


# Reducing Avoidable Hospital Transfers From Nursing Homes in Austria: Project Outline and Baseline Results

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## Abstract

Hospital transfers from nursing homes (NHs) are frequent, burdensome for residents, and often avoidable. The evidence regarding the effectiveness of interventions to reduce avoidable transfers is limited, and most projects focus on nurses' knowledge and skills. In the present project, interventions focusing on nurses and physicians are integrated, elaborated, and implemented in 17 NHs. Results of the 6 months preintervention period are reported. Hospital transfer rates ( $N = 1,520$ ) and basic data on all residents ( $N = 1,238$ ) were collected prospectively. Nurses' preintervention knowledge and self-efficacy were assessed using standardized questionnaires ( $N = 330$ ). Many hospital transfers were initiated by nurses without physician involvement, polypharmacy was common, and a high potential for reducing transfers by increasing physician presence was observed. Nurses showed rather low knowledge but high self-efficacy. The results are discussed against the background of the interventions including enhancement of physician presence and geriatric quality circles.

## Keywords

hospital transfer, nursing home residents, intervention, avoidable transfers, evaluation

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According to international studies, hospital transfer rates from nursing homes (NHs) are high, although hospitalization poses a threat to the physical and psychological health of elderly patients (Dwyer, Gabbe, Stoelwinder, & Lowthian, 2014). Transfer rates vary considerably depending on the country and respective care system, on the regions investigated, and on the employed research design (Grabowski, Stewart, Broderick, & Coots, 2008). According to a study conducted in Norway, NH residents are hospitalized twice as often compared with community-dwelling elderly (Graverholt et al., 2011), and data from Germany and the United States suggest that burdensome hospital transfers at the end of life are common (Gozalo et al., 2011; Miller et al., 2016; Ramroth, Specht-Leible, König, & Brenner, 2006). Depending on the respective study, design, and assessment tool, the reported amount of avoidable transfers varies from 1.6% to 77% (Renom-Guiteras, Uhrenfeldt, Meyer, & Mann, 2014).

However, the reasons leading to avoidable hospital admissions are complex depending on characteristics of residents, NHs, health professionals involved, and

policy incentives (Graverholt et al., 2011; Kada & Janig, 2016). Medical care in NHs is usually not provided around the clock; clinical leadership in NHs provided by physicians is lacking in many countries worldwide (Tolson et al., 2011). In Austria, NHs are usually not equipped with diagnostic resources (Kada et al., 2011)—although this would support the management of acute care needs (Cohen-Mansfield & Lipson, 2006; Crilly, Chaboyer, & Wallis, 2012)—and not allowed to store medications. Medical care for NH residents is provided by residents' general practitioners (GPs; Leichsenring, Lamontagne-Goodwin, Schmidt, Rodrigues, & Ruppe, 2014), and specialist consultations are scarce (Kada

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et al., 2011). These standards might no longer be adequate given the fact that NHs are increasingly becoming a place to live for severely ill people in need for continuous medical care (Tolson et al., 2011).

Despite differences in care systems, there are a lot of similarities between countries concerning the factors contributing to potentially avoidable hospital transfers. One main factor is the limited availability of physicians (Kada, Janig, Pinter, Cernic, & Likar, 2015; Laging, Ford, Bauer, & Nay, 2015; O'Neill, Parkinson, Dwyer, & Reid-Searl, 2015). Outside of the GPs' office hours, emergency doctors have to be contacted; they do not know the residents and are often not provided with the necessary information to support their transfer decisions (Janig, Kada, Neuwersch, & Likar, 2015). Furthermore, nurses are often forced to make transfer decisions without physician presence (Kada et al., 2011; Laging et al., 2015; O'Neill et al., 2015). The coordination of the often large number of GPs (Marshall, Clarke, Peddle, & Jensen, 2015) may contribute to communication gaps (Laging et al., 2015; Lamb, Tappen, Diaz, Herndon, & Ouslander, 2011) and facilitate hospitalizations (Cohen-Mansfield & Lipson, 2006). The lack of geriatric education in nurses and GPs is a further core factor (Arendts & Howard, 2010; Cohen-Mansfield & Lipson, 2006; Laging et al., 2015; Lamb et al., 2011) as well as the well-known nursing shortage problem (Tolson et al., 2011). The high prevalence of polypharmacy (Jokanovic, Tan, Dooley, Kirkpatrick, & Bell, 2015), facilitated by the fragmented medical care, is another factor contributing to adverse events and, hence, to hospital transfers (Cherubini et al., 2012).

Many interventions to reduce avoidable hospital admissions focus on NH nurses' knowledge and skills. For example, the U.S. project "INTERACT" (Ouslander et al., 2011) tries to improve NH nurses' communication and monitoring. In the Australian "Hospital in the Nursing Home" (NINH) project (Crilly et al., 2012), in-hospital treatments are being replaced by improved treatment in the NH due to training of and support for NH nurses. According to a recent systematic literature review (Graverholt, Forsetlund, & Jamtvedt, 2014), the evidence for the effectiveness of these interventions is weak. Nevertheless, some interventions seem promising, namely, the implementation of care pathways and advance care planning, the use of palliative care services (see also Miller et al., 2016), and the implementation of geriatric specialist services (Graverholt et al., 2014). The geriatric consultant (GECO) service, an intervention tested in Austria, proved useful for reducing emergency transfers (Schippinger, Pilgram, & Hartinger, 2013).

As reasons for avoidable transfers are complex, interventions should focus not only on nurses' knowledge and skills but also on physician skills and presence. Furthermore, interventions must be tailored to the respective long-term care and health care system, and the specific region (Grabowski et al., 2008). In Austria, NHs are run by private and public providers and financed by

residents' pensions and from long-term care allowances and potential assets (Leichsenring et al., 2014). Hospital care, however, is funded by the social insurance system and free of charge for everyone. Usually, medical care for NH residents is provided by residents' GPs as NHs are not required to employ physicians. The number of GPs NHs have to collaborate with varies considerably. Registered nurses (RNs) and assistant nurses (ANs) provide care for NH residents, with the limitation that the presence of RNs on site is not mandatory during night shifts (Kada & Janig, 2016; Leichsenring et al., 2014).

An intervention study conducted in Austria (province of Carinthia) tested the effectiveness of interventions comprising geriatric training for nurses, workshops improving nurse-physician cooperation, information on advance directives for residents and family, and polypharmacy checks (Kada, Janig, Likar, Pinter, & Cernic, 2013). The interventions were implemented in two NHs for 6 months, and two comparable NHs without interventions served as control group. Hospital transfer rates were documented prospectively, and the proportion of avoidable transfers was assessed using a complex mixed methods design (Kada & Janig, 2016); there were significantly less hospital transfers and avoidable transfers in the intervention group. In a follow-up project, the interventions were rolled out to nine NHs for 12 months and extended by the implementation of a GECO service (Kada et al., 2015). Consultations regarding residents' therapy, supporting transfer decision making, and medication checks turned out to be the main GECO duties. Successful implementation of the GECO service was mainly characterized by regular presence of the GECO on site, his or her good availability for the nursing staff, and his or her efforts to bridge communication gaps between NHs and hospitals. GECOs were mainly contacted by nursing staff, while only a small proportion of GPs collaborated with the GECOs (Kada et al., 2015).

In the present article, baseline results from a project involving 17 NHs in Austria (province of Carinthia) are presented. The project aimed at the improvement of NH care and the reduction of avoidable hospital transfers and builds upon the above-mentioned projects conducted in Carinthia. Tailored interventions deduced from the literature and own prior research and adapted for the baseline results were implemented in January 2016 for a 12-month period and are introduced in the "Discussion" section of the present article.

## Method

*Characteristics of project NHs.* Seventeen NHs from 10 different private and public providers participated voluntarily in the baseline period of the project, which equals almost one fourth (23%) of all NHs in the province of Carinthia (Austria). These NHs are heterogeneous regarding geographic location, number of residents ( $M = 64$ , range = 37-132 at the beginning of

the project), nursing staff ( $M = 32$ , range = 18-57 nurses working full time or part time), and number of GPs caring for the residents ( $M = 10$ , range = 1-29).

### Research Design

The baseline period the present article is concerned with comprised a 6-month period without interventions (July 2015 to December 2015). Hospital transfer rates and basic data on all residents were collected prospectively throughout the complete baseline period (focus of the present article) and during the intervention period. If the interventions are effective, a decrease in transfer rates (especially acute transfers initiated by nurses) during the intervention period can be expected. Nurses' knowledge and self-efficacy are evaluated using a pretest–posttest design.

### Measures

All hospital transfers during the 18-month project period were assessed using weekly structured telephone interviews with the directors of nursing (DONs) conducted by the trained project study nurse. The interview comprised 27 items concerning characteristics of the transfer (date and time, acute vs. planned, ambulatory treatment vs. admission to the ward), the decision-making process (care providers involved in decision-making process, reasons for transfer), and cooperation with other care providers (GPs, hospital, and GECO if involved; five-point rating scale from 1 = *very good* to 5 = *very bad*) as well as the unavailability/avoidability of the transfers (four-point rating scale from 1 = *not avoidable at all* to 4 = *definitely avoidable*; if avoidable, reasons were assessed, modified from Ouslander et al., 2011).

Basic information on all residents (with and without hospital transfers; excluding short-term-care residents) was assessed at the beginning of the project by the DONs supervised and supported by the project study nurse using a 22-item structured documentation form. Updates in case of new entries or death were conducted via telephone. Demographic data (date of birth, sex) and date of NH entry/exist were assessed. Short information on the health state of the residents was collected, namely, official level of care, care effort rated by the nurses (seven-point rating scale from 1 = *very low* to 7 = *very high*), number of medical diagnosis, number of medications (excluding cutaneous, nasal, and other rescue medication), pain (rating scale from 0 = *no pain* to 100 = *maximal pain*), and existence of an advance directive. The DONs were further asked to rate the availability of each resident's GP in case, the collaboration with the GP regarding the respective resident, and the congruence of intensity of medical care provided by the GP and the needs of the respective resident (five-point rating scale each; for details, see Figure 3). The collaboration with

relatives was answered on a five-point rating scale (1 = *very good* and 5 = *very bad*). Resident data and hospital transfer data can be merged using an anonymous resident ID.

Nurses' knowledge and self-efficacy concerning geriatric care issues were assessed using the Bonn test for knowledge in palliative care (BPW; Pfister et al., 2013), which comprises 23 items measuring knowledge and 15 self-efficacy statements that are answered on a four-point rating scale (details reported elsewhere; Kada, Janig, Pinter, Cernic, & Likar, 2017). Furthermore, 10 true–false knowledge items (see Table 2) were added to cover all topics of the training sessions for nurses who are part of the interventions of the present project. The items cover 10 topics, namely, polypharmacy, heart failure, hydration, wounds, chronic obstructive pulmonary disease (COPD), urinary tract infections, diuretics, dementia, and blood pressure. The topic of pain management and palliative care is covered by the BPW. Self-efficacy concerning hospital transfer decision making (short: transfer decision self-efficacy) was measured using a theory-driven, self-constructed six-item scale (four-point rating scale, 1 = *not true at all* and 4 = *very true*; see Table 1).

### Results

In the present article, results from the baseline period of the project are presented.

#### Descriptive Results on Resident Characteristics and Transfer Rates

Descriptive data analysis was performed using SPSS and Excel. The purpose of the present study is to describe the situation in the NHs in the preintervention period.

Basic data on a total of 1,238 residents (age:  $M = 81.7$  years,  $SD = 11.79$  years; 69% females) were collected and 1,520 hospital transfers ( $n = 1,465$  from 1,238 long-term care residents and further 55 transfers from short-term care residents) were observed. Figure 1 illustrates the monthly transfer rates. A slight decrease in hospital transfers can be observed by the end of the year (November and December). Planned transfers—which are mainly initiated and organized by the hospitals—show a stronger decrease than acute transfers. In-patient treatments are stable, whereas ambulatory treatments decrease toward the end of the year.

The mean transfer rate per resident averages 1.19 ( $SD = 3.41$ ; planned transfers:  $M = 0.63$ ,  $SD = 3.20$ ; acute transfers:  $M = 0.55$ ,  $SD = 1.00$ ); 90.3% of the planned transfers resulted in ambulatory treatment, while 54.4% of the acute transfers led to ambulatory treatment (vs. 45.6% admission to the ward). The distribution is skewed to the left with a zero excess; 54.6% of the residents did not have any hospital transfer during

**Table 1.** Items Transfer Decision Self-Efficacy Scale.

I think, I am competent to . . .	<i>n</i>	Minimum	Maximum	<i>M</i>	<i>SD</i>	95% CI
advocate for a resident's well-being in case of a transfer decision (hospital yes or no)	330	1.00	4.00	3.43	0.750	[3.35, 3.51]
recognize whether a hospital transfer is required immediately or whether it is possible to wait for the GP seeing the resident.	330	1.00	4.00	3.30	0.810	[3.22, 3.40]
monitor a resident continuously so that a hospital transfer can be prevented.	330	1.00	4.00	3.39	0.708	[3.32, 3.47]
arbitrate between physician, resident's family, and the NH in case of difficult transfer decisions.	330	1.00	4.00	2.97	0.860	[2.88, 3.07]
claim relevant information for the care of a resident from the GP.	330	1.00	4.00	3.13	0.940	[3.03, 3.23]
claim relevant information for the care of a resident from the hospital.	330	1.00	4.00	3.03	0.979	[2.93, 3.14]

Note. Items were administered in German language and translated to English for the present article (no forward backward translation). GP = general practitioner; NH = nursing home.

the baseline period, 78.2% did not have a planned transfer and 65.3% did not have an acute transfer. Excluding residents without transfer episodes, the mean number of hospital transfers is 2.61 (*SD* = 4.69).

The mean care effort was 4.6 (*SD* = 1.47). The distribution of the number of medications and number of medical diagnosis is skewed to the left; the median number of medications per resident is 7.0 (interquartile range [IQR] = 5.0, range = 0-30), the median number of diagnosis is 7.0 (IQR = 6.0, range = 0-36). There is a small positive correlation between the number of diagnosis and the number of medications ( $r = .24$ ). Almost three fourths (72.3%) of the residents fulfill the criteria of polymedication, that is, five or more compounds. The median pain (nurse proxy) was 20 (IQR = 40, range = 0-100). One fifth of the residents were judged pain free (22.0%); however, one quarter (26.3%) suffer from severe pain ( $\geq 50$ ). The pain level is slightly correlated to the number of diagnosis ( $r = .18$ ) and the number of medications ( $r = .25$ ). Only 20 residents (1.6%) had an advance directive.

During the baseline period, there were 200 new entries, 143 cases of death, and 27 residents leaving the NH. Most residents died in the NH (69.9%), while 30.1% died in hospital (see Figure 2), mostly after an acute transfer because of changes in the general physical condition ( $n = 11$ ), falls ( $n = 9$ ), or difficulty in breathing ( $n = 6$ ). As shown in Figure 2, one quarter of residents who died in the NH had been transferred to hospital in the preintervention period at least once (median = 1.0 transfer, IQR = 2.0, range = 1-56,  $n = 34$ ). For one fifth of the residents who died in the NH, the last transfer was an acute one, mainly because of falls ( $n = 10$ ), pain ( $n = 4$ ), or changes regarding the general physical condition ( $n = 3$ ).

The quality of medical care provided by the GP was rated positively (see Figure 3). Nevertheless, 13.7% of the residents receive less care by the GP that they would need, the availability of the GP is moderate or bad for

13.3% of the residents and nurse-physician collaboration is moderate or bad in 12.3% of the cases.

Acute transfers were initiated by nurses most of the times (51.7% without physician involvement, 4.5% in consultation with the GP) or by a physician (GP, 26.3%; emergency doctor, 15.9%) and seldom by the resident or his family (1.6%). Nurses did not contact the GP when making an acute care transfer decision in 42.3% of the cases (mainly falls) and in some cases, the GP was not available (9.4%). That means that half of the transfer decisions (51.7%) are made without physician involvement. The main reasons for acute transfers were falls, changes in the general physical condition, and pain (Figure 4).

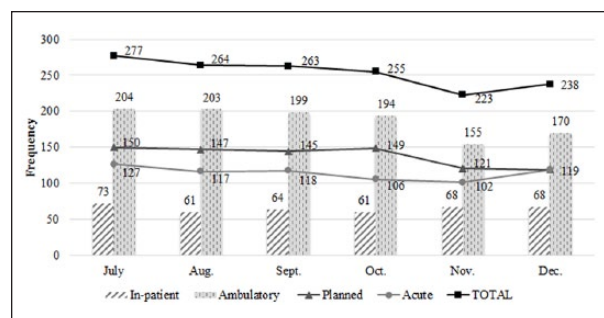
Most planned transfers were initiated by the hospital (72.9%) or by the GP (25.2%; nurse, 1.2%; resident/relative, 0.7%). The main reasons for planned transfers were dialysis, other monitoring, and wound treatment or controls (see Figure 5). In case of retransfers ( $N = 1,474$ ,  $n = 43$  residents died in hospital,  $n = 2$  were transferred to a different NH), the NHs received information regarding therapy by means of a medical report (39.9%) or other written information (48.2%) most of the times. Sometimes, information was provided via telephone (3.6%) or not provided at all (8.4%). Cooperation with the hospitals was mainly rated very good (82.5%) or good (8.7%); in 8.8% of the cases, the cooperation was rated moderate or bad (moderate, 4.5%, bad, 1.3%; very bad, 3.0%; missing values:  $n = 42$ ).

The majority of hospital transfers were rated not avoidable (definitely not avoidable, 74.8%; probably not avoidable, 18.6%), while 6.6% were rated avoidable (probably avoidable, 5.2%; definitely avoidable, 1.4%; missing values:  $n = 33$ ). The majority of avoidable transfers could have been prevented by specialist medical care in the NHs, and therapy or monitoring by the GP (see Figure 6). A further important reason was that residents did not benefit from the transfer given their health state.

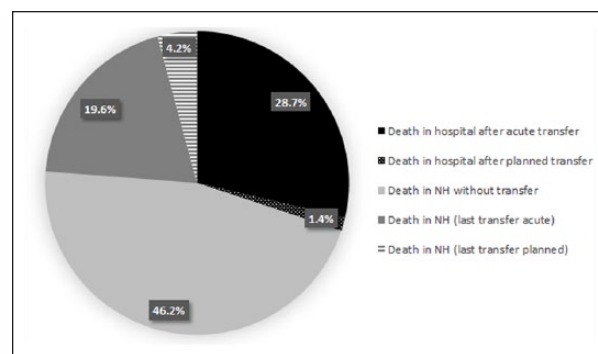
**Table 2.** Correct Answers by NHs Nurses (n = 330) Regarding Knowledge Items on Geriatric Care.

Item number		n	% correct answers	95% CI
3	Raised skin folds in old people do always indicate dehydration.	325	23.1	[18.5, 27.7]
6	An asymptomatic urinary tract infection in old people is always treated with antibiotic therapy.	327	45.9	[40.4, 51.3]
5	Patients suffering from severe COPD can permanently receive 4 L of oxygen per minute via nasal oxygen tube.	325	47.1	[41.6, 52.5]
10	In older patients, typical myocardial infarction symptoms are often missing.	328	50.0	[44.6, 55.4]
2	In patients with cardiac insufficiency, weight checks need <i>not</i> be performed on a daily basis.	327	53.5	[48.1, 59.0]
8	In residents with dementia, regular weight checks are important.	330	54.2	[48.8, 59.7]
7	Thiazide diuretics can cause severe hyponatremia.	316	59.8	[54.4, 65.3]
9	In older patients, blood pressure should always be less than 130/80 mmHg.	329	72.9	[68.1, 77.8]
4	When changing wound dressings in granulation wounds, there has to be a sufficient moist period.	325	76.3	[71.7, 81.0]
1	In case of five medications or more, the indication for new medications should be well considered.	328	78.4	[73.7, 82.8]

Note. Items 2, 3, 5, 6, 9 are reverse coded (not true = correct answer). Items were administered in German language and translated to English for the present article (no forward backward translation). NH = nursing home; CI = confidence interval.



**Figure 1.** Monthly hospital transfer rates.



**Figure 2.** Places of death and hospital transfers for deceased residents during baseline period (n = 143). Note. NH = nursing home.

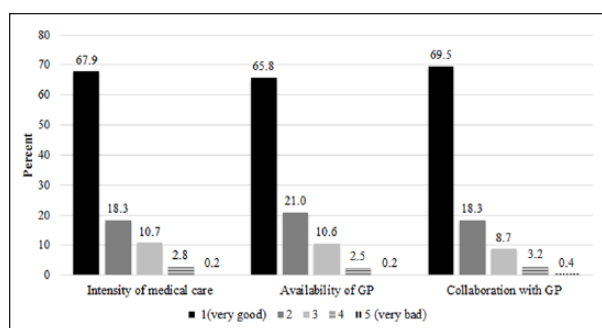
### Results on Nurses' Knowledge and Self-Efficacy (t1)

In sum, 330 nurses (31% RNs) participated in the survey, which is 61% of the nursing staff working in the 17 project NHs. The purpose of the present article is to describe geriatric knowledge and self-efficacy in NHs' nurses at baseline and to test effects of professional groups (RNs vs. ANs). Data analysis was performed using SPSS.

The Transfer Self-Efficacy Scale was developed for the present project and, hence, the factorial structure was explored using exploratory factor analysis. The Kaiser–Meyer–Olkin measure of sampling adequacy was .82 and, hence, above the recommended value. Bartlett's test of sphericity was significant,  $\chi^2(15) = 1,010.236, p < .001$ . Exploratory factor analysis with principal component analysis and varimax rotation (extraction of eigenvalues >1) revealed one dimension, explaining 59.9% of variance (factor loadings from .67

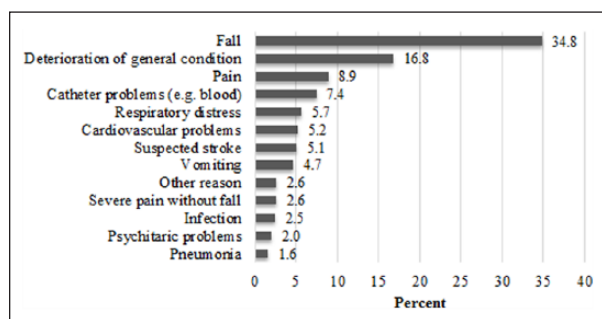
to .86). The internal consistency is satisfactory (Cronbach's  $\alpha = .87$ ). Hence, the mean value across all six items was calculated to yield the final composite score with a range from 1 to 4 with higher values indicating higher self-efficacy.

The transfer decision self-efficacy score is skewed to the right ( $-0.632$ ), and high with a mean value of 3.21 ( $SD = 0.66$ ), 95% CI = [3.14, 3.28]. Table 1 shows that self-efficacy is above the theoretical mean for all six items. Nurses' self-efficacy was comparably low concerning the arbitration between different parties involved in a transfer decision and highest concerning advocacy for residents' well-being. Transfer decision self-efficacy is significantly higher in RNs ( $M = 3.66, SD = 0.38$ ) versus ANs ( $M = 2.98, SD = 0.65$ ) with 50% scoring between 3.5 and 4.0, Mann–Whitney  $U$  test:  $z = -9.034, p < .001$  (see Figure 7).



**Figure 3.** Medical care provided by the GP of the respective resident.

Note. Regarding intensity of medical care the item was “How would you rate the quality of care provided by the GP of this resident given the care need?” (five-point rating scale from 1 = very good, the intensity of care corresponds to the care needs to 5 = very bad, the intensity of care does not correspond to the care needs). The wording of the availability item was, “How would you rate the availability of this GP regarding this resident?” (five-point rating scale from 1 = very good availability in care to 5 = very bad availability). Collaboration was assessed using the item, “How would you rate the collaboration with this GP concerning this resident?” (five-point rating scale from 1 = very good collaboration between nurses and GP regarding this resident to 5 = very bad collaboration). GP = general practitioner.

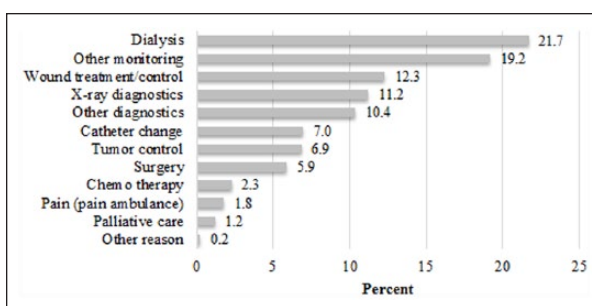


**Figure 4.** Reasons for acute hospital transfers.

Note. Categories with  $n < 10$  were summarized under “other”;  $n = 686$  (missing values  $n = 3$ ).

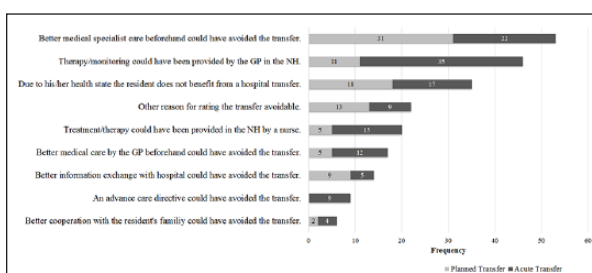
To provide a baseline for evaluating the training sessions for nurses during the intervention period, 10 true–false questions were deduced from the content of the trainings. Table 2 illustrates the percentage of correct answers per item. Less than one fourth of the respondents knew that raised skin folds are not always a sign of dehydration in old patients. The highest percentage of correct answers was observed for the polypharmacy item. On average, respondents answered 5.62 questions correctly ( $SD = 1.55$ ,  $n = 311$ ), 95% CI = [5.45, 5.80]. On average, RNs ( $M = 6.09$   $SD = 1.65$ ) could answer half an item more compared with ANs ( $M = 5.42$ ,  $SD = 1.47$ ), Mann–Whitney  $U$  test:  $z = -3.448$ ,  $p = .001$ .

Nurses palliative care knowledge (BPW) was low with a mean of 12.31 correct answers of 23 items ( $SD = 3.14$ ), whereas self-efficacy was high ( $M = 3.31$ ,  $SD = 0.41$ ); again, RNs showed higher knowledge and self-efficacy (detailed results reported elsewhere; Kada et al., 2017).



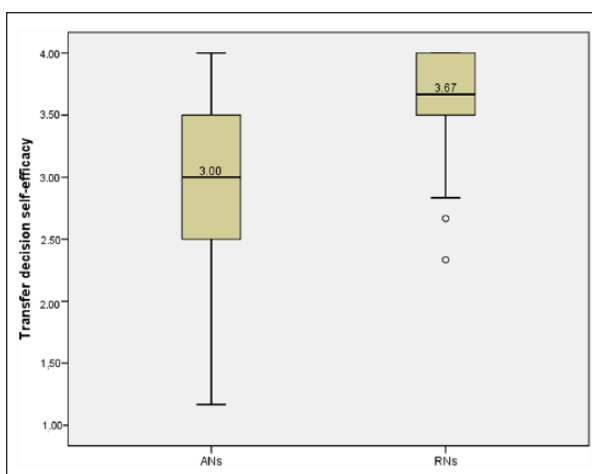
**Figure 5.** Reasons for planned hospital transfers.

Note. Categories with  $n < 10$  were summarized under “other”;  $n = 830$  (missing values  $n = 1$ ).



**Figure 6.** Reasons for rating transfers avoidable.

Note. In case a transfer was rated probably or definitely avoidable ( $n = 98$ ), reasons were assessed (multiple answers possible). The category “other reasons” was mentioned in combination with other categories most of the times. GP = general practitioner.



**Figure 7.** Transfer decision self-efficacy—boxplot.

Note. RN = registered nurse; AN = assistant nurse.

## Discussion

During the 6 month preintervention period, there was a mean number of 1.19 transfers ( $SD = 3.41$ ) per resident; this equals a mean number of 2.61 transfers ( $SD = 4.69$ ) if residents with 0 transfers are excluded. In a retrospective secondary data analysis, a ratio of 3.4 transfers per NH bed in a 12-month period could be observed in Carinthia (Kada et al., 2011). In the present study, the transfer to

resident ratio was 1.18 and, hence, lower and well comparable with the results of the intervention study the present project builds upon ( $M = 2.3$ ,  $SD = 2.4$  transfers in 91 transferred residents in 6 months; transfer to occupied NH bed ratio = 0.83; control group only, ratio = 1.05; Kada et al., 2013). Interpreting the differences in transfer rates, it has to be kept in mind that a strong Hawthorne effect can be expected whenever NHs are participating in projects investigating transfer rates; the comparison of the results with data from a secondary data analysis is certainly limited thereby. The present project closes this gap by enabling a direct comparison of transfer rates before and during the intervention period, with a potential Hawthorne effect affecting both periods.

Acute transfers resulted in ambulatory hospital treatment versus admission to the ward to a large part; furthermore, there was a high number of transfers initiated by nurses (cf. Kada et al., 2015), especially in falls (NHs often follow automatic rules such as always transferring a resident in case of a fall; see Laging et al., 2015). Furthermore, GP availability was moderate or bad for 13.3% of the residents. Burdensome end-of-life transitions in NH residents are well documented (Gozalo et al., 2011; Miller et al., 2016). In the present project, more than two thirds of the deceased residents had died in the NH and less than one third had died in hospital (mostly following an acute transfer); hospital transfers before death had occurred in a substantial proportion of residents. Even if a rather small amount of transfers were rated potentially avoidable (cf. Kada & Janig, 2016; Kada et al., 2013; Lamb et al., 2011), most of them could have been prevented by specialist consultations on site or the GP seeing the resident. These results indicate the potential for reducing transfers by increasing physician presence and diagnostic resources in NHs.

By implementing a GECO service (modified from Schippinger et al., 2013), the present project aimed at increasing physician presence and reducing transfer decisions without physician involvement. In January 2016, a GECO service was implemented in each of the 17 project NHs. GPs and nursing staff received consultations regarding geriatric care issues and support regarding treatment and transfer decisions. GECOs documented each consultation prospectively since the beginning of the intervention period using a 21-item structured documentation form including information on the emphasis of the consultation, its success, and consequences (e.g., preventing a transfer, changing medication). Establishing a trustful relationship between GECOs and GPs was certainly a major challenge of the project (Kada et al., 2015).

The vanishingly low proportion of advance directives observed in the present project is meant to be raised by information sessions for residents and family on site in the NHs. If these educational sessions are effective, an increase in the amount of advance directives should be observable throughout the project.

In line with international studies (O'Neill et al., 2015), communication gaps between NHs and hospitals were observed; in 8% of transfers, no information on therapy was provided to the NHs at all. Standardizing communication could help to reduce this problem.

A high rate of polypharmacy was detected in the present project (72.3%  $\geq 5$  compounds); this is in line with current studies showing polypharmacy rates of up to 91% (Jokanovic et al., 2015). In addition to the GECO service focusing on polypharmacy, geriatric quality circles (modified from Siebolds, Jacobs, & Horaczek, 1994) were conducted monthly throughout the present project since January 2016. Each quality circle was dedicated to the evaluation of the medication of one single resident, who has been identified as highly problematic concerning polypharmacy by the GECO, the GP, or nursing staff. Each geriatric quality circle in the intervention period was evaluated by the participants using a theory-driven self-constructed questionnaire. In addition to prospective risk management regarding the discussed resident, the knowledge transfer to other similar residents should help to reduce polypharmacy throughout the project.

One fifth of the residents were rated pain free in the present project. It is well known though, that pain in NHs residents—especially residents suffering from dementia—is underrated and NH residents are often undersupplied regarding pain therapy (Lukas et al., 2013). Furthermore, the present study showed that nurses' knowledge is in great need of improvement. However, nurses' self-efficacy in transfer decision making and palliative care was high. Regarding transfer decision self-efficacy, they felt especially competent to advocate for a residents' needs; several qualitative studies have shown that nurses consider this an important part of their role (Laging et al., 2015). Self-efficacy was considerably higher in RNs versus ANs; due to the lack of registered staff, it can be assumed that ANs are often involved in transfer decisions. Measures to improve their self-efficacy are needed. In the present project, we provided training on geriatric care issues (e.g., hydration, pain management and palliative care, dementia, COPD, and heart failure) for nursing staff (RNs and ANs) of the project NHs to counteract the well-documented deficits in geriatric knowledge (Arendts & Howard, 2010; Cohen-Mansfield & Lipson, 2006; Laging et al., 2015; Lamb et al., 2011). Nurses' knowledge and self-efficacy are evaluated using a pretest-posttest design. In addition, for each training session, the number of participants was documented to identify NHs highly versus slightly involved in the project.

There are several limitations to be discussed. The above-mentioned Hawthorne effect is certainly a limitation affecting all projects on hospital transfer rates from NHs; it can be assumed that nursing staff and GPs are more reluctant to send residents to hospital knowing that transfers are being observed and analyzed. Furthermore,

it might be criticized that data are provided by NHs self-report (via structured interviews and documentations forms). However, this approach is common (e.g., Ouslander et al., 2011), and a lot of important information (e.g., on the transfer decision process and health professionals involved) cannot be obtained from hospital routine data but directly from NHs. By having a study nurse continuously supporting each NH in data collection/reporting, data quality should be high in the present project. The main advantage of the present project is the fact that data on residents without transfers (54% during preintervention period) are collected as well; this can provide useful information on protective factors for transfers. The theory-driven self-constructed items of transfer decision self-efficacy and geriatric knowledge that were used in addition to the standardized questionnaire are a further limitation. Nonetheless, the present article provides important insight into NH care in Austria and possibilities to enhance it.

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