nurses and nurse aides. A strength of the study was that we collected actual staffing data directly from the ward managers and all data were collected at the same point in time.

Our proposed theoretical model should further be refined in future longitudinal studies, considering work environment characteristics as potential mediators. Future studies could consider a combination of staff-reported QoC and clinical resident outcomes. Generating more evidence on which work environment characteristics actually lead to better QoC in nursing homes may help to improve QoC in future nursing homes, as this knowledge would enable ward managers to select better targeted improvement strategies. Our findings suggest that team climate may be an important factor ward managers should consider when trying to improve QoC in their wards.

Conflict of interest

None of the authors have any conflict of interest.

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