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Predictors of Non-Pharmacological and Pharmacological Treatments Stopped and New Treatments Started among Nursing Home Residents with Dementia

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Abstract

Purpose—The purpose of this study was to describe the pharmacological and non-pharmacological treatments stopped and new treatments started over 6 weeks among a sample of nursing home residents with moderate-to-severe dementia and to identify the nurse and resident factors associated with starting new and stopping ineffective/unnecessary non-pharmacological and pharmacological treatments.

Design and Methods—One hundred and thirty-four nursing home residents with dementia and 39 nurses from 12 nursing homes in the Midwest participated in this study. Resident and nursing process data were collected on daily tracking forms completed by the primary nurse over a six week period.

Results—Both assessment driven intervention and evaluation driven follow through significantly predicted treatments stopped and new treatments started.

Implications—The nurse serves an essential role in maintaining resident physiological and psychological homeostasis by vigilantly responding to residents' physical problems and behaviors with assessment driven intervention and evaluation driven follow through.

Keywords

dementia; nursing home; assessment; polypharmacy; non-pharmacological

In people with dementia there is both reduced homeostatic physiological responsiveness (Mace & Rabins, 1981; Reisberg, 1984) and a reduced threshold for psychosocial and environmental stressors (Hall & Buckwalter, 1987). These reductions result in a more narrow therapeutic window that increases sensitivity to the therapeutic effects of pharmacological and non-pharmacological interventions (Kovach, 2000). Consideration of this decreased homeostatic capacity among nursing home residents with dementia may be particularly important when starting and stopping non-pharmacological and pharmacological therapies.

Although several studies have described the pattern and resident factors associated with daily pharmacological and non-pharmacological use among nursing home residents with dementia (Blass et al., 2008; Handler, Wright, Ruby, & Hanlon, 2006; Tjia et al., 2010), there has been limited systematic study of nurse factors associated with starting and stopping treatments. The purpose of this secondary study was to: a) describe the pharmacological and non-pharmacological new treatments started and stopped over 6 weeks among a sample of nursing home residents with moderate-to-severe dementia and, b) identify the nurse and resident factors associated with starting new or stopping ineffective pharmacological and non-pharmacological treatments.

Background

Nursing home residents are prescribed more medications than individuals in any other clinical setting (Guay, Artz, Hanlon, & Schmader, 2003), with recent studies reporting an average of 5.9 to 14.6 daily medications per nursing home resident (Akner, 2009; Blass et al., 2008; Cherma, Lofgren, Almkvist, Haller, & Bengtsson, 2008; Tjia et al., 2010). Tjia et al. (2010) found that 37.5% of the participants received at least one medication that was never appropriate and only modest reductions in daily medications occurred during the last week of life. As identified by Blass et al. (2008), there is significant inter-site variability in prescribing practices for similar populations of nursing home residents with advanced dementia. This group also found that drugs prescribed at the advanced stage of dementia are untested in clinical trials with this population. For example, the use of lipid-lowering drugs and anti-cholinesterase inhibitors at this advanced stage of illness were questioned. In another study, nursing home staff identified that low staffing patterns during evenings and weekends contributed to the overuse of medications to calm and control resident behavior (Kolanowski, Fick, Frazer, & Penrod, 2009).

Various non-pharmacological treatments have been identified (Cohen-Mansfield, 2001, 2005; Opie, Rosewarne, & O'Connor, 1999) and are widely believed to address the needs of individuals with dementia. Examples include social contact, stimulating activity, and human touch (e.g., massage) for the relief of discomfort. Consensus statements on best practices for Alzheimer's disease indicate that behavioral and psychological symptoms of dementia (BPSD) are best treated initially with non-pharmacological therapies (American Geriatrics Society & American Association for Geriatric Psychiatry, 2003; Benoit et al., 2006; Lyketsos et al., 2006). The empirical evidence to support the efficacy of most non-pharmacological therapies is quite limited. A recent meta-analysis indicated that of seven types of non-pharmacological interventions available for individuals with dementia, sensory interventions were the only treatments effective in reducing agitation (Kong, Evans, & Guevara, 2009).

Several studies have examined processes associated with treatment provision in the nursing home. In a study of physicians providing care to nursing home residents, physicians report a higher use of psychotropic drugs (80%) than non-pharmacological treatments (75%) for the symptom of resistive care (Cohen-Mansfield & Jensen, 2008). However, the role of written documentation was found as a critical missing aspect in communicating key information needed for physicians to make appropriate clinical decisions for their residents (Cunningham, 2006). Another study found that the lack of skill in understanding BPSD and applying non-pharmacological treatments by nursing home staff was associated with a trial and error approach (Kolanowski et al., 2009). Kovach, Kelber, Simpson, & Wells (2006) found a pattern they called "static care" in which nursing staff continued using treatments that were ineffective or the effectiveness lasted less than 24 hours.

Nurses are the frontline care givers responsible for assessment, timely identification of problems, effective communication, acting (intervening) and mobilizing resources. The study of these processes is more evident in the acute care literature, with support for the prevention of hospitalization and optimization of physical comfort and quality of life (Barry et al., 2002; Bates-Jensen, Cadogan, Jorge, & Schnelle, 2003; Gray-Miceli, Strumpf, Reinhard, Zanna, & Fritz, 2004; Longo, Young, Mehr, Lindbloom, & Salerno, 2004; Wipke-Tevis et al., 2004). Although the findings of a recent study demonstrated that quality of nurse assessment is associated with shorter time to identify new nursing home resident problems (Kovach, Logan, Simpson, Reynolds, 2010), there is limited study of how the processes of nursing care are operationalized within the practice setting. In this study we were particularly interested in examining the nursing care processes (e.g., assessment driven intervention and evaluation driven follow through) and resident factors (e.g., age, mental status, length of stay and co-morbid illness) associated with starting and stopping pharmacological and non-pharmacological treatments.

Methods

We report here a secondary study conducted within a randomized experiment studying the efficacy of an assessment and treatment protocol for people with moderate to severe dementia that have a behavior change (Kovach, Noonan, Schlidt, & Wells, 2006). The main experimental study compared a protocol for assessing and treating unmet needs of people with dementia (5-step Serial Trial Intervention) (STI) to a more comprehensive 9-step version of the STI; all residents in this study received at a minimum the 5-step STI. All nurses participating in this secondary study received enhanced education on behavior change and the assessment and treatment protocol being tested in the larger efficacy study (http://projectreporter.nih.gov/project_info_details.cfm?aid=7743788&icde=4752118). More specifically, nurses were taught that dementia behaviors may be symptoms of unmet needs and about the various types of dementia behaviors such as nonspecific vocalizations, motor agitation, passive behavior and body part cues. In addition, nurses were taught that descriptions of verbal symptoms and dementia behaviors may be important clues for physical problems such as pain, infection or exacerbations of chronic conditions. The need for behavior change or verbal symptoms to be followed by physical assessment was emphasized.

Setting and Participants

One hundred and thirty-four residents from 12 nursing homes in the Midwest participated in this secondary study. Nursing home residents with a medical diagnosis of dementia (as noted within the individual's healthcare record) were recruited from March 2007 to December 2009. Following University and facility/long-term care organization IRB approval, written consent was obtained from the Durable Power of Attorney and verbal assent was obtained from each resident. Nursing home residents with chronic psychiatric illnesses, other than a condition identified as causing dementia, were excluded from the study.

Of the 134 resident participants, 104 (77.6%) were female and 30 were male, averaged 87.09 (SD=7.28) years in age and resided in the nursing home an average of 33.22 months (SD = 30.56). Forty-six percent of the residents lived in the nursing home 2 years or more. Study participants were predominantly Caucasian ($n = 131$, 98.5%) and had an average Mini-Mental Status Examination score of 6.60 (SD = 6.03). Ninety percent of resident participants scored ≤ 15 , indicating moderate to severe dementia. As measured by the Functional Assessment Staging Tool, functional impairment averaged 6.46 (SD = .57) with 57 individuals scoring in Stage 7 (most impaired stage), 73 in Stage 6, and 1 person in Stage 5. Lastly, the study participants averaged 17.63 (SD = 4.64, Range = 4–33) on the

Cumulative Illness Rating Scale – Geriatrics, indicating a moderate level of disability for chronic problems.

Thirty-nine nurses (23 LPNs, 16 RNs) were asked to participate based on working day shift full time on one of the units that housed resident participation. All 39 nurses provided written informed consent. Each nurse provided care to 2–12 resident study participants. Over half of the nurse participants were white (64%) and the majority were female (94.1%). Fifty-three percent ($n=17$) of the nurses were 46 years old and older, 50% had 14 or more years of experience as a nurse and 50% worked for their current employer 5 years or more.

Measurements

Following initiation of the STI protocol, six weeks of daily tracking forms were completed by the primary nurse to record resident behaviors, problems, assessments, interventions, consultations, and new medical orders. To teach nurse interventionists to consistently record assessments and treatments, four vignettes were digitally produced using actors and the university film department. These vignettes showed nurses using varied steps of STI to respond to behavioral symptoms. Interventionists were trained using the vignettes until inter-rater reliability reached a percentage agreement of $>.85$. In order to assure valid and complete tracking of information, a research staff advanced practice nurse met with the nurse twice a week and cross-checked the tracking forms with resident charts. Any discrepancies that were found between the two records were investigated and resolved with the nurse.

Resident data extracted from the tracking forms included physical signs, behaviors, new problems, non-pharmacological and pharmacological treatments stopped and non-pharmacological and pharmacological treatments started. As described in Kovach, Cashin, & Sauer (2006), the coding categories for the non-pharmacological and pharmacological treatment variables were developed based on an examination of 304 daily logs outlining nursing care given using the STI. Three APNs with expertise in dementia and pain management examined and refined the categories. Inter-rater reliability, calculated as percentage agreement, of two graduate students coding 55 daily logs was 1.0 for pharmacological treatments and 0.80 for non-pharmacological treatments.

Non-pharmacological treatments categories include therapeutic human interaction, therapeutic communication, pace activity, environmental, oral intake, mobility, therapeutic activity, therapeutic cueing, skin, touch, elimination, sensory, spirituality, and other (e.g., treatments started: palm cushion, motion activated night light, warm lap robe; treatments stopped: thin liquids, small portion diet, rectal checks, foley, commode at bedside, dressing change every day). Pharmacological treatments categories include non-narcotic, antibiotic, bowel, narcotic, anxiolytic, combined analgesic, diuretic, and other (e.g., treatments started: capsaicin, methyl salicylate topical, topical-lidocaine; treatments stopped: propranolol, insulin, guaifenesin, synthroid, warfarin), other analgesic (i.e., gabapentin), antidepressant, psychotropic, and other psychotropic (i.e., divalproex sodium). Additionally, four reasons for stopping non-pharmacological and pharmacological treatments were identified and include side effect, ineffective, not needed, or other (i.e., hospice care initiated).

Nursing care process data extracted from the tracking forms included assessment driven intervention and evaluation driven follow through. The nursing care process of *Assessment driven intervention* is an action or actions taken to provide treatment that is informed by a prior assessment. *Evaluation driven follow through* refers to actions taken to change the treatment regime and/or schedule dosing of effective treatments that are informed by an evaluation of treatment effects.

Analysis

Frequencies, ranges, and when appropriate, means and standard deviations were used to describe the study variables. Bivariate analysis was used to examine the association between assessment driven intervention, evaluation driven follow through, treatments stopped, treatments started, and resident factors (age, length of stay, Mini-Mental Status Examination score and total co-morbidities). Poisson regression model, using SAS Proc NLMIXED, was used to fit the two outcomes of treatments stopped and new treatments started. Assessment driven intervention, evaluation driven follow through and resident total number of co-morbid conditions were included as independent variables in the model. Since 14 (of 134) residents had <30 days of study participation due to transfer to hospital or death (89.9% [$n = 120$] of the residents were observed for the full 6 weeks [30 days]), exposure effect for days of resident study participation was included in the model. Nurse as random effect was also included in the model to account for use of either a 5-step or 9-step version of the Serial Trial Intervention and variability in nurses' use of assessment driven intervention and evaluation driven follow through.

Interpretation of model parameters is as follows. Theta is the estimated standard deviation of the random nurse effect, that is, how much the results vary among nurses (as shown in Table 3, Theta is significant for both of the outcome variables of treatments stopped and treatments started). The Poisson distribution gives the probability of a certain number of events (e.g., treatments stopped or treatments started) occurring and can be further interpreted as an exponential relationship. Therefore, the effect of each independent variable on the dependent variable can be calculated by computing the IDR as $\text{Exp}(\text{Estimate})$.

Findings

Treatments Started and Stopped

Table 1 describes the non-pharmacological and pharmacological treatments started and stopped. Overall, 93 (69.4%) residents had between 1 and 12 treatments started, with nearly half ($n = 66$, 49.3%) with 1 to 3 new treatments started. Among the treatments started/added to the care of these residents, 172 were non-pharmacological and 129 were pharmacological. Therapeutic communication, pacing activity, and environmental safety accounted for over half ($n = 76$, 56.7%) of the non-pharmacological treatments started. This was followed by intake, mobility, and other (e.g., hand soak with massage daily, take outdoors for short periods daily, increase table levels, palm cushions on in AM, motion activated night light on at night). Of the new pharmacological treatments started, 51.5% ($n = 69$) were a non-narcotic analgesic or antibiotic.

Among the 134 study participants, 56 (41.8%) had non-pharmacological and pharmacological treatments stopped. The number of treatments stopped for a single resident ranged from 1 and 4. Over one-quarter ($n = 35$, 26.1%) of the resident participants had a single treatment stopped, while 21 residents had 2 to 4 treatments stopped. More pharmacological treatments were stopped ($n = 50$) than non-pharmacological treatments ($n = 37$).

While a variety of various categories of pharmacological treatments were stopped, other (e.g., propranolol, insulin, guaifenesin, synthroid, warfarin) ($n = 16$, 11.9%) and antipsychotic ($n = 6$, 4.5%) were the most frequent. Pharmacological treatments were stopped due to not being needed ($n = 16$, 11.4%), side effect ($n = 16$, 11.4%), or ineffectiveness ($n = 16$, 11.4%). The most frequent non-pharmacological treatments stopped were within the categories of other (e.g., thin liquids, small portion diet, rectal checks, foley, commode at bedside, dressing change every day), elimination, mobility and pace activity.

The most common reason for stopping a non-pharmacological treatment was that it was not needed ($n = 19$, 13.7%).

Predictors of Treatments Stopped and New Treatments Started

Among the individual resident characteristics of age, Mini-Mental Status Examination score, length of stay, and total co-morbid conditions, the only significant association was between resident total co-morbid conditions and new treatments started ($r = -.176$, $p < .05$). The nursing process factors of assessment driven intervention and evaluation driven follow through were significantly associated with both treatments stopped and new treatments started. As summarized in Table 2, separate models were fit for the two outcomes (total/sum of pharmacological and non-pharmacological) treatments stopped and treatments started with assessment driven intervention, evaluation driven follow and resident total number of co-morbid conditions as predictors.

The total number of treatments stopped was significantly predicted by assessment driven intervention and evaluation driven follow through. After accounting for the random effect of nurse and exposure effect for days of resident study participation, a 1-unit increase in assessment driven intervention significantly increased the number of treatments stopped by 3.28 ($\text{Exp}(1.189) = 3.28$, $p = .025$). A 1-unit increase in evaluation driven follow through increased the number of treatments stopped by 1.19 ($\text{Exp}(0.177) = 1.19$, $p = .049$). Resident total number of co-morbid conditions was not significantly related to treatments stopped ($\text{Exp}(.009) = 1.00$, $p = .745$).

Similarly, the total number of new treatments started was significantly predicted by assessment driven intervention and evaluation driven follow through. Again, after accounting for the random effect of nurse and exposure effect for days of resident study participation, each 1-unit increase in assessment driven intervention significantly increased the number of new treatments started by 3.01 ($\text{Exp}(1.10) = 3.01$, $p < .001$). A 1-unit increase in evaluation driven follow through significantly increased the number of new treatments started by 1.19 ($\text{Exp}(0.17) = 1.19$, $p = .003$). Resident total co-morbid conditions was not significantly related to new treatments started ($\text{Exp}(-.027) = 0.97$, $p = .125$).

Discussion

This study highlights the multiple pharmacological and non-pharmacological treatments stopped and new treatments started among nursing home residents over a six week period. Of importance, the nurses' use of assessment driven intervention and evaluation driven follow through altered the average number of non-pharmacological and pharmacological resident treatments stopped and started. In this sample of residents, non-narcotic analgesics and antibiotics were the two most common pharmaceutical treatments started. This finding is consistent with prior research on the prevalence of pain and acute infections among nursing home residents (Black et al., 2006; Kovach, Logan, Simpson, & Reynolds, 2010; Ouslander et al., 2010). Therapeutic communication was the most common non-pharmacological treatment started, followed by pacing activity and environmental safety. Although non-pharmacological treatments are readily available and frequently utilized by nurses, their effectiveness requires further study. The finding that many non-pharmacological and pharmacological treatments were not needed underscores the importance of incorporating a regular process for evaluating the need for continued use of treatments as a standard nursing home practice. Of interest, Garfinkel and colleagues (2007) Garfinkel and colleagues (2010) have identified and tested a systematic approach for medication discontinuation among older adults residing within the nursing home and within the community. Future research could include applying a similar approach to non-pharmacological treatments.

In the nursing home, people with dementia are dependent on the nurse and/or other healthcare providers to identify and respond to their needs. The nurse fills a critical role in the healthcare team in the nursing home setting - as they provide ongoing surveillance and management of nursing home residents' needs 24 hours a day, 7 days a week. The vague and variable display of behaviors and symptoms that accompany physiological and/or psychological unmet needs among residents with dementia, coupled with individuals' multiple co-morbid conditions, presents a challenge for maintaining physiological and psychological homeostasis. The findings of this study support that this challenge may be ameliorated by vigilant nursing care. This vigilance includes nurses' use of key processes: assessment driven intervention and evaluation driven follow through. By using these processes - which includes not only assessment, but action that builds on assessment and subsequent follow through, unnecessary and ineffective pharmacological and non-pharmacological treatments may be stopped and/or necessary and effective treatments may be started. These processes are intended to improve residents' quality of life and prevent adverse outcomes.

Prior research has identified assessment as a missing process at critical points in residents' care (Barry et al., 2002; Bates-Jensen et al., 2003; Gray-Miceli et al., 2004; Wipke-Tevis et al., 2004). Furthermore, communication breakdown is shown to exist at multiple levels in the management of residents' care (such as with acute infections) (Longo et al., 2004). This study begins to further delineate the specific nursing processes that address the previously identified assessment and communication gaps. When nurses' utilize assessment driven intervention and evaluation driven follow through, residents' needs may be better met.

Assessment driven intervention and evaluation driven follow through can be provided within existing nursing home structures. Recognizing that nurses fill a critical role in translating the needs of the individuals with dementia, administrative leadership need to provide the opportunity for nurses to acquire the knowledge and skills to undertake these nursing process responsibilities. While the steps of assessment driven intervention and evaluation driven follow through are foundational components of the nursing process, ongoing education in the areas of older adult physiology and healthcare team communication strategies is needed within the nursing home setting.

Limitations

The findings in this report are based on cross-sectional data that represent the presence of non-pharmacological and pharmacological treatments among a sample of 134 nursing home residents with dementia and 39 nurses who provided care during a 6 week period. Therefore, no causal claims can be made. Additionally, a limitation relates to the nosology used to categorize non-pharmacological treatments. Although our nosology was applied consistently, alternative methods for categorizing the treatments may be possible.

Summary

As indicated in the Institute of Medicine's report (2008) and Manojlovich and Talsma (2007), identification of nurses' important role in ensuring effective communication and facilitating collaboration and coordination of care is critical to preventing serious complications, discomfort, and/or unnecessary hospitalizations. The present study extends what we know about the critically important nursing practice steps in managing resident care. The findings suggest the need for nurses and other health care team members in long-term care facilities to be vigilant in assessing, intervening and following through (i.e., scheduled dosing of effective treatments) among residents with dementia. This comprehensive approach is needed to alleviate preventable discomfort, agitation and other adverse outcomes

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Table 1

Non-pharmacological and Pharmacological Treatments Started and Stopped over 6 Week Period^{a,b}

Non-pharmacological Treatment	Frequency of Treatment Started	Percentage of Treatment Started	Frequency of Treatment Stopped	Percentage of Treatment Stopped
Therapeutic Communication	32	23.9	1	.7
Pace Activity	25	18.7	6	4.5
Environmental Safety	19	14.1	0	0
Intake	17	12.6	2	1.5
Mobility	14	10.4	6	4.5
Other	12	8.9	8	5.9
Therapeutic Activity	11	8.2	2	1.5
Therapeutic Cue	10	7.5	1	.7
Skin	9	6.7	3	2.2
Therapeutic Human Interaction	9	6.7	0	0
Touch	6	4.4	0	0
Elimination	5	3.7	6	4.5
Sensory	3	2.2	2	1.5
Non-narcotic	49	36.6	5	3.7
Antibiotic	20	14.9	5	3.7
Other	20	14.9	16	11.9
Bowel	9	6.7	3	2.2
Narcotic	8	5.9	2	1.5
Anxiolytic	8	5.9	4	3.0
Combined Analgesic	7	5.2	0	0
Other Analgesic	1	0.7	1	.7
Antidepressant	1	0.7	4	3.0
Antipsychotic	1	0.7	6	4.5
Other Antipsychotic Agent	1	0.7	2	1.5
Diuretic	0	0.0	2	1.5

^a 172 Non-pharmacological treatments started and 37 non-pharmacological treatments stopped among 134 residents^b 129 Pharmacological treatments started and 50 pharmacological treatments stopped among 134 residents

Table 2
Predictors of Non-pharmacological and Pharmacological Treatments Started and Stopped ($n = 131$)

Model for Treatments Started					
Variable	Estimate	SE	95% CI	IDR	p value
Assessment driven intervention	1.101	0.324	(1.61, 5.61)	3.01	<.001
Evaluation driven follow through	0.177	0.056	(1.06, 1.33)	1.19	.003
Theta	0.317	0.114	--	--	.006
Model for Treatments Stopped					
Variable	Estimate	SE	95% CI	IDR	p value
Assessment driven intervention	1.189	0.525	(1.16, 9.31)	3.28	.026
Evaluation driven follow through	0.177	0.089	(1.00, 1.43)	1.19	.049
Theta	0.753	0.318	--	--	.019

Note: Models converged in 13 (treatments stopped) and 15 iterations (treatments started); df for all model parameters = 96