Inappropriate psychotropic medication uses in relation to nurse staffing in U.S nursing home residents with dementia

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Report Title: Nursing Staffing and State-level Dementia Training In Relation to Inappropriate Psychotropic Medication Use In Nursing Home Residents With Dementia

Author: Jung Min Yoon

Abstract

Psychotropics use to manage behavioral symptoms associated with dementia in nursing homes (NHs) has been the focus of policy attention due to their adverse effects. NHs can be flagged for inappropriate psychotropics use as a deficiency of care (F-tag 758). This study was to examine the occurrence of F-758 citations in relation to nurse staffing in U.S nursing residents with dementia. Certification and Survey Provider Enhanced Reporting data (n=13,318 NHs) from 2017-18 were used. Staffing measures included nursing hours per resident day (HPRD) and registered nurse (RN) skill-mix. 1,872 NHs received F-758 tags related to care of residents with dementia. NHs with greater RN HPRD had significantly lower odds of receiving F-758 tags (OR=0.59, 95% CI=0.47-0.73) and similar findings were found in NHs with greater RN skill-mix (OR=0.14, 95% CI=0.05-0.35). NHs need to be equipped with adequate RN staffing levels to reduce unnecessary psychotropics use.

1. Introduction

People with dementia represent the largest proportion of all nursing home (NH) residents in the US (Harris-Kojetin et al., 2016, 2019). Almost 50 percent of NH residents were diagnosed with Alzheimer's disease or other dementias (Harris-Kojetin et al., 2016, 2019), of which more than 60 percent had moderate or severe cognitive impairment (Center of Medicare & Medicaid Services, [CMS], 2015). Behavioral symptoms (also known as behavioral and psychological symptoms of dementia (BPSD) or neuropsychiatric symptoms) is a major component of dementia, as nearly all individuals with moderate to severe cognitive impairment exhibit one or more of these symptoms at some point during the course of their dementia (Lyketsos et al., 2011; Sampson et al., 2015).

Behavioral symptoms refers to distressing misperceptions, impairments in thought content and mood, and associated behaviors (Kales, Gitlin, Lyketsos, & Detroit Expert Panel, 2014) and include behaviors such as, agitation, aggression, apathy, anxiety, depression, wandering, socially inappropriate behavior, sleep disturbances, and resistiveness to care (Cerejeira, Lagarto, & Mukaetova-Ladinska, 2012; Kales, Gitlin, & Lyketsos, 2015; Lyketsos et al., 2011). Caring for NH residents with behavioral symptoms could result in physical and emotional distress and led to increased workload and staff turnover (van Duinen-van den Ijssel et al., 2017; Schmidt, Dichter, Palm, & Hasselhorn, 2012; Zwijsen et al., 2014).

According to the American Geriatrics Society (AGS), Beers criteria, non-pharmacological interventions should be used as a first line of management of behavioral symptoms (AGS, 2012, 2015). Non-pharmacological interventions were found to promote physical and emotional comfort and a decrease in behavioral symptoms, while minimizing adverse effects (Burke, Stein-Parbury, Luscombe, & Chenoweth, 2016; CMS, 2016; Kales et al., 2015; Yang, Lin, Wu, Chiu, Wang, & Lin, 2015; Zimmerman et al., 2014). Despite this, antipsychotic medications are often used off-label to manage behavioral symptoms. These

medications lack efficacy for behavioral symptoms and have been criticized as a form of chemical restraint that simply sedates residents without managing the behaviors (CMS, 2016; Long Term Care Community Coalition, 2012).

The use of antipsychotics for behavioral symptoms has raised concerns about the quality of dementia care and such use has been the focus of recent policy attention. The CMS National Partnership to Improve Dementia Care in Nursing Homes began in 2012, which has led to a steady decline in antipsychotic medication usage, now used in an average of 14.3% in 2019 (CMS, 2020a). However, inappropriate use remains, along with difficulty implementing non-pharmacological interventions for behavioral symptoms.

Nursing staff significantly influences the care quality for residents with dementia, as they have close contact and provide the most direct care for these residents. Previous research has examined dementia care quality in relation to nurse staffing, finding that lower staffing was significantly related to increased verbal or physical aggressions by residents with dementia (Cassie, 2012; Isaksson et al., 2009; Mukherjee et al., 2017). Nurse staffing levels were inversely associated with reliance on off-label antipsychotics use (Zuidema et al., 2011; Lee, Blegen, & Harrington, 2014; Lucas et al., 2014; Phillips, Birtley, Petroski, Siem, & Rantz, 2018). With fewer staff to care for residents, consistent implementation of behavioral interventions was considered too time-consuming, posing a barrier to daily care practices (Schnelle & Simmons, 2016).

Under federal law, NHs must have a full-time director of nursing, a registered nurse (RN) on duty for 8 consecutive hours 7 days a week, and one RN and one other licensed nurse (RN or licensed practical/vocational nurse (LPN/LVN)) for the two remaining shifts (Code of Federal Regulation, 2018a). CMS research suggested minimum nurse staffing levels of at least 0.75 RN hours per resident day (HPRD), 0.55 LVN/LPN HPRD, 2.8-3.0 certified nurse assistant (CNA) HPRD, and 4.1 total nursing HPRD to meet federally required care

standards (CMS, 2001). However, according to a Kaiser Health News analysis using the new CMS payroll-based journal (PBJ) system, 70 percent of NHs had lower staffing levels, a concern for providing quality care (Harrington, Schnelle, McGregor, & Simmons, 2016; RTI International, 2018).

One reason for low staffing levels, is the challenge of recruiting and retaining sufficient skilled nursing staff. NH positions have higher workloads, lower salaries, and higher turnover rates compared to acute care settings making them less attractive (Banaszak-Holl, Castle, Lin, Srivastava, & Spreitzer, 2015; Kayyali, 2014; Harrington & Edelman, 2018; RTI International, 2018). Inadequate staffing levels are of concern, as studies have found low levels associated with poorer quality of care, including higher restraint and indwelling catheterization rates, more pressure ulcers, urinary tract infections, re-hospitalizations, and pain and deficiency citations (Backhaus, Verbeek, van Rossum, Capezuti, & Hamer, 2014; Castle & Anderson, 2011; Dellefield, Castle, McGilton, & Spilsbury, 2015; Spilsbury et al., 2011).

Despite these concerns, there is a paucity of research on inappropriate psychotropics use in relation to nurse staffing levels across U.S NHs. The purpose of this study was to examine NH deficiency citations for inappropriate psychotropics use to manage behavioral symptoms in relation to nurse staffing levels. The deficiency citations dealt with all psychotropic medications that can affect the mental function. For quality of dementia care, the focus was mostly on antipsychotics, but in the past 5 years or so the CMS has tried to focus on other psychiatric medications such as antidepressants, mood stabilizers, anti-anxiety agents, and sedative hypnotics, in addition to antipsychotics. It was hypothesized that NHs with lower nurse staffing levels and RN skill-mix would be associated with greater odds of receiving deficiencies of care for inappropriate psychotropics use. Excessive workloads due

to inadequate staffing combined with challenging resident behaviors could result in greater reliance on psychotropics over non-pharmacological interventions to address these behaviors.

2.Theoretical/conceptual framework

This study was guided by Donabedian's structure-process-outcome quality of care model (Donabedian, 1972), which emphasizes the importance of the relationship between nursing staff and the facility to improve performance and dementia care quality. Donabedian defines structure as the professional and organizational factors associated with the provision of health care (e.g., physical facility, availability of medicines/equipment and staff training). Process represents all actions to provide healthcare for the patient (e.g., diagnosis, treatment, preventive care, patient education and interpersonal processes) and outcomes are the results of care provided (e.g. complications, disease, disability and death, patient satisfaction with care, patient's quality of life) (Donabedian, 1972). According to the model, improvements in the structure of care should lead to improvements in clinical processes and patient care outcomes. With regard to staffing factors associated with healthcare, inadequate staffing levels can increase the employee workload and adversely affect their job performance. This in turn can influence care quality.

3. Methods

3.1 Study design and data source: We used a cross-sectional design with a secondary data analysis of 2018 CASPER (Certification and Survey Provider Enhanced Reporting) data that includes all US Medicare or Medicaid-certified NHs governed by federal and state regulations (N=13,318 NHs). CASPER is a facility-level database updated annually by the CMS (Harrington et al., 2018). CASPER contains information on 1) facility characteristics (type of certification, bed capacity, type of ownership, geographical location and presence of

special care units, such as rehabilitation, dementia, dialysis), 2) staffing (number of nursing staff and nursing staff hours per resident day), 3) resident characteristics (proportion Medicare/Medicaid recipients, proportion with ADL limitations, psychological problems and other special care needs) and 4) NH deficiencies based on state surveyor evaluations of quality of care in the facilities (Harrington et al., 2018). CASPER has been widely used for quality evaluations and policy analyses (Li, Ye, Glance, & Temkin-Greener, 2014). CASPER data was obtained using a calendar year format which had information on all surveyed NHs during December 1, 2017 to December 31, 2018 (Cowles Research Group, 2019).

3.2 Sample: During the 13-month period, 2,796 NHs received a F-758 deficiency citation (total of 2,837 F-758 tags). We confined our analysis to those citations specifically indicating inappropriate psychotropics use for residents with Alzheimer's disease or other dementias (n=1,872). NHs with F-758 citations indicating inappropriate psychotropics use only for residents who had no cognitive impairment (n=794) and/or any mention of psychiatric disorders (e.g., bipolar disorder, schizophrenia) (n=130) were excluded.

3.3 Measures

3.3.1 Dependent variable: Inappropriate psychotropic medication use was determined using the CMS code that indicated the NH had received a deficiency citation (F-758 deficiency tag) for inappropriate psychotropic medication use (CMS, 2017; Simonson, 2018). When NH inspections are conducted by state surveyors, the F-758 tag is given when a facility violates the federally regulated care standards. According to regulations, a psychotropic drug refers to any medications associated with mental processes and behavior and includes antipsychotic, anti-depressant, anti-anxiety, and hypnotics (CFR. Title 42, §483.45 Pharmacy services, 2017). NHs must ensure that psychotropic medications are prescribed to treat a specific condition as indicated. Residents with psychotropic medications are to receive gradual dose reductions and appropriate non-pharmacological interventions, unless they are clinically

contraindicated. Furthermore, any PRN orders for psychotropic drugs should not be beyond 14 days without clinical indications from the prescribing physician or practitioner (mainly applied for benzodiazepines and antipsychotics) (CRF, 2017). The F-758 tag was measured as a dichotomous variable (no citation=0, yes citation(s)=1). Other studies support the reliability and accuracy of deficiency measures in measuring quality of care in NHs (Lin, 2014; Harrington, Swan, & Carillo, 2007; Zhang et al., 2009).

3.3.2 Independent variables: NHs are required to electronically submit direct care staffing information based on payroll (CMS, 2020b) under Section 6106 of the Affordable Care Act. This data can be used to assess staffing levels, employee turnover and tenure for all Medicare and Medicaid certified NHs, which can influence the quality of care. Payroll-based journal data were used to calculate nurse staffing measures. The journals provided daily information on the total number of working hours within 24-hour period for each staff member along with the number of residents for the same period.

Two nurse staffing measures were calculated: 1) nursing hours per resident day (HPRD) and 2) skill-mix (National Quality Forum, 2016). The HPRD was calculated by adding the total number of nursing staff working for a 24-hour period, then dividing this by the number of NH residents for the same period. An average HPRD was calculated for each type of staff: registered nurses (RN)/ licensed practical nurse (LPN)/ certified nurse assistant (CNA)/nurse aide. In addition, a total nursing staff HPRD was created to capture the number of productive hours worked by all nursing staff (RN, LPN, CNA, nurse aide). Skill-mix was assessed as the percentage of productive nursing hours worked by RNs (RN proportion) with direct patient care responsibilities divided by the total nursing hours worked by RNs, LPNs, CNAs, and nurse aides (National Quality Forum, 2016) to examine the impact on quality of dementia care. In several studies, the proportion of RNs was more strongly related to NH

quality of care, compared to the relationship between LVNs/LPNs and quality of care (Backhaus et al., 2014; Dellefield et al., 2015; Harrington et al., 2016).

3.3.3 Covariates: NH resident-related characteristics included the proportion of residents diagnosed with dementia, depression, psychiatric disorders, and exhibiting behavioral symptoms due to mental illnesses. These variables were created by dividing the number of residents with dementia, depression, psychiatric disorders, and behavioral symptoms by the total number of NH residents, respectively.

NH facility characteristics included facility size, geographic location, type of ownership, proportion of residents certified for Medicare and Medicaid services, and presence of dementia special care units (SCUs). The facility size refers to the number of certified beds and was divided into four categories: small (<50 beds), medium (50-99 beds), large (100-199 beds), and extra-large (≥200 beds) (CMS, 2015). The geographic location was assessed using CDC's classification based on each county's population (CDC, 2017). These are divided into small (noncore, micropolitan, and small-metro with < 250,000 residents), medium (medium-metro area with ≥ 250,000 to < 1 million residents) and large (large fringe and large central cities with ≥ 1 million residents). The type of ownership was classified into for-profit, government and not-for-profit. The proportion of residents certified to receive Medicare/Medicaid services was calculated by dividing the number of residents who received Medicare and/or Medicaid services by the total number of NH residents. The presence of SCUs was categorized as present or not.

3.4 Data analysis plan: Descriptive statistics were used to describe NH staffing, resident and NH facility characteristics. Chi-Square and t-tests were used to assess differences in proportion or means of each covariate between NHs with and without F-758 deficiencies.

The occurrence of F-758 citations was assessed using a generalized linear mixed model (GLMM) with binomial distribution (Meyers, Gamst, & Guarino, 2013). Prior to use of

GLMM, the intraclass correlation (ICC) was assessed among NHs within each state using the null model, to decide whether states need to be included as random effects, in order to account for the non-independence of NHs under the same regulations (clustering). GLMM models were applied as the ICC between NHs within states (13.6%) was above the maximum allowable amount of 1% (Garson, 2013). State was included as a random intercept to account for correlation due to clustering. Facility and resident-related characteristics were included in all regression analyses. All p-values were two-sided, and significant associations were defined as $p<.05$.

4. Results

About half of NHs were large or very large bed size (n=6,642, 49.9%), 41.4% (n=5,502) were in urban areas with ≥1 million residents, and more than half (n=9,490, 71.3%) were for-profit. About 14% of NHs (n=1,873) had dementia SCUs. The average of the proportion of NH residents with dementia was 0.45. Overall, 15.1% of NHs received a citation for inappropriate use of psychotropic medications in residents with Alzheimer's disease or other dementias (Table 1). The total nursing HPRD averaged 3.48±0.88 and the average licensed nursing (RN+LPN) HPRD was 1.26±0.51 for an average RN skill-mix of 0.12±0.08.

Table 1. Descriptive Characteristics of NHs across states in 2018 (N=12,394)

Variables	**n (%)**	**M±SD***
Presence of F-758 tags*		
No	10522 (84.9)	
Yes	1872 (15.1)	
Hours per resident day		
Registered Nurse		0.45±0.41
Licensed Practical Nurse		0.81±0.35
Certified Nursing Assistant		2.19±0.55
Nurse aide		0.03±0.09
Total all nursing staff		3.48±0.88
RN skill-mix		0.12±0.08
Facility size		
Small (<50 beds)	1544 (11.6)	
Medium (50 to 99 beds)	5132 (38.5)	

Large (100 to 199 beds)	5922 (44.5)	
Very large (≥200 beds)	720 (5.4)	
Geographic location		
Small (areas with <250,000 residents)	5066 (38.2)	
Medium (areas with ≥ 250,000 to <1 million residents)	2707 (20.4)	
Large (areas with ≥1 million residents)	5502 (41.4)	
Type of ownership		
For-profit	9490 (71.3)	
Government	860 (6.5)	
Not-for-profit	2967 (22.3)	
Dementia SCU		
No	11445 (85.9)	
Yes	1873 (14.1)	
Proportion of residents with:		
dementia		0.45±0.17
depression		0.37±0.23
psychiatric disorders		0.33±0.19
mental behavior		0.22±0.19
Medicare		0.14±0.14
Medicaid		0.60±0.24

*Deficiencies related to inappropriate psychotropics use among residents with dementia

NHs that had no F-758 citations had significantly higher RN staffing HPRD (p<.001), CNA HPRD (p=.015), total nursing HPRD (p<.001) and RN skill-mix (p=.003), whereas NHs with F-578 deficiency citations had higher nurse aide HPRD (p<.001) (Table 2). There were no significant associations between the occurrence of F-758 citations and facility characteristics, except having a dementia SCU. There was a significantly higher percentage of F758 citations in NHs with dementia SCUs compared to those without dementia SCUs (p=.020). NHs with F-758 tags were significantly more likely to have residents with dementia (p=.046), depression (p<.001), psychiatric disorders (p=.037), or mental behaviors (p=.008), compared to those with no F-758 citations. NHs with F-758 tags had significantly lower proportion of residents with Medicare (p<.001), and significantly higher proportions of residents with Medicaid (p=.005).

Table 2. Mean or proportion differences in nurse staffing levels, state-level in-service dementia training requirements, and NH facility and resident characteristics between NHs with and without F-758 tags (N=12,394)

Variables	**NHs with F758, n (%) or M±SD**		**X^2 or t**	**p value**
	No	**Yes**		
Hours per resident day:				
Registered Nurse	0.45±.0.44	0.41±0.29	5.464	<.001

Licensed Practical Nurse	0.81±0.35	0.80±0.32	1.552	.121
Certified Nursing Assistant	2.19±0.55	2.16±0.51	2.444	.015
Nurse aide	0.03±0.09	0.04±0.11	-3.512	<.001
Total nursing staff	3.48±0.89	3.40±0.73	4.140	<.001
RN skill-mix	0.12±0.08	0.11±0.07	2.996	.003
Facility size				
Small	1238 (86.4)	196 (13.6)	4.943	.176
Medium	4007 (84.2)	752 (15.8)		
Large	4695 (85.0)	830 (15.0)		
Very large	582 (86.0)	95 (14.0)		
Geographic location				
Small	4023 (84.5)	739 (15.5)	2.717	.257
Medium	2178 (85.9)	358 (14.1)		
Large	4280 (84.7)	774 (15.3)		
Type of ownership				
For-Profit	7456 (84.9)	1327 (15.1)	1.814	.404
Government	679 (83.4)	135 (16.6)		
Non-For-Profit	2386 (85.3)	410 (14.7)		
Dementia SCU				
No	9045 (85.2)	1571 (14.8)	5.392	.020
Yes	1477 (83.1)	301 (16.9)		
Proportion of residents				
Dementia	0.45±.0.17	0.46±0.16	-1.995	.046
Depression	0.37±0.24	0.39±0.23	-3.674	<.001
Psychiatric disorders	0.33±0.19	0.34±0.18	-2.084	.037
Mental behaviors	0.21±0.19	0.23±0.19	-2.648	.008
Medicare	0.14±0.14	0.12±0.12	4.544	<.001
Medicaid	0.59±0.24	0.61±0.22	-2.789	.005

NHs with higher RN HPRD were significantly associated with a lower odds of receiving F-758 citations (OR=0.59, 95% CI=0.47-0.73, p<.001) controlling for facility and resident-related characteristics (Table 3). NHs with greater RN skill-mix also were significantly associated with lower odds of F-758 citations (OR=0.14, 95% CI=0.05-0.37, p<.001). No significant associations between F-758 tags and LPN/CNA/nurse aide/total HPRD were noted.

Table 3. Association between F-758 tags and nursing staffing in relation to residents with dementia

Variables	**Adjusted* Odds Ratio**	**95% Confidence Interval**		**p value**
		Lower	**Upper**	
Registered Nurse HPRD*	0.59	0.47	0.73	<.001
Licensed Practical Nurse HPRD	1.16	0.94	1.43	.169
Certified Nursing Assistant HPRD	0.91	0.79	1.03	.139
Nurse aide HPRD	1.37	0.75	2.49	.304
Total HPRD	0.90	0.81	1.00	.053
RN Skill-mix	0.14	0.05	0.37	<.001

*All odds ratios adjusted for facility characteristics (facility size, geographic location, type of ownership and the presence of dementia special care units), and resident characteristics (the proportion of residents with dementia/depression/psychiatric disorders/mental behaviors and the proportion of residents with Medicare/Medicaid)
* HPRD: Hours per resident day

5. Discussion

Our findings indicated that NHs have a greater likelihood of being cited for inappropriate psychotropic medication use if they have low RN staffing levels, which was consistent with previous study findings (Lee et al., 2014; Lucas et al., 2014; Phillips et al., 2018). According to Phillips and colleagues (2018), one unit increase in RN HPRD was associated with decreased odds of antipsychotic prescription by 52% for residents with dementia. They also found that RN HPRD above the CMS recommendation for minimum levels (0.75 hours) lowered the odds of antipsychotic medication use. RNs played an important role in improving quality of care, since they provide care that requires higher levels of decision making, critical thinking, and clinical judgment (Vogelsmeier et al., 2015; Vogelsmeier et al., 2017).

Our study findings found that a higher RN skill-mix was also significantly associated with having lower odds of receiving a F-758 citation. The proportion of professional licensed nurse staff, not just the number of staff per patient, is also important for dementia care. Lower RN staff proportion was more related to quality of care than total nurse staffing levels (Harrington, Schnelle, McGregor, & Simmons, 2016). For dementia care, RNs could help with clearly identifying the target behavioral symptom, ruling out acute issues such as delirium, adopting non-pharmacological strategies, and then referring for further consideration of psychotropics use. RNs may have greater concerns on patients' safety and be aware that psychotropic medications should be used only for those with behaviors resistant to non-pharmacological interventions (Dyer, Harrison, Laver, Whitehead, & Crotty, 2018). RNs may have better knowledge of the importance of addressing unmet needs and triggering

determinants of behavioral symptoms to provide proper non-pharmacological interventions, which can lead to decline in off-label use of psychotropics (Birtley, 2016; Richter, Meyer, Mohler, & Kopke, 2012).

Our study found that greater LPN staffing levels had no significant associations with the occurrence of F-758 deficiency citations. In contrast, another study found that higher LPN staffing levels were related to the greater prescription of psychotropics (Lucas et al., 2014). The role of LPNs in many long-term care settings tends to focus more on completing necessary care tasks such as medication administration, treatments and documentation, whereas the RNs are accountable for identifying resident needs, incorporating these needs into the care plan, and evaluating nursing care outcomes (Vogelsmeier, Scott-Cawiezell, & Pepper, 2011). This different approach and training may lead to different medication reconciliation practices, including psychotropics use for behavioral symptom management. To address this, additional dementia training should be provided for LPNs to enhance their awareness of importance of non-pharmacological interventions and adverse effects of unnecessary psychotropics use.

There was no significant association between CNA or nurse aide staffing levels and deficiency citations on inappropriate psychotropics use, although they provide much of the hands-on care and directly influence the quality of life in persons with dementia. Some studies also found no significant relationships between CNA staffing levels and dementia care quality (Gräske, Schmidt & Wolf-Ostermann, 2019; Phillips et al., 2018). Gräske et al. (2019) pointed out the need to examine the quality of direct interaction between caregivers and residents, instead of only staffing levels. Successful caregiving is not merely dependent on the length of time caring for residents, rather it may be more related to caregiver's attitude and interaction style with individuals with behavioral symptoms during care interventions. Providing dementia training was positively associated with improved interactions between

staff and residents and the way staff behaved towards residents (Spector, Orrell, & Goyde, 2013; Grøndahl, Persenius, Bååth, & Helgesen, 2017). In addition to training, consistent mentoring and motivation should be conducted to evaluate resident-staff interaction and promote direct care staff to implement behavioral approaches (Resnick et al., 2018). Thus, along with having adequate nursing staffing levels, it is important to provide ongoing training, motivating, coaching, and mentoring for these assistive personnel, and staff need to be acknowledged for practicing in a new way.

This study supports the importance of having proper supervision by licensed nursing personnel, especially RNs, for assistive nursing personnel. In addition, RNs provide care that requires more complex knowledge and skills and are responsible for evaluating nursing care delegated to assistive nursing personnel, to ensure that residents are safe and receive appropriate care (Vogelsmeier, Scott-Cawiezell, & Pepper, 2011). RNs also evaluate and modify care plans in consideration of overall nursing outcomes performed by nursing assistive personnel (Corazzini et al., 2010). Proper delegation and supervision through constructive feedback are key areas to promote cooperation and teamwork between licensed nursing personnel and nursing assistive personnel (Riisgaard, Nexøe, Le, Søndergaard, & Ledderer, 2016). Prior to assigning nursing tasks, RNs may need to educate nursing assistive personnel to enhance their knowledge on care for behavioral symptoms and the importance of implementing non-pharmacological interventions. Successful teamwork within nursing staff personnel served as an essential factor of the high quality of NH dementia care (Coates & Fossey, 2016; Graf et al., 2016).

This study was limited due to lack of data on potentially important covariates. CASPER provides information at the facility level, so findings did not consider residents' individual factors that could be related to higher psychotropics use. Higher psychotropics prescription rates were associated with older resident age (Kim, Chaing, & Kales, 2011),

history of comorbid psychiatric disorders (Larrayadieu et al., 2011; Nishtala, McLachlan, Bell, & Chen, 2010) and dementia severity stage (Eggermon, De Vries, & Scherder, 2009; Nijk, Zuidema, & Koopmans, 2009).

6. Conclusions

This study delineated the importance of RN staffing to provide optimal quality of care for NH residents with dementia. This study suggested the need for higher RN staffing levels and RN skill-mix to reduce the odds of deficiency citations for inappropriate psychotropics use. Due to the adverse health outcomes associated with use of psychotropics in older adults, it is important that NHs be equipped with adequate RN staffing levels to facilitate implementation of non-pharmacological interventions and reduce unnecessary use of psychotropic medications. The nursing staff characteristics associated with inappropriate psychotropics use could serve as a basis for meaningful interventions to improve the quality of care in NHs.

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