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Original Study

Physician Contacts and Their Influence on the Appropriateness of Pain Medication in Nursing Home Residents: A Cross-Sectional Study

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A B S T R A C T

Objectives: This study assessed the frequency of physician contacts for individual nursing home residents (NHRs) and investigated whether the frequency of contacts influences the appropriateness of pain medication in NHRs.
Design: Observational cross-sectional study conducted between March 2009 and April 2010.
Setting: Forty nursing homes in Berlin and Brandenburg, Germany.
Participants: A total of 560 NHRs.
Measurements: The number and type of NHR physician contacts were obtained by face-to-face interviews. To assess the appropriateness of pain medication, the German version of the Pain Medication Appropriateness Scale ($PMAS_D$) was used. The influence of physician contacts on the appropriateness of pain medication was calculated with a linear mixed-effect model.
Results: The proportions of NHRs with at least 1 contact with their attending physicians were 61.8% (primary care physicians), 55.2% (general practitioners), 9.6% (neurologists), 9.4% (other), 5.4% (internists), 2.2% (orthopedic surgeons), and 0.7% (psychiatrists). The number of all physician contacts correlated weakly with the appropriateness of pain medication ($r = 0.166$, $P = .039$). With every physician contact, the $PMAS_D$ score rose by about 2 points ($P = .056$).
Conclusions: Physician care in German nursing homes is mainly provided by primary care physicians. A higher number of physician contacts had a modest impact on more appropriate pain medication use.

With the increasing age of the German population, the number of people in need of care is rising as well.[1] According to the care statistics of the German Federal Statistical Office, 2.6 million people in Germany were in need of care at the end of 2013.[2] Between 1999 and 2013, the number of nursing home residents (NHRs) increased by 27%.[2,3] Although the majority of people in need of care still receive care at home, there has been a marked trend toward professional care in nursing homes (NHs).[1–3]

Pain is a very common health problem among NHRs. Up to 80% of NHRs suffer from pain.[4,5] Although adequate pain management can substantially improve the quality of life in NHRs by preventing depression, anxiety, and falls,[6,7] a large proportion of NHRs does not receive appropriate pain treatment.[8] Chronic pain and multimorbidity in NHRs often require extensive nursing and physician care. However, till date only a few studies focused on physician care in German NHs.[9–11] The reported studies also have methodological limitations[9–11] that impede drawing precise conclusions on the frequency and appropriateness of physician contacts for German NHRs.[12] To our knowledge, there are no studies determining the number of physician contacts for individual NHRs exactly by interviewing the NHR personally. Until now, the number of physician contacts are mainly assessed through individuals not directly involved in the care of NHRs (eg, nursing home managers)[9] or by evaluating health insurance data,[11] whereas specific information for individual NHRs was not analyzed.[9,11] Moreover, there are no studies available investigating the

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influence of physician contacts on the appropriateness of pain medication among NHRs.

Therefore, the first aim of the present report was to determine the frequency of contacts with primary care physicians and specialists for individual NHRs. The second aim was to investigate whether the frequency of physician contacts influences the appropriateness of pain medication in NHRs.

Methods

Design and Setting

The primary data used to answer the research questions stem from the observational cross-sectional PAiN (Pain and Autonomy in the Nursing Home) study as previously reported.[8] Data were collected between March 2009 and April 2010 in 40 NHs in the city of Berlin and the Federal State of Brandenburg (Germany). The study was approved by a local ethics committee of the Charité, Berlin, and complies with the Declaration of Helsinki.

Sample

With the target population being NHRs in Germany, a random sample of NHs in the City of Berlin and the Federal State of Brandenburg was selected. Out of the overall population of the corresponding NHRs, a 40% random sample was drawn for the interviews. NHRs who had been living in the respective institution for at least 4 weeks and were receiving healthcare services according to long-term care insurance guidelines were included in this study. Residents living in special needs facilities and residents under artificial/mechanical ventilation were excluded. Because of the demographic situation in German NHs,[13] an oversampling of men had to be implemented to generate a representative number of male NHRs. Before any data collection, written informed consent from the NHRs or their legal representatives was obtained.

Data Collection and Instruments

Sociodemographic parameters and physician contacts

Sociodemographic parameters and physician contacts within the past 4 weeks were determined by means of face-to-face interviews through trained research personnel using standardized questionnaires. For NHRs not able to answer the questions by themselves, a nurse in charge of the respective NHR was interviewed.

Cognitive status

We used the Mini Mental State Examination (MMSE) to assess the cognitive status of the NHR.[14] Expecting differences in medical care among NHRs who were still able to report pain by themselves (MMSE scores $\geq$10) and those who were not (MMSE scores $<$10), we used the cut-off value of 10. Consequently, NHRs were stratified into having severe (MMSE values $<$10) or mild to moderate cognitive impairment (MMSE values $\geq$10).

Pain

Pain was assessed using the SSI (Strukturiertes Schmerzinterview)[15] or BISAD (Beobachtungsinstrument für das Schmerzassessment bei alten Menschen mit Demenz) tool (Fischer, 2009[16]) for NHRs with MMSE values $\geq$10 or $<$10.

Appropriateness of pain medication

To assess the appropriateness and quality of pain medication, the German version of the American Pain Medication Appropriateness Scale (PMAS),[17] the so-called $PMAS_D$,[18] was used. This instrument assesses the quality and appropriateness of pain medication with respect to kind, dose, and dose interval.[5] Pain intensity in relation to the potency of the prescribed analgesic and the use of proper co-medication is also taken into account.[5] On the basis of 10 different criteria, a percentage value is calculated, which reflects the appropriateness of pain medication.[5] The final score (S_{PMASD}) is calculated as a percentage of the applicable points.[17] A cut-off value of $>$67% is defined as appropriate pain medication.[17] Only NHRs with pain and/or scheduled pain medication applied for the $PMAS_D$.[8]

Statistical Analysis

Descriptive and bivariate analyses were performed with SPSS statistics program (version 22.0). The Kolmogorov-Smirnov test was used to check for normal distribution. To determine associations between categorical variables, a chi-square test was applied. Correlations between interval-scaled parameters were performed by Pearson correlation test. Independent samples *t* test was used to determine differences between the $PMAS_D$ population and NHRs without pain. S_{PMASD} was calculated as specified in the original publication[8,17] with PASW 18.0 statistics (SPSS, Chicago, IL). To describe the effects of physician contacts on the $PMAS_D$, we used a linear mixed-effect model with the frequency of physician contacts as fixed effect and the NH as random effect. The model was calculated with the statistics program R and the lme package. The intraclass correlation coefficients were calculated after Smeeth and Ng.[19]

Results

Sociodemographic Characteristics

Full study population

From the 40 NHs in the city of Berlin and the German Federal State of Brandenburg, a total of 560 NHRs took part in the PAiN study (Table 1). In the full study population, the mean age was 81.2 years and 60.9% were women. The most frequent level of care was level 2, accounting for 42.3% of the full study population. Whereas only 1.4% of the full study population were not in need of care, 34.7% and 21.6% required $>$90 minutes (care level 1) and 5 hours (care level 3) of daily care (Table 1). The full study population comprised 209 NHRs (37.3%) with severe cognitive impairment (MMSE scores $<$10). There was a statistically significant difference in the level of care between NHRs with severe versus NHRs with nonsevere impairment of cognitive function ($P < .001$; Table 1). Thus, NHRs with severe impairment of cognitive function had a higher mean level of care compared with NHRs with MMSE values $\geq$10 (2.3 $\pm$ 0.7 vs 1.6 $\pm$ 0.6, $P < .001$).

Table 1
Sociodemographic Characteristics of the Study Population*

Characteristics	Full Study Population			$PMAS_D$ Population
	Total (n = 560)	MMSE Score $\geq$10 (n = 351)	MMSE Score $<$10 (n = 209)	Total (n = 321)
Age	81.2 ± 10.7	80.8 ± 10.3	81.9 ± 11.4	82.2 ± 9.9
Male	219 (39.1)	143 (40.7)	76 (36.4)	122 (38)
Female	341 (60.9)	208 (59.3)	133 (63.6)	199 (62)
Level of care†				
0	8 (1.4)	6 (1.7)	2 (0.9)	4 (1.3)
1	194 (34.7)	169 (48.1)	25 (12)	116 (36.1)
2	237 (42.3)	153 (43.6)	84 (40.2)	137 (42.7)
3	121 (21.6)	23 (6.6)	98 (46.9)	64 (19.9)

*All values are mean values ± standard deviations or percentages in parentheses.
†Levels of care 1, 2, and 3 require at least 90 minutes, 3 hours, and 5 hours of care per day, respectively.