MASTER THESIS

Role conflicts and distress among surgical nurses associate to quality of contact with patients and their family: a multicentre cross-sectional study

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Summary

Role conflicts and distress among surgical nurses associate to quality of contact with patients and their family: a multicentre cross-sectional study

Background: After surgery, patients are often cared for by family caregivers in addition to nursing care. Involving family caregivers could prevent surgical complications and provide valuable outcomes for patients, such as decreased stress and pain levels. Family caregivers' increasing role during hospitalisation may intervene with the role of nurses, as both parties become involved into a patient's care. This could result into a lack of role clarity and may lead to role ambiguity, role conflict and distress among nurses.

Aim: To examine whether role conflict, role ambiguity, respect, distress, or trust in collaboration, due to interactions with family caregivers, associate (in)directly to nurses' quality of contact with patients and their family.

Methods: Between January and March 2020, a multicentre cross-sectional study was conducted and surgical nurses were asked to fill-out questionnaires anonymously in university (n=2), teaching (n=1) and peripheral (n=1) hospitals. The questionnaire recorded role conflicts, role ambiguity, respect, distress, trust in collaboration and quality of contact with patients and their family. Data were analysed using bivariate, multiple linear regression and mediation analyses.

Results: A total of 135 nurses completed the questionnaire. Most nurses were female (n=119,88%) and the median age in years was 26 (IQR=11). Multiple regression analyses revealed statistical significant associations between role conflict on quality of contact (B=3.62, p=0.02) and between distress on quality of contact (B=3.51, p=0.00). The mediation analysis revealed that role conflict associates indirectly with quality of contact through distress ($p<0.05$).

Conclusion: Role conflicts among nurses associate significantly with distress and quality of contact with patients and their family.

Recommendations: It is critical to address role conflicts that nurses might experience due to interactions with family caregivers, because such role conflicts could have an impact on the quality of care.

Keywords: role problems, family participation, nurses, surgery, cross-sectional study

Nederlandse samenvatting

Rolconflicten en stress onder chirurgisch verpleegkundigen associëren met kwaliteit van contact tussen verpleegkundigen, patiënten en hun familie: een multicenter cross-sectioneel onderzoek

Achtergrond Mantelzorgers worden vaak betrokken bij de zorg na een operatie. Het betrekken van mantelzorgers kan complicaties voorkómen en waardevol zijn voor patiënten omdat zij bijvoorbeeld minder angst en pijn ervaren. De toenemende rol van mantelzorgers in de zorg tijdens een ziekenhuisopname wringt mogelijk met de rol van verpleegkundigen. Deze onduidelijkheid in rollen kan leiden tot rol conflicten, rol ambiguïteit en stress resulterend in een verminderde kwaliteit van contact tussen verpleegkundigen, patiënten en hun familie.

Doel Onderzoeken of rol conflict, rol ambiguïteit, respect, stress, of vertrouwen in de samenwerking, vanwege interacties met mantelzorgers, (in)direct associëren met de kwaliteit van contact tussen verpleegkundigen, patiënten en hun familie.

Methode Een multicenter cross-sectionele studie werd uitgevoerd. Van januari tot maart 2020 vulden chirurgische verpleegkundigen in een academisch (n=2), topklinisch (n=1) en perifeer (n=1) ziekenhuis anoniem een vragenlijst in. De vragenlijst registreerde rol conflicten, rol ambiguïteit, respect, stress, vertrouwen in samenwerking en kwaliteit van contact met patiënten en hun familie. Data werd geanalyseerd met bivariate, multipele lineaire regressie en mediatie analyses.

Resultaten In totaal vulden 135 verpleegkundigen de vragenlijst in. De meeste verpleegkundigen waren vrouw (n=119, 88%) en de mediane leeftijd was 26 (IQR=11). Statistisch significante associaties werden gevonden tussen rol conflict op kwaliteit van contact (B=3.62, p=0.02) en stress op kwaliteit van contact (B=3.51, p=0.00). Uit de mediatieanalyse kwam naar voren dat rolconflicten indirect geassocieerd zijn met kwaliteit van contact via stress ($p<0.05$).

Conclusie Rol conflicten associëren met stress en kwaliteit van contact tussen verpleegkundigen, patiënten en hun familie.

Aanbevelingen Het is cruciaal om rol conflicten aan te pakken die verpleegkundigen kunnen ervaren, vanwege interacties met mantelzorgers, omdat dergelijke rolconflicten een impact kunnen hebben op de kwaliteit van zorg.

Keywords rol problemen, familie participatie, verpleegkundigen, chirurgie, cross-sectioneel

Introduction

Worldwide, over 310 million surgical procedures are performed each year[1]. For patients, surgical procedures often involve a substantial loss of physical, emotional and social capacity[2]. Although patients' recovery start immediately after surgery, full recovery to the preoperative state of well-being may take weeks or sometimes even months[3,4]. Likewise, discharge from the hospital is not synonymous with full recovery[5]. After surgery, patients are often cared for by family caregivers in addition to nursing care. However, family caregivers are generally not actively involved in caring for their loved-one during hospitalisation and do often feel not well-trained and self-confident to provide care[6,7].

In addition to this, it is widely known that all surgical procedures have potential complications, e.g. delirium, pneumonia, pressure ulcers and malnutrition[7–9]. Some of these complications are believed to be preventable by adequately performing basic care activities, for example personal hygiene, feeding, dressing and ambulating[8,9]. The risk of complications may be reduced when family caregivers are involved into a patient's care during hospitalisation[10]. Furthermore, involving family caregivers demonstrated several positive outcomes related to the patient, e.g. improved satisfaction and knowledge, reduced pain levels and decreased stress and anxiety[11–14].

Due to these positive outcomes, family caregivers are encouraged to become involved into a patient's care during hospitalisation[11]. Nonetheless, nurses can experience involving and guiding family caregivers as an additional responsibility while providing patient care[10]. Nurses' busyness during work activities may hamper them from using a patient and family-centred approach in which nurses also recognise the added value of family participation during hospitalisation. Furthermore, some nurses feel that they have insufficient knowledge on how to involve a family caregiver, and have a fear of losing authority when family caregivers are involved[15–19]. Family caregivers' increasing role during hospitalisation may intervene with the role of nurses, as both parties become involved into patients' care[16]. This could result in a lack of role clarity during work activities which may lead to role ambiguity and role conflicts among nurses[20]. Role ambiguity concerns uncertainty about task performance, while role conflicts relate to having conflicting responsibilities[20]. The presence of role ambiguity and role conflict might lead to job dissatisfaction, emotional exhaustion, feelings of job-related strain and distress[20–22]. Distress seems to influence work productivity, patient safety and quality of healthcare adversely[23,24]. Upon now, it has not yet been investigated whether these hindering factors i.e. role problems (role conflict and role ambiguity) and distress among nurses, due to interactions with family caregivers, contribute to impaired quality of contact with patients and their family.

In addition to this, it is important to achieve a wider understanding in the factors that contribute to the collaboration and interactions between family caregivers and nurses. One of these factors could be respect received from family caregivers. Respect refers to the feeling of being valued, which is important to nurses as feeling respected relate to increased work satisfaction, self-esteem and self-worth[25,26]. Respect is considered to improve trust in collaboration, to enhance information transition, to stimulate a positive relationship between nurse and family caregiver, and to potentially affect quality of contact between nurses and family caregivers positively[27].

Therefore, this study focuses on role problems, distress, respect and trust in collaboration, that nurses may experience, due to interactions with family caregivers, and their associations with nurses' quality of contact with patients and their family. By addressing potential hindering and contributing factors, this study develops insights relevant for improving quality of contact between nurses, patients and their family.

Aim

The aim of this research was to examine among nurses whether 1) role conflict, or 2) role ambiguity, or 3) respect received from family caregivers, or 4) distress, or 5) trust in collaboration, due to interactions with family caregivers during work activities, associate (in)directly with nurses' quality of contact with patients and their family (see Figure 1).

Method

This study is reported according to applicable criteria of the STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) Statement: guidelines for reporting cross-sectional studies[28].

Design and population

A multicentre cross-sectional survey was conducted with a convenience sample of surgical nurses from four hospitals, i.e. two academic medical centres, one teaching and one peripheral hospital, in the Netherlands between January and March 2020. To be eligible, all nurses needed to work on a surgical ward, were able to proficiently speak and read Dutch and had contact with patient's family caregivers during work activities. The sample consisted of nurses with qualification level 4 or 6 on the European Qualifications Framework.

Data collection

Nurses received during their shift, the hardcopy questionnaire with a cover letter that provided general information about the study and its purpose. We chose for hardcopy questionnaires because of the higher response rate among healthcare professionals compared to online questionnaires[29,30]. It took approximately five to ten minutes to complete the questionnaire and a reminder by mail or in person was sent twice with a 2-3 week interval. After completing the questionnaire, the nurses put the questionnaire in an answer box anonymously or handed them over directly to one of the researchers (MS).

Instruments

Nurses' sociodemographic and professional characteristics e.g. gender, age, work experience, were obtained. We used a validated questionnaire to measure six different variables i.e. dependent variable 1) nurses' quality of contact with patients and their family, and independent variables 2) role ambiguity, 3) role conflict, 4) respect received from family caregivers, and potential mediating variables 5) distress and 6) trust in collaboration. See Appendix 1 for relevant background information and item-wording adjustments of all scales to make the scales more relevant to the context of this study.

Nurses' quality of contact with patients and their family

Nurses' quality of contact with patients and their family (in short: *quality of contact*) was measured using the 8-item scale 'Impaired contact with patients and their family', with α = 0.81, derived from the Nurses Work Functioning Questionnaire (NWFQ)[31]. The scale was scored on three 7-point Likert scales ranging from 'no difficulty' (= 1) to 'great difficulty' (= 7), from 'never' (= 1) to 'always' (= 7) and from 'not once' (= 1) to 'more than one time per day' (= 7)[31]. Items 1, 2, 3, 4 were reversed scored and a higher standardised sum score indicated a higher impaired quality of contact. The range of the standardized sum score is 0-100[31]. We added in item-wording the term '*family'* in three of the eight items (see Appendix 1).

Role conflict and role ambiguity

Role conflict and role ambiguity were respectively measured using the 3-item and 4-item scales derived from the 'VOS-D: Questionnaire on Organisational Stress-D', with α = 0.69 for role conflict and α = 0.66 for role ambiguity[32]. Each item in both scales was scored on a 5-point Likert scale ranging from 'always' (= 1) to 'never' (= 5) and from 'very precise' (= 1) to 'not precise at all' (= 5)[32]. All items on the role conflict scale were reverse scored. A higher mean score indicated a higher level of role conflict and role ambiguity. We added a specific answer heading and replaced in item-wording the term '*supervisor'* with *'family caregiver'* (see Appendix 1).

Respect received from family caregivers

Respect received from family caregivers (in short: *respect)* was measured using the 4-item instrument 'Respect', with Cronbach's Alpha between $0.86 \leq \alpha \leq 0.97$. Items were scored on a 7-point Likert scale from 'totally disagree' (= 1) to 'totally agree' (= 7)[26]. A higher mean score indicated a higher level of respect. We replaced in item-wording the term *'coordinator'* with *'family caregiver'* and the term *'as a volunteer'* to *'as a nurse'* (see Appendix 1).

Distress

Distress was recorded with the 6-item 'Stress Energy Questionnaire', with calculated Person Seperation Index (PSI) as reliability coefficient with PSI of 0.87. Items were scored on a 7-point Likert scale from 'totally disagree' (= 1) to 'totally agree' (= 7)[33]. Items 4, 5, 6 were

reversed scored and a higher mean score indicated a higher level of distress. No item-wording adjustments were made (see Appendix 1).

Trust in collaboration

Trust in collaboration was derived from the 4-item instrument 'Trust in team members', with α > 0.70[34]. Items were scored on a 7-point Likert scale from 'totally disagree' (= 1) to 'totally agree' (= 7)[34]. A higher mean score indicated a higher level of trust in collaboration. We replaced in item-wording the term '*team member'* with *'family caregivers of patients'* (see Appendix 1).

Analysis

Data handling

Data entry and analysis were conducted using the IBM SPSS statistics software version 26 for Windows[35]. Due to the minor adjustments we made to adapt the scales to the specific context of the research, we verified the internal consistency by recalculating Cronbach's Alpha for all six scales to indicate scale reliability, after we recoded the negative worded items in three scales (i.e. role conflict, distress and quality of contact). After this, we calculated mean scale scores for all scales to prepare the data for further analyses. Missing data were handled by using listwise deletion (complete case analysis).

Sociodemographic and professional characteristics

Descriptive analyses were used to summarize sociodemographic and professional characteristics of the nurses. Continuous normal distributed variables were presented as mean and standard deviation and non-normal distributed variables were presented as median and interquartile range (IQR). For categorical variables, data were presented as frequencies and proportions.

Statistical analyses

First, an association matrix was construed containing the associations between variables to determine whether a possible relationship between two variables was present and if so, how strong this relationship was. According to Cohen (1988) an absolute value of r between 0 to 0.3 (or 0 to -0.3) was classified as small, an absolute value of 0.3 to 0.5 (or -0.3 to -0.5) was

classified as medium and of 0.5 to 1 (or -0.5 to -1) was classified as large[37]. Associations with a p-value equal or less than 0.05 were considered to be statistically significant.

After this, we verified if the assumptions for linear regression analyses were met by assessing linearity, homoscedasticity, multicollinearity and the normal distribution of all variables. The following two multiple linear regression analyses according to enter method with bootstrap procedures (N=5000) were used to gain an in-depth insight in and to investigate the significant associations between independent (role conflict, role ambiguity and respect), mediating (distress and trust in collaboration) and dependent (quality of contact) variables. First, role ambiguity, role conflict and respect were entered into a model with quality of contact. Second, distress and trust in collaboration were entered into a model with quality of contact. For both analyses, we considered a two sided p-value equal or less than 0.05 to be statistically significant. R^2 indicated which part of the total variance in the dependent variable was explained by the regression model.

Finally, we determined whether and to what extent distress or trust in collaboration mediated the association between one of the independent variables and the dependent variable, using model four (single mediation) of Andrew Hayes' PROCESS macro for SPSS which used bootstrapping resamples (N=5000) and generated a 95% confidence interval (95%-CI)[39,40]. Mediation analyses were only performed when both the a-path (independent variable on mediating variable) and the b-path (mediating variable on dependent variable) were significant in multiple regression analyses (see Appendix 2)[41]. The mediating effect (in %) of the relation between independent variable on dependent variable was calculated.

Ethical approval

Institutional Review Board (University of Amsterdam) approval was obtained with a waiver of consent (protocol no. W19_477 #19.551). The study was conducted according to the principles of the Declaration of Helsinki (version 7, 2013) and in accordance with the Medical Research Involving Human Subjects Act. Nurses provided informed consent by reading the cover letter and answering the following statement included in the questionnaire with 'yes': *'I give permission to use my data for this research. The data is processed anonymously.'* When nurses did not answer or answered 'no' on this statement, the questionnaire was excluded in analyses.

Results

Initially, 280 nurses received the questionnaire. Of these, 135 responded, resulting in a response rate of 48%. Eight nurses (6%) were excluded, due to incomplete questionnaires, resulting in 127 nurses that formed the data set reported and analysed below.

Socio-demographic and professional characteristics

The characteristics of the nurses are presented in Table 1. Most nurses were female (n=119, 88%) and the median age in years was 26 (IQR=11). The main group participating in this study were general nurses (n =79, 58%), followed by senior nurses (n=34, 25%) and student nurses (n=13, 10%). Most nurses worked in a teaching hospital (n=52, 38%) and 44 (33%) and 39 (29%) nurses worked in an academic or peripheral hospital. Eighty-one nurses (60%) had experience with family caregiving in personal life. Seventy nurses (52%) stated they had at least regularly contact with family caregivers during work activities.

Reliability of the scales

An overview of the Cronbach Alpha's per scale are presented in Table 2. 'Trust in team members' and 'Impaired contact with patients and their family' had a recalculated reliability coefficient of $\alpha = 0.58$ and $\alpha = 0.69$, respectively, whereby the original reliability coefficients for these scales were 0.70 and 0.81, respectively[42]. The recalculated Cronbach Alpha's for variables role conflict, role ambiguity, distress and respect showed reliability coefficients between $0.69 \leq \alpha \leq 0.92$, which correspond to the original scales[42].

Analyses

Identify associating variables

Concerning bivariate analyses, significant positive associations were found between role conflict, role ambiguity and distress on quality of contact (see Table 3). A significant negative association was found between trust in collaboration and quality of contact. Respect was positively associated with trust in collaboration and role conflict was negatively associated with trust in collaboration (both $p<0.01$). Role conflict was strongly and positively associated with distress ($p<0.01$). All of the significant associations showed small to medium associations ranging between 0.18 – 0.35.

Associating variables on quality of contact

Concerning multiple linear regression analyses, the assumptions were not violated. Statistical significant associations were found between role conflict and quality of contact (B=3.62, p=0.02) and between distress and quality of contact (B=3.51, p=0.00) (see Table 4). Role conflict and distress explained 10% and 14% of the variance on quality of contact, respectively.

Distress as mediator

Concerning the mediation analysis, role conflict and distress were the only variables significantly associated to quality of contact. Multiple linear regression analysis (see Table 4) confirmed a significant association between role conflict and distress (B=0.44, p=0.00). Therefore, we performed a mediation analysis for these variables only (see Table 5). The total effect on role conflict and quality of contact was significant (effect=4.20, 95%-CI=1.61, 6.79). In addition, the direct effect on role conflict and quality of contact was significant (effect=2.80, 95%-CI=0.17, 5.43). Furthermore, the indirect effect on role conflict and quality of contact was significantly mediated by distress (effect=1.40, 95%-CI=0.54, 2.51). This indicates that the association between role conflict and quality of contact is partially mediated by distress for 33% (1.40 / 4.20 * 100).

Discussion

This study showed that role conflict, role ambiguity, distress and trust in collaboration associate directly to quality of contact. Only respect did not show a significant association. The findings of the study suggest that role conflict and distress are important variables associating to an impaired quality of contact. Furthermore, a significant mediating role of distress in the relation between role conflict and impaired quality of contact was found.

Comparison to other studies and practical contributions

Upon now, previous research focused on role conflicts and role ambiguity among nurses in relation to increased distress and decreased job satisfaction[43–45]. Partially similar results were found on the significant relationship between role problems on distress. One study did show insignificant results for role conflict on distress and significant results for role ambiguity on distress, which are in contrast with our findings[44]. Furthermore, earlier research focusing on the attitudes of nurses towards active involvement of family caregivers during hospitalisation showed fairly positive results towards the presence of family caregivers during work activities, job satisfaction and distress[46]. These results are in contrast with our findings where distress among nurses associates significantly to impaired quality of contact. Thus, role problems in the context of nursing have been addressed previously by researchers and the current findings are in line with earlier work because it is found that role conflicts associate with important outcomes in the context of nursing. But beyond this previous work, the current research is the first to address associations on the quality of contact between nurses, patients and their family and as such represents a contribution to the literature. The theoretical contribution of this research may provide the valuable insight that especially role conflicts associate to impaired quality of contact mediated by distress. Practical contributions for this may include that nursing managers should provide nurses with role clarity and emphasize what is and what is not expected of nurses with regard to contact with family caregivers of patients[47].

Strengths and limitations

Our study has some limitations. First, the questionnaire was slightly adapted, mainly in the wording of some questions to make the scales more relevant to the specific context of this study. The questionnaire was not pilot tested, which would have permitted us to make some small improvements in the questionnaire to facilitate the understanding of participants[48]. However, it were existing and validated questionnaires which were already used in other studies. Besides, we recalculated the internal consistency of all scales, and only two scales

showed a fairly lower reliability compared to the original scales[42]. Furthermore, we used convenience sampling, which possibly provoked a biased study sample[49]. Non-respondents may represent nurses with less interest towards this subject. In addition, slightly over half of the sample of nurses stated to have at least regular contact with family caregivers. It is conceivable that role problems arise due to a lack of experience with family caregivers during working activities. Lastly, this study is an association study and no cause-effect relations have been examined. It cannot be concluded, within the scope of this study, whether the variables actually lead to an impaired or improved quality of contact. While the current research could not establish causality, the idea that role conflicts influence distress and quality of contact as outcomes are in line with role theory and previous work on effects of role conflict. Further, the current research represented a first step into this new area of research, in the light of its findings researchers are now encouraged to conduct studies with a more robust design to examine whether role conflicts have causal effects on distress and impaired quality of contact. A strength of the study is that we strove to accomplish generalisability as much as possible due to the multicentre character of this study, the homogeneous sample of surgical nurses and the response rate of 48%.

Implications for clinical practice and suggestions for further research

Findings of this study may have several implications for clinical practice. First, it is important to gain attention to the increasing role of family caregivers during hospitalisation[53]. Active involvement of family caregivers, as part of patient and family centred care (PFCC) has been increasing over the past few years[54]. The PFCC approach is encouraged and advocated across various healthcare settings and emphasizes patients and their family caregivers as crucial partners throughout the entire process of healthcare[11,54]. Therefore, nurses should be trained in their interaction and communication skills with family caregivers during work activities e.g. using education programs. Furthermore, hospital policy makers should consider how role conflicts among nurses could be decreased. This may involve initiating education programs to increase role clarity and minimize role conflicts in order to reduce distress[55]. Besides, formulating transparent working agreements, to define clear tasks and to determine who is responsible for which task, are important to create role clarity. In the long-term care and home care setting, clear agreements to improve collaboration between healthcare professionals, patients and families are already widely implemented by using e.g. mobile applications or (online) training instruments[56–58]. A suggestion for future research is to analyse the socio-demographic and professional characteristics of the sample of nurses in relation to one of the five variables or dependent variable quality of contact. Earlier research showed that

nurses' attitude towards active involvement of family caregivers depends on age, educational background and work experience[46]. Younger, less experienced nurses were found to have a less positive attitude and often indicated the families of patients as burdens, in contrast to their older, more experienced colleagues[46,51,52]. Our study represents a fairly young and unexperienced sample of nurses, therefore, these characteristics may augment nurses' impaired quality of contact. Furthermore, no actual behaviour observations were measured in this study, but only self-reporting questionnaires were analysed. It should be investigated whether role conflicts, role ambiguity, distress, respect and trust in collaboration also associate with actual behaviour of nurses with regard to quality of contact.

In conclusion, it seems critical to address role conflicts that nurses might experience, due to interactions with family caregivers, because such role conflicts could have an impact on the quality of care. Further research to examine cause-effect relationships and education programs to increase role clarity are needed to address role problems and distress in order to improve quality of contact.

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Tables and figures

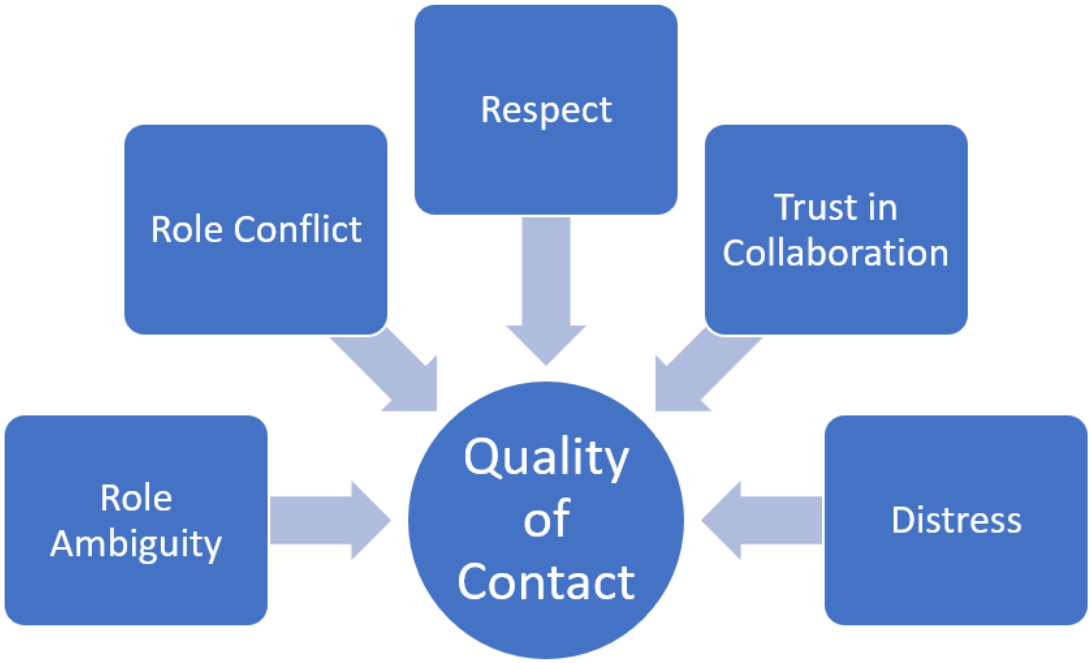


Figure 1 Model

Table 1 Sociodemographic and professional characteristics

Variables (N=135)		
Age (median (IQR))	26 (11)	
Missing n = 1		
Gender (n, %)		
• Female	119	88
Hospital (n, %)		
• Academic	44	33
• Teaching	52	38
• Peripheral	39	29
Current function (n, %)		
• Senior nurse* (registered)	34	25
• Nurse (registered)	79	58
• Student	13	10
• Other	9	7
Contractual working hours per week (median (IQR))	32 (4)	
Work experience in total (in years) (median (IQR))	4 (10)	
Work experience on current ward (in years) (median (IQR))	2 (7)	
Missing n = 2		
Experience with family caregivers during work activities (n, %)		
• Rarely	16	12
• Now and then	47	35
• Regularly	38	28
• Often	24	18
• Very often	8	6
• Missing	2	1.5
Experience with a family caregiver program (n, %)		
• Yes	25	18.5
• No	108	80
• Missing	2	1.5
Experience with family caregivers in personal life (n, %)		
• Yes	81	60
• No	52	38.5
• Missing	2	1.5

** Senior nurse is a general nurse with advanced tasks, e.g. to secure quality of care, to provide transcending care, to coach colleagues*
IQR = interquartile range

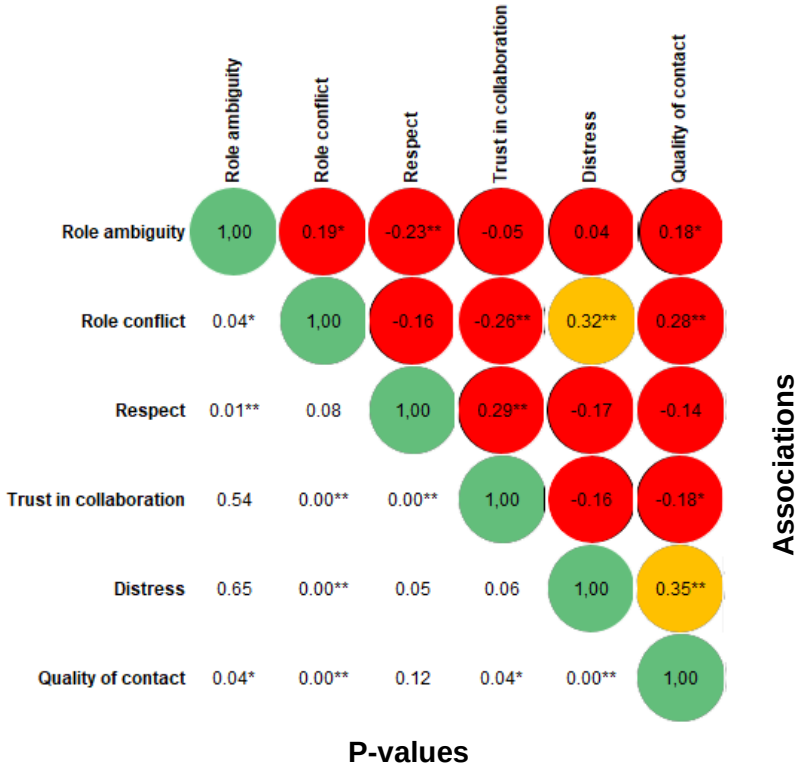
Table 2 Cronbach Alpha's per scale*

Variable	*Scale*	*Original Cronbach Alpha in scale*	*Cronbach Alpha after minor adjustments*
Quality of contact	'Impaired contact with patients and their family' from NWFQ[31]	α = 0.81	α = 0.69
Role Ambiguity	VOS-D: Questionnaire on Organisational Stress-D[32]	α = 0.66	α = 0.74
Role Conflict	VOS-D: Questionnaire on Organisational Stress-D[32]	α = 0.69	α = 0.69
Respect	Respect[26]	$0.86 \leq \alpha \leq 0.97$	α = 0.92
Trust in collaboration	Trust in team members[34]	α > 0.70	α = 0.58
Distress	Stress-Energy Questionnaire[33]	0.87 (PSI)	α = 0.87

** Cronbach's alpha (α) is a measure used to assess the reliability, or internal consistency, of a set of scale or test items[59].*

PSI = Person Separation Index

Table 3 Association matrix



*Association is significant at the 0.05 level.

** Association is significant at the 0.01 level.

Green = large association (absolute value of r between 0.5 to 1 / -0.5 to -1).

Orange = medium association (absolute value of r between 0.3 to 0.5 / -0.3 to -0.5).

Red = small association (absolute value of r between 0 to 0.3 / 0 to -0.3).

Table 4 Multiple linear regression analyses

Variable	*Coefficient*	*SE*	*p-value*	*95%-CI Lower bound*	*95%-CI Upper bound*	*R^2*
Quality of contact						0.10
(Constant)	31.15	10.38	0.00*	11.22	51.72	
Role ambiguity	2.32	1.45	0.11	-0.55	5.22	
Role conflict	3.62	1.48	0.02*	0.76	6.58	
Respect	-1.20	1.36	0.37	-3.89	1.39	
Quality of contact						0.14
(Constant)	34.29	5.62	0.00*	23.53	45.79	
Trust in collaboration	-1.59	1.10	0.15	-3.78	0.49	
Distress	3.51	0.83	0.00*	1.89	5.18	
Distress						0.12
(Constant)	3.61	0.90	0.00*	1.87	5.47	
Role ambiguity	-0.08	0.14	0.58	-0.34	0.20	
Role conflict	0.44	0.12	0.00*	0.21	0.68	
Respect	-0.21	0.12	0.08	-0.45	0.02	

* p-value is < 0.05.

Table 5 Total, direct and indirect effects of role conflict on quality of contact.

Variables	***Total effect (c)***	***Direct effect (c')***	***Indirect effect (ab)***	***Completely standardized indirect effect***
	Effect (LLCI - ULCI)	Effect (LLCI - ULCI)	Effect (LLCI - ULCI)	Effect (LLCI - ULCI)
Quality of contact				
Distress	4.20* (1.61 – 6.79)	2.80* (0.17 – 5.43)	1.40* (0.54 – 2.51)	0.09* (0.04 – 0.16)

* p-value is < 0.05.

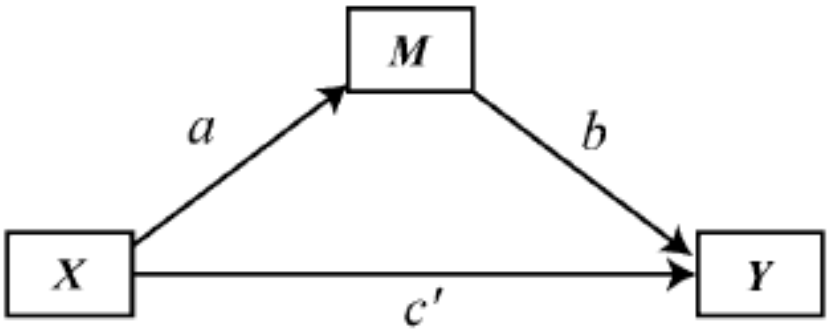
Appendices

Appendix 1

Relevant background information and adjustments per scale.

Variable	***Scale***	***Year***	***Authors***	***Original validated population***	***Cronbach's Alpha or PSI***	***Adjustments of scales***
Nurses' quality of contact with patients and their family	'Impaired contact with patients and their family' from NWFQ[31]	2011	Gärtner, Niewenhuijsen, van Dijk and Sluiter	Nurses	α = 0.81	The term '*family'* was added in three of the eight items to make the scale more relevant to the specific context of this study. For example '*family'* was added in the phrase: I do not succeed in listening well to my patients and family.
Role ambiguity	Vragenlijst Organisatie Stress-Doetinchem: VOS-D[32]	1986	Bergers, Marcellissen and de Wolff	Nurses	α = 0.66	We added a specific answer heading i.e. *'Concerning family caregivers during work activities,…*'. For example: 'Concerning family caregivers during work activities, do you ever receive conflicting assignments?' Another question in the original scale was formulated as followed: 'Do you know exactly how your *supervisor* feels about your performance?' The term '*supervisor'* was replaced with '*family caregiver'*.
Role conflict	Vragenlijst Organisatie Stress-Doetinchem: VOS-D[32]	1986	Bergers, Marcellissen and de Wolff	Nurses	α = 0.69	
Respect received from family caregivers	Respect[26]	2014	Boezeman and Ellemers	Volunteer workers	0.86 ≤ α ≤ 0.97	To record whether nurses feel respected by the family caregivers of patients, we replaced in the item-wording the term '*coordinator'* with '*family caregiver'* and the term '*as a volunteer*' to '*as a nurse'*. For example: 'My *coordinator* values my contribution *as a volunteer'* into 'The *family caregiver* values my contribution *as a nurse'*.
Distress	Stress-Energy Questionnaire[33]	2005	Hadzibajramovic, Ahlborg jr, Grimby-Ekman and Lundgren-Nilsson	Public healthcare organisation and social insurance office workers	PSI = 0.87	No adaptations were made.
Trust in collaboration	Trust in team members[34]	2005	Schippers, den Hartog and Koopman	Team members	α > 0.70	We replaced the term '*team member*' with '*family caregivers of patients'* in the item-wordings. Nurses and family caregivers of patients are not formal team members of each other, hence the adaptation is necessary to make the scale relevant to the context of this research.

Appendix 2



Single mediation model[41]

X = independent variable
M = mediator variable
Y = dependent variable

Explanation of model:

c' = c'-path (X on Y) → direct effect.

a = a-path (X on M)

b = b-path (M on Y)

ab-path (X via M via Y) → indirect effect