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RESEARCH ARTICLE

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How do nurses and physicians assess inter-professional collaboration in long-term care homes? A survey study

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Abstract

Aims: To assess inter-professional collaboration between nurses and physicians in long-term care facilities and to determine if there are differences between subgroups of nurses.

Design: A cross-sectional questionnaire survey was carried out between January 2018 and January 2020.

Methods: 408 health professionals (345 nurses, 63 physicians) from 37 nursing homes in Baden-Wuerttemberg (Germany) participated in the survey. For data collection, the "Team-Scale" and "Work Situation Questionnaire for nurses/physicians" instruments were used. Furthermore, five self-generated items were employed assessing how ward rounds and documentation are implemented. For the evaluation, descriptive analyses, one-way variance analyses (ANOVAs) and a multilevel analysis were performed.

Results: Inter-professional teamwork was rated positively overall. However, the nursing staff usually gave more critical assessments than the physicians (for example, regarding mutual appreciation). Critical assessments could be used to initiate constructive change processes.

KEYWORDS
communication, long-term care, multiprofessional practice, nurse-physician relationship, nursing home residents, teamwork

1 | INTRODUCTION

Good collaboration in healthcare is essential in order to achieve the common goal of safe and high-quality patient care (Reeves et al., 2017). It requires the active contributions of the involved health professionals (Schot et al., 2020). Collaboration in healthcare includes, on the one hand, that different medical professions assume complementary roles and work together in order to address the needs of the patient (O'Daniel & Rosenstein, 2008), but it also means integrating different perspectives, respecting and trusting each other (D'Amour et al., 2005).

The positive effects of good collaboration are well documented in nursing homes for the elderly. Care there is mostly provided by nurses or their aides and physicians, respectively. Good collaboration between these occupational groups shows positive effects on various outcomes such as appropriate medication use, or a reduction in falls (Nazir et al., 2013), and it also contributes to the prevention of avoidable hospital admissions and ambulance

Clinical Trial Registration Number: Trial registration: WHO UTN: U1111-1196–6611; DRKS-ID: DRKS00012703

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transportation (Ouslander et al., 2011). This is relevant because hospital admissions are not just burdensome for nursing home residents and their relatives, but are also costly and might be associated with complications.

However, it is not only patients who benefit from good collaboration, but also the staff. Working in elderly care involves some quite specific aspects that contribute to job satisfaction, for example long-term relationships with the residents, a holistic view of the resident, and relatively independent work (Carlson et al., 2014). Beyond that, studies with leading nurses show that also factors such as satisfaction with communication or organizational support contribute to job satisfaction (Laschinger et al., 2008). In contrast, lack of personal, emotional, and strategic support can lead to nurse turnover (Skytt et al., 2007). Job satisfaction is important because it is a key factor in keeping nurses in their jobs (Hayes et al., 2006; Lu et al., 2019). Moreover, a collaboration characterized by mutual appreciation and recognition is known to be an important interpersonal component of a balanced relationship between effort and reward at work (Siegrist, 2005). Such a balance is crucial because long-term exposure to an effort-reward imbalance is associated with higher risks of stress-related illnesses for the employees (de Jonge et al., 2000).

A well-functioning inter-professional collaboration can be encouraged or hindered by numerous factors, for example exchange of information or the perceived appreciation of one's own work by the other occupational group (Meyer-Kühling et al., 2015). However, perceptions might vary considerably between and even within occupational groups and can therefore lead to varying assessments of collaboration (O'Leary et al., 2010). Knowing which factors of inter-professional collaboration in nursing homes are perceived as particularly problematic, and by whom, allows the addressing of targeted interventions to improve collaboration and is therefore of great interest.

2 | BACKGROUND

The focus of our study was to investigate the inter-professional collaboration between nurses and physicians in long-term care facilities. The study was conducted in a sample of nursing homes in Southern Germany.

Due to the specific features of the German health system, an adequate collaboration between nurses and physicians is especially essential here. Medical care in German nursing homes differs from many other countries because in Germany, nurses are solely in charge of basic care (like assistance with personal hygiene, mobilization, etc.), but medication or medical treatments must be prescribed or delegated by a physician (Müller et al., 2018). This is because unlike in many other countries where nurses complete degree-level study programs or a bachelor's degree (Hämel & Vössing, 2017), nurses in Germany only complete 3-year vocational training, and their degree in nursing does not correspond to an academic degree (Meyer, 2015). There are no nurse practitioners in the German health care system. Instead, the medical care of nursing home residents is provided by general practitioners and specialized physicians. Regular visits by physicians in nursing homes and good communication between nurses and physicians are therefore required, in order to provide nursing home residents with sufficient medical care.

Another specific detail of nursing care in Germany, which is mentioned here for a better understanding of our study is that until January 2020, there used to be separate vocational training courses for general nursing and geriatric care (Bruns, 2017), whereas in other countries like the US, nurses can specialize in geriatric care after completing a registered nursing program (American Geriatrics Society, 2021). Despite these specialized vocational training courses, both general nurses and geriatric nurses are employed in German nursing homes.

From a previous study dealing with expectations, communication and collaboration in nursing homes (Meyer-Kühling et al., 2015), it is known that nursing staff assessed the collaboration more negatively and felt less valued compared to physicians. Another study conducted in hospitals also reports that nurses assess these aspects more negatively than physicians (Dinius et al., 2020). This is alarming because a good and respectful relationship between physicians and nurses can contribute to higher job satisfaction and higher job retention for nurses (Galletta et al., 2013) which, in turn, leads to better patient care (Koy et al., 2015).

In our study, we wanted to obtain more differentiated data about the nurse-physician collaboration in long-term care facilities. We, therefore, used additional tools and questions to take a closer look at various aspects of collaboration and to identify differences between subgroups.

3 | THE STUDY

3.1 | Aims

The aim of the study was to explore how nurses and physicians assess their inter-professional collaboration in long-term care facilities for the elderly and to determine which factors predict the assessment of collaboration. Our research questions were: How are specific aspects of collaboration between nurses and physicians in long-term care facilities assessed by these two professional groups? Are there any differences between and within groups?

Various aspects of teamwork were taken into account in order to obtain a differentiated view of positive and negative factors. In addition, the nursing staff was asked questions about which training they had completed, the number of years they have worked in the facility, the hierarchical position (management position or not) and the shifts usually completed (day and/or night shifts). These aspects did not apply to the physicians, as a university degree in medicine is a prerequisite for all physicians, and all surveyed physicians worked in outpatient practices, that is they were not employed in the nursing homes. It was an exploratory study, and no specific hypotheses regarding group differences were formulated a priori.

3.2 | Design

A cross-sectional questionnaire survey was carried out. The paper-pencil survey was sent by post and included a pre-franked return envelope, the questionnaire was in German. The study was part of a larger project entitled "CoCare – coordinated medical care" (Trial registration: WHO UTN: U1111-1196–6611; DRKS-ID: DRKS00012703), whose design is described in detail in our study protocol (Brühmann et al., 2019). The purpose of CoCare is to evaluate a complex intervention aiming to improve the coordination of medical care in long-term care nursing homes in Germany. Among other things, measures are taken to improve the flow of information and to promote the collaboration between general practitioners, specialists and nursing staff. The survey was conducted pre-intervention (t0).

3.3 | Participants

Questionnaires were sent to 37 consecutively recruited long-term care facilities for the elderly of the intervention group of the CoCare project. Nursing homes for the intervention group were recruited in all administrative districts of Baden-Wuerttemberg (area of the intervention group), Germany, except the administrative district of Tuebingen (area of the control group). All the nursing homes in Baden-Wuerttemberg had the opportunity to participate in the CoCare project and were able to voluntarily decide to participate. In the intervention group, 1,220 long-term care facilities were invited to participate in the intervention.

The questionnaires were sent to the nursing staff as well as the physicians who care for the nursing home residents and participate in the CoCare project intervention group. Participation in the survey was voluntary.

3.4 | Data collection

We compiled a questionnaire consisting of four parts. Part one of the questionnaire comprised a six-item questionnaire for evaluating inter-professional teamwork called the "Team Scale" (Körner & Wirtz, 2013). It assesses the relevant determinants of teamwork (communication, coordination, cooperation, respect, agreements and climate). Items were adjusted linguistically to the target group (e.g. using the term "nursing home" instead of "hospital" in the original version). Part two contained six items from the "Work Situation Questionnaire for nurses/physicians" (Fischbeck & Laubach, 2005). These questions also cover aspects of inter-professional communication and collaboration but put special emphasis on mutual appreciation. These items were also slightly adjusted (e.g. using the term "resident" instead of "patient"). In part three, we designed five items that should assess how ward rounds and documentation are implemented. Ward rounds and documentation are occasions where good collaboration is required; therefore, we were interested in how their implementation is assessed.

In part four, some socio-demographic data were collected for all the participants (age, gender, profession), and for the nurses, the following aspects were also surveyed: Type of training (geriatric care/general nursing/paediatric care/other), number of years in the facility (<2 years/2–5 years/6–10 years/11–15 years/longer than 15 years), hierarchical position (no leading position/middle management level/upper management level), and type of shift in which most work is done (day shift/night shift/day and night shift alternating).

Our pre-intervention survey took place in the period January 2018 to January 2020. This period was relatively long because recruitment was spread over that period of time and long-term care facilities were consecutively included in the study.

3.5 | Ethical considerations

A comprehensive data protection concept was developed for the CoCare study and approved by the university's data protection officer. Ethics approval for the CoCare study was obtained by the university's ethics committee (Reference number: 333/17; 03.08.2017) and the Chamber of Physicians (Reference number: B-F-2017–127; 14.11.2017).

Each of the addressed nurses and physicians was able to voluntarily decide whether to participate in the study. Neither through participation nor through non-participation did any disadvantages arise. Each participant of the survey signed an informed consent.

3.6 | Data analysis

The "Team-Scale" (Körner & Wirtz, 2013) comprises a total of six Likert-scaled items with a value range of 1–4. Each answer option is labelled (does not apply at all/rather does not apply/rather applies/completely applies). The "Work Situation Questionnaire" (Fischbeck & Laubach, 2005) comprises a total of six Likert-scaled items with a value range of 1–6. Low values stand for positive/functional descriptions and high values for negative/dysfunctional descriptions. The answer labels are not the same for all the questions. For the analyses, all the answers to the "Work Situation Questionnaire" were reversed for better interpretation so that high values represent positive/functional descriptions. The scale with the self-generated items assessing how ward rounds and documentation are implemented (e.g. "The implementation of the ward rounds in this nursing home is going…") includes five Likert-scaled items with a range of 1–6 (labels of the levels: excellent/very well/well/satisfactory/badly/very badly). Here, too, the scale was reversed for the analyses, so that high values have a positive/functional meaning.

Descriptive analyses were performed using the metrics frequencies, means, and standard deviations. Group comparisons between physicians and nurses were performed by one-way variance analyses (ANOVA). Sum scores were calculated for all three scales, including values from participants with a maximum of one missing value

per scale. Descriptive analyses, ANOVAs and sum scores were calculated with IBM SPSS Statistics 26. In addition, we computed effect sizes according to Cohen's d using Microsoft Excel 2010.

Moreover, multilevel analysis was performed using R-package lme4 (Bates et al., 2015). A multilevel analysis was performed because we used clustered data due to the nurses' and physicians' survey from different nursing homes. As we repeatedly sampled from the same nursing homes, this violates the assumption that observations are independent of each other. Multilevel models add extra parameters that control for this clustering. Due to the small number of cases among physicians, this analysis was carried out only for nurses. In addition, some of the physicians were in charge of several nursing homes, and from several nursing homes, no data from physicians were available, which meant that a meaningful analysis was not possible for physicians. Significance tests were obtained via Satterwaithe's degrees of freedom method within the lmerTest package (Kuznetsova et al., 2017). R^2 was calculated based on the proposal of Nakagawa et al. (Nakagawa et al., 2017).

In each of the models, the care facilities were on group level two (L2), while the nurses were on level one (L1). The following L1-predictors were considered: age, gender, type of education (geriatric nursing, general nursing, paediatric care, other), number of years working in the facility (<2 years, 2–5 years, 6–10 years, 11–15 years, longer than 15 years), hierarchical position (no leading position, middle management level, upper management level), type of shift in which most work is done (day shift, night shift, day and night shift alternating). No L2-predictors were used.

Power simulation with the R-package SIMR (Green & MacLeod, 2016) showed that with the current sample size, medium effects of Cohen's d = 0.50 could be found with sufficient power (93%), but the power to detect small effect sizes of d = 0.30 was not sufficient (56%).

3.7 | Validity and reliability/rigour

The psychometric properties of the "Team-Scale" and the "Work Situation Questionnaire" are satisfactory to good and have been reported in detail elsewhere (Fischbeck & Laubach, 2005; Körner & Wirtz, 2013). The self-generated items refer to aspects that will later be addressed in the CoCare project, they should especially query aspects relating to the ward rounds and documentation. They were designed by the authors within the project team.

For the self-generated items, it was assumed that all the items share one common latent factor. A common latent factor captures common variance among the observed variables. This ensures unidimensionality and further allows us to compute a mean value of all the items belonging to this factor. To test this hypothesis we calculated a tau congeneric model for the items of the nurse and physician questionnaire separately. For this calculation, the lavaan R-package was used (Rosseel, 2012). The fit of the tau congeneric models was poor (nurses: $\chi^2(9) = 71.88$, $p < .001$, CFI = 0.93, RMSEA = 0.14, SRMR = 0.13; physicians: $\chi^2(15) = 24.30$, $p = .042$, CFI = 0.92, RMSEA = 0.11, SRMR = 0.18). For both groups, McDonalds omega hierarchical ω_h as an index of reliability was acceptably high (nurses = 0.81, physicians = 0.78). As a result, we had to reject our hypothesis of a common latent factor. Instead, different latent factors might underlie the mean score. Nevertheless, reliability for one assumed general factor was acceptably high to use a general mean score for analysis.

TABLE 1 Participant characteristics of the nurses (*N* = 345)

	N	(%)[a]
Type of training		
Geriatric care	266	(77.6%)
General nursing	61	(17.8%)
Pediatric care	3	(0.9%)
Other	13	(3.8%)
Missing	2	
Number of years in the facility		
Less than 2 years	51	(14.9%)
Two to five years	84	(24.5%)
Six to 10 years	71	(20.7%)
Eleven to 15 years	49	(14.3%)
Longer than 15 years	88	(25.7%)
Missing	2	
Hierarchical position		
No leading position	229	(67.0%)
Middle management	93	(27.2%)
Upper management	20	(5.8%)
Missing	3	
Types of shift in which most work is done		
Day shift	259	(76.0%)
Night shift	27	(7.9%)
Day and night shift alternating	55	(16.1%)
Missing	4	

[a]Percentages calculated for those who answered the question

4 | RESULTS

The sample comprises 408 health professionals, consisting of 345 nurses and 63 physicians. The average age of nurses was 41 years (standard deviation [*SD*] = 12 years, minimum [min] = 19 years, maximum [max] = 66 years), while the average age of physicians was 53 years (*SD* = 10 years, min = 32 years, max = 75 years). The majority of the nursing staff was female (*N* = 276, equates to 81% of the nursing staff, 3 missing), while among physicians, *N* = 38 persons (equates to 60% of the physicians) were male. For the nurses, some further characteristics were queried which are reported in Table 1.

Nurses and physicians from 37 nursing homes participated in the study. We received nursing questionnaires from 36 homes (range = 0–29 nurse questionnaires per home) and physician questionnaires from 22 homes (range = 0–7 physician questionnaires per home).

TABLE 2 "Team-Scale" (Körner & Wirtz, 2013)[a]: Results of the ANOVA ($N = 408$; including $N = 345$ nurses and $N = 63$ physicians)

		Physicians			Nurses			Total scores				
Topic	Item	*N*	*M* (*SD*)	Agreement in percent (rating 3 or 4)	*N*	*M* (*SD*)	Agreement in percent (rating 3 or 4)	*N*	*M* (*SD*)	*F* (*df* numerator, *df* denominator)	p-value	Cohen's d
1) Climate	Overall there is a friendly climate in the clinic.	60	3.57 (0.50)	100%	336	3.42 (0.63)	94.3%	396	3.44 (0.61)	2.84 (1, 394)	0.093	0.24
2) Cooperation	The health care professionals work hand-in-hand.	61	3.46 (0.59)	95.1%	342	3.13 (0.65)	86.8%	403	3.18 (0.65)	13.69 (1, 401)	0.000***	0.51
3) Agreements	Agreements made amongst health care professionals are well coordinated.	61	3.34 (0.60)	93.4%	343	3.17 (0.64)	88.9%	404	3.19 (0.64)	4.09 (1, 402)	0.044*	0.28
4) Coordination	The different types of treatment are well coordinated.	60	3.32 (0.65)	90.0%	338	3.04 (0.67)	82.5%	398	3.09 (0.68)	8.44 (1, 396)	0.004**	0.40
5) Communication	Communication in the team is efficient.	61	3.28 (0.69)	86.9%	343	3.09 (0.69)	82.5%	404	3.12 (0.69)	3.78 (1, 402)	0.053	0.27
6) Respect	The health care professionals respect each other.	61	3.70 (0.49)	98.4%	343	3.43 (0.65)	92.7%	404	3.48 (0.63)	9.71 (1, 402)	0.002**	0.43
Average values of the „Team Scale"		61	3.44 (0.49)		341	3.21 (0.52)		402	3.25 (0.52)	10.61 (1, 400)	0.001**	0.44

Abbreviations: M, mean; *SD*, standard deviation.

[a]Ratings ranged from 1–4 (1 = does not apply at all, 2 = rather does not apply, 3 = rather applies, 4 = completely applies).

*$p < .05$;; **$p < .01$;; ***$p < .001$.

TABLE 3 "Work Situation Questionnaire"[a] (Fischbeck & Laubach, 2005)[b]: Results of the ANOVA ($N = 408$; including $N = 345$ nurses and $N = 63$ physicians)

		Physicians		Nurses		Total scores				
	Item	*N*	*M* (*SD*)	*N*	*M* (*SD*)	*N*	*M* (*SD*)	*F* (*df* numerator, *df* denominator)	p-value	Cohen's d
1)	The collaboration with the other professional group (nurses / physicians) in the nursing home is generally… (very poor / very good).	63	5.06 (0.72)	343	4.76 (0.82)	406	4.81 (0.81)	7.32 (1, 404)	0.007**	0.37
2)	I find the way the other professional group (nurses / physicians) treats the residents… (very poor / very good).	61	5.10 (0.65)	339	4.85 (0.89)	400	4.89 (0.86)	4.23 (1, 398)	0.040*	0.28
3)	I have the impression that the other professional group (nurses / physicians) appreciates the work of my own professional group… (very poor / very much)	63	4.98 (0.66)	343	4.64 (1.02)	406	4.69 (0.98)	6.69 (1, 404)	0.010*	0.35
4)	By observing how the other professional group (nursing / physicians) deals with the residents, I can… (learn very little / learn alot)	62	3.81 (1.30)	342	4.13 (1.25)	404	4.08 (1.26)	3.57 (1, 402)	0.059	−0.26
5)	I myself, as a nurse / physician, am valued by the other professional group (nurses / physicians)… (very low / very highly)	63	5.02 (0.58)	339	4.71 (0.92)	402	4.75 (0.88)	6.72 (1, 400)	0.010*	0.35
6)	Information that I get from the other professional group (nurses / physicians) about the residents is generally… (completely insufficient / completely sufficient).	63	4.78 (0.94)	341	4.69 (1.04)	404	4.70 (1.03)	0.422 (1, 402)	0.516	0.09
	Average values of the "Work Situation Questionnaire"	63	4.79 (0.63)	341	4.62 (0.80)	404	4.65 (0.77)	2.47 (1, 402)	0.117	0.21

[a]The translation of the items was done by the authors during the manuscript preparation, this is not an validated translation of the questionnaire. Only a forward translation has been conducted.

[b]Ratings ranged from 1–6 with low values standing for negative/dysfunctional descriptions and high values for positive/functional descriptions. The answer labels were not the same for all the questions, and only the extreme values were labelled.

*$p < .05$;; **$p < .01$;; ***$p < .001$.

TABLE 4 Scale with the self-generated items[a]: Results of the ANOVA (N = 408; including N = 345 nurses and N = 63 physicians)

	Item	Nurses	Nurses	Nurses	Nurses	Total scores		F (df numerator, df denominator)	p-value	Cohen's d
		N	M (SD)	N	M (SD)	N	M (SD)			
1)	The collaboration between physicians and nursing staff in the care of the residents is…	63	4.38 (0.83)	344	4.17 (0.83)	407	4.21 (0.83)	3.30 (1, 405)	0.070	0.25
2)	The implementation of the ward rounds in this nursing home is …	63	4.37 (0.96)	342	4.10 (1.02)	405	4.14 (1.01)	3.59 (1, 403)	0.059	0.26
3)	The documentation of the ward rounds is…	63	4.16 (0.97)	343	4.01 (1.01)	406	4.03 (1.00)	1.19 (1, 404)	0.277	0.15
4)	The implementation of the measures ordered by the physicians is…	63	4.46 (0.80)	343	4.41 (0.90)	406	4.42 (0.89)	0.15 (1, 404)	0.703	0.05
5)	The preparation of the ward rounds by nurses is…	63	4.08 (1.14)	341	4.09 (1.04)	404	4.09 (1.05)	0.01 (1, 402)	0.936	−0.01
	Average values of the self-generated items	63	4.29 (0.84)	344	4.16 (0.82)	407	4.18 (0.82)	1.33 (1, 405)	0.250	0.16

[a]Ratings ranged from 1–6 (1 = very poor, 2 = bad, 3 = satisfactory, 4 = good, 5 = very good, 6 = excellent).
*$p < .05$;; **$p < .01$;; ***$p < .001$.

4.1 | Team-scale

On the basis of the "team scale" (Körner & Wirtz, 2013), interprofessional teamwork was assessed positively on average, with nurses making less favourable assessments than physicians (p = .001) (see Table 2). Differences between nurses and physicians were particularly large for the individual item concerning cooperation (see item 2 in Table 2). The other individual items concerning climate, agreements, coordination, communication and respect also showed differences between nurses and physicians and achieved small effect sizes ranging from 0.2–0.4, with physicians always giving more favourable assessments than nurses.

4.2 | Work situation questionnaire

In the "Work Situation Questionnaire for nurses/physicians" (Fischbeck & Laubach, 2005), too, ratings were generally favourable, although this time there were no significant differences between nurses and physicians concerning average ratings (p = .117) (see Table 3). Nevertheless, differences between physicians and nurses could be observed at the level of individual items. In the items assessing the perceived esteem by the other occupational group, nursing staff felt on average less valued by physicians than vice-versa (see items 3 and 5 in Table 3). In addition, at the level of individual items nurses assessed collaboration somewhat less favourably than physicians (p = .007, d = 0.37) (see item 1 in Table 3). The most unfavourable evaluations were found in item 4, which asks how much one can learn from the other professional group in terms of dealing with patients. Both physicians and nurses gave mediocre ratings concerning this question (no significant differences). Nevertheless, both professional groups indicated that they find the way the other professional group deals with the residents good, with physicians giving nurses even more positive evaluations than vice-versa (p = .040, d = 0.28) (see item 2 in Table 3).

4.3 | Scale with self-generated Items

With regard to the self-generated items, there were no significant differences between physicians and nurses, neither in terms of the overall score nor in terms of individual items (see Table 4). Overall, collaboration, implementation of the ward rounds and documentation were assessed as rather good. This assessment of ward rounds and documentation can be seen as an indicator of a rather successful coordination and collaboration in the nursing homes.

4.4 | Multilevel analysis

Only for the "Team-Scale" with the predictor "gender", a random-slope-model fitted better to the data than a random-intercept model. This means that the differences between women and men

within a nursing home concerning their assessments of teamwork are not the same for all nursing homes (for all the results of the multilevel analysis, see Table 5).

For the "Work Situation Questionnaire", there were no significant random effects, whereas significant fixed effects were found in two cases. Nurses who completed a general nursing education differed significantly from geriatric nurses, with the former showing lower and therefore more negative values concerning their work situation (including inter-professional communication, collaboration and mutual appreciation) ($\gamma_{10} = -0.29$, standard error (*SE*) = 0.11, $p = .008$). The marginal Rm^2 for this model was 0.02. There was also a significant difference between nurses at the upper management level and nurses who were not in a leading position. Nurses at the upper management level showed significantly lower (more negative) values on the "Work Situation Questionnaire" than nurses who are not in a management position ($\gamma_{10} = -0.35$, $SE = 0.17$, $p = .036$). Marginal Rm^2 for this model was 0.01.

On the scale with the self-generated items, there were also no significant random effects but a significant fixed effect depending on how long someone had been working in the facility was found ($\gamma_{10} = 0.30$, $SE = 0.13$, $p = .021$). Nurses who had been working in the facility between 2–5 years showed significantly higher (more positive) values than those who had been working in the facility for <2 years. Thus, nurses who were relatively new to the institution judged processes around the ward rounds in the long-term care home more negatively than those who had been working there for longer. The marginal Rm^2 of "number of years in the facility" as a predictor was 0.02.

5 | DISCUSSION

In this study, we investigated how nurses and physicians assess various aspects of their inter-professional collaboration in nursing homes and if there are differences between subgroups of nurses.

Although inter-professional collaboration was assessed as quite good overall, nurses rated most aspects more critically than physicians. Such a finding has already been reported in several other

TABLE 5 Fixed and random effects for each linear mixed model for the three scales[a]

	Team-Scale		Work-Situation-Questionnaire		Scale with self-generated items	
	Fixed effects (SE)	Random effects	Fixed effects (SE)	Random effects	Fixed effects (SE)	Random effects
Age: Intercept	3.25 (0.05)	0.23 (0.47)	2.26 (0.08)	0.41 (0.69)	2.75 (0.09)	0.44 (0.70)
Age	0.002 (0.002)	–	−0.004 (0.003)	–	0.003 (0.004)	–
Gender: Intercept (female)	3.26 (0.05)	0.21 (0.45)	2.84 (0.08)	0.40 (0.69)	2.39 (0.09)	0.43 (0.70)
Male	−0.10 (0.12)	0.45	−0.10 (0.10)	–	−0.18 (0.11)	–
Type of training: Intercept (geriatric care)	3.23 (0.05)	0.22 (0.47)	2.32 (0.08)	0.36 (0.69)	2.78 (0.09)	0.41 (0.71)
General nursing	0.10 (0.07)	–	**−0.29 (0.11)**	–	−0.14 (0.11)	–
Hierarchical position: Intercept (no leading position)	3.23 (0.05)	0.23 (0.47)	2.32 (0.08)	0.39 (0.69)	2.79 (0.09)	0.44 (0.70)
Middle management	0.03 (0.06)	–	−0.07 (0.09)	–	−0.06 (0.09)	–
Upper management	0.004 (0.11)	–	**−0.35 (0.17)**	–	−0.18 (0.17)	–
Type of shift in which most work is done: Intercept (day and night shift alternating)	3.20 (0.07)	0.23 (0.47)	2.26 (0.11)	0.40 (0.70)	2.79 (0.11)	0.43 (0.70)
Day shift	0.06 (0.06)	–	0.01 (0.10)	-	−0.04 (0.10)	–
Number of years in the facility: Intercept (<2 years)	3.26 (0.08)	0.25 (0.47)	2.23 (0.13)	0.41 (0.69)	2.57 (0.13)	0.46 (0.70)
2–5 years	−0.11 (0.09)	–	0.18	–	**0.30 (0.13)**	–
6–10 years	−0.02 (0.09)	–	0.13	–	0.20 (0.14)	–
11–15 years	0.15 (0.10)	–	−0.16	–	0.07 (0.15)	–
>15 years	0.01 (0.09)	–	−0.05	–	0.21 (0.14)	–

Note: Bold = significant on $p < .05$.

[a]Age was group mean centered. Fixed effects = regression weights with standard error (SE) in parantheses. Random effects = variance for each predictor. Random effects in parantheses = Residuals on Level 1. Random effects for predictors are only shown when a random slope model fitted better.

studies (e.g. Dinius et al., 2020; O'Leary et al., 2010). A factor contributing to this phenomenon could be the traditionally pronounced hierarchies within medicine (compare O'Leary et al., 2012), which can become problematic when nurses do not find a suitable opportunity or do not dare to address problematic aspects. This can lead to a situation in which physicians may not even be aware of the existing problems. To overcome barriers to effective nurse-physician communication and cooperation in nursing homes, regular inter-professional ward rounds, as well as regular inter-professional meetings, could be an important measure. Such scheduled time slots for a regular, open and constructive exchange could be a good first step to intensifying communication, improving relationships and thus give an opportunity to collaborate on more equal terms. In the CoCare project, in the context of which the study was conducted, regular inter-professional weekly ward rounds and quarterly meetings are an integral part of the intervention. It remains to be seen whether they actually help to optimize inter-professional collaboration (including the evaluation of ward rounds) from a nursing perspective as well.

Mutual appreciation, which was queried as a facet of teamwork, was also assessed more negatively by nurses than by physicians, a result that has also been found in earlier research (Meyer-Kühling et al., 2015). When measures are taken to improve cooperation and communication, the aspects of appreciation and respect should therefore earn special consideration, for example in the context of leadership training.

Although the questionnaire was answered quite positively overall, the question of whether one can learn something from the other professional group concerning how to deal with residents, was answered quite critically by both physicians and nurses. Here, it can be assumed that the two occupational groups regard their fields of activity (medical care versus nursing) as quite separate from each other and see only a few overlaps at which they could learn from each other in terms of dealing with patients. In a recent systematic review (Schot et al., 2020), effective measures were summarized which can contribute positively to successful inter-professional collaboration. These measures include bridging the gaps between professions (e.g. by becoming familiar with other professional values and norms, or by helping each other), as well as negotiating overlaps in work roles and responsibilities and creating spaces for interacting. A stronger focus on the common tasks and challenges of physicians and nurses in nursing homes (e.g. by conducting joint advanced training courses on how to deal with confused residents) could thus contribute to a climate in which the different professions feel they can learn from each other. This, in turn, could strengthen their collaboration.

Looking at group differences, it was found that nurses who completed a general nursing education were less satisfied with their work situation (including aspects of inter-professional communication, collaboration and mutual appreciation) than geriatric care nurses. Possibly nurses who have specialized training in geriatric care hold more positive views and attitudes about their work situation in long-term care homes for the elderly than those without specialized training, with their more positive views and attitudes, potentially having a positive impact on job satisfaction (Carlson et al., 2014).

Nurses at an upper management level were also less satisfied with inter-professional collaboration than nurses with no leading position. This result is surprising in view of earlier findings showing that nurse leaders rate their work environment more positively than those in leadership roles below them (Laschinger et al., 2008). On the other hand, nurse managers are often confronted with specific challenges and difficult situations (e.g. insufficient support or appreciation from the head of the facility, difficult staff matters) which can negatively affect their satisfaction in the long-term (Skytt et al., 2007).

It is also interesting to note that nurses who have been working in the facility for a longer period of time are more satisfied with the implementation of the processes around the ward rounds than nurses who are still quite new in the facility. Selection effects may play a role here: Those who are permanently dissatisfied with certain processes might look for a more suitable working place and change jobs instead of remaining dissatisfied in the same institution for years. The link between job satisfaction in nursing and retention is well established in the literature (Hayes et al., 2006; Lu et al., 2019).

5.1 | Limitations

It must be taken into account that the participating nursing homes are only a small proportion of the population addressed (37 of a total of 1,220 nursing homes). Unfortunately, we cannot make any statements about the representativeness of the participating homes, as we have no further information on characteristics (e.g. number of nursing home residents, staffing level) of the participating and non-participating homes.

There are also some limitations as regards the multi-level analysis. Firstly, both the number of participating nursing homes and sample sizes within each nursing home were rather low to detect small effect sizes. In order to increase the power and to detect also small effects, more nursing homes and more participants within each nursing home were needed. However, our sample size was sufficient to detect medium effects, which – at least from the perspective of practical application – can be considered more relevant than small effects. Secondly, because of the exploratory character of this study, we used multiple testing, which results in α-error inflation. Therefore, a statistically significant predictor should be considered more relevant for further investigations and theory building than in the sense of hypothesis-testing. We tested only one predictor for each model at the same time, so we cannot say anything about multivariate associations and did not check for other influences. We chose this approach because of the exploratory character and the issue that numerous predictors combined with small samples may cause problems in the estimation of random effects. Furthermore, we did not include comparisons between physicians and nurses in the multilevel analysis, because some physicians were responsible

for several of the nursing homes, and for some nursing homes, no data from physicians were available.

The problem of multiple testing due to the exploratory character of the study and thus the α-error inflation also exists in the evaluation of the three scales with ANOVAs. A further limitation concerns the self-generated items which so far have not been psychometrically validated. Our first inspection of the factorial validity showed insufficient support for unidimensionality, but acceptable reliability. However, from the authors' point of view, they allow a content valid baseline survey, because the questions are closely related to aspects addressed by the underlying CoCare project.

With regard to the generalizability of the results to other countries, the specific apprenticeship-based training system for nursing staff in Germany must be taken into account, as it differs from the often academic training system in the international arena. It can be assumed that higher education and increased professionalization of nurses would change the given hierarchies and therefore influence collaboration (Hämel & Vössing, 2017). Results of the study should be therefore applied to other countries with caution.

6 | CONCLUSION

If interventions for improving inter-professional collaboration in long-term care homes are planned, not only the perspective of physicians but also that of nurses should be included. The assessment of nurses will most probably differ negatively from that of physicians, for example when mutual esteem and recognition are assessed. This result has not only been ascertained in our survey but has been repeatedly established in other studies.

In our study, nurses with general nursing training (as opposed to geriatric nursing training), as well as nurses in higher management positions, were found to be subgroups that evaluate inter-professional collaboration in long-term care facilities even more critically. These are therefore groups whose perspectives should be explicitly included in measures to improve inter-professional teamwork, so that, as far as possible, critical assessments can be used for constructive improvement processes.

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CONFLICT OF INTEREST

No conflict of interest has been declared by the authors.

AUTHOR CONTRIBUTIONS

CR, MS, BB, EFG: Made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; CR, MS, BB, EFG: Involved in drafting the manuscript or revising it critically for important intellectual content; CR, MS, BB, EFG: Given final approval of the version to be published. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content; CR, MS, BB, EFG: Agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All authors have agreed on the final version and meet at least one of the following criteria [recommended by the ICMJE (https://www.icmje.org/recommendations/)]: substantial contributions to conception and design, acquisition of data or analysis and interpretation of data; drafting the article or revising it critically for important intellectual content.

DATA AVAILABILITY STATEMENT

Research data are not shared for data protection reasons.

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